Decisions and Orders

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Massachusetts Energy Facilities Siting Board

VOLUME 20

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COMMONWEALTH OF MASSACHUSETTS
ENERGY FACILITIES SITING BOARD

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FINAL DECISION

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Presiding Officer
May 16, 2014

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ABBREVIATIONS

AAL	annual average loading
ACEC	Area of Critical Environmental Concern
ACOE	U.S. Army Corps of Engineers
APL	annual peak loading
ASAPP	Archaeological Site Avoidance and Protection Plan
Berkshire Power	Berkshire Power Development, Inc., D.P.U. 96-104 (1997)
Boston Gas	Boston Gas Company, D.T.E. 00-24 (2001)
Cape Wind	Cape Wind Associates LLC, 15 DOMSB 1 (2005)
CELT	Capacity, Energy, Loads, and Transmission
CLL	critical load level
CMP	Conservation and Management Permit
Company	New England Power Company d/b/a National Grid
CVP	Certified Vernal Pool
DAR	Department of Agricultural Resources
dBA	A-weighted decibels
DCR	Massachusetts Department of Conservation and Recreation
Department	Massachusetts Department of Public Utilities
DG	distributed generation
DOMSB	Decisions and Orders of Massachusetts Energy Facilities Siting Board
DOMSC	Decisions and Orders of Massachusetts Energy Facilities Siting Council
DR	demand response
EE	energy efficiency

EFSB	Energy Facilities Siting Board
FCA	Forward Capacity Auction
FCM	Forward Capacity Market
GHG	Greenhouse Gas
G.L. c.	Massachusetts General Laws chapter
GSRP	Western Massachusetts Electric Company, EFSB 08-2/D.P.U. 08-105/08-106
Hampden County	New England Power, EFSB 10-1/D.P.U. 10-107/10-108
HQ Phase II	Hydro-Quebec Phase II direct-current transmission line
Hybrid Alternative	115 kV upgrades in Massachusetts for IRP in lieu of a new 345 kV line in Massachusetts
IRP	Interstate Reliability Project
ISO-NE	ISO New England
kV	kilovolts
kW	kilowatt
Lower SEMA	NSTAR Electric Company, EFSB 10-2/D.P.U. 10-131/10-132 (2012)
MassDEP	Massachusetts Department of Environmental Protection
MECo/Westford	Massachusetts Electric Company, D.T.E. 01-77 (2002)
MESA	Massachusetts Endangered Species Act
mG	Milligauss
MHC	Massachusetts Historical Commission
MODF	Mineral Oil Dielectric Fluid
Modified Project	Connecticut and Rhode Island portions of IRP without upgrades in Massachusetts
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
NY Central Railroad	New York Central Railroad v. Department of Public Utilities, 347 Mass. 586 (1964)
O&M	Operation and Maintenance
OOS	out of service
Project	Massachusetts portion of Interstate Reliability Project
PSC	Public Service Corporation
PVP	Potential Vernal Pools
QC	Qualifying Capacity
Queue	ISO-NE Interconnection Queue
RISE	Rhode Island State Energy Generation Station
ROW	right-of-way
Russell	Russell Biomass, LLC, 17 DOMSB 1 (2009)
Save the Bay	Save the Bay v. Department of Public Utilities, 366 Mass. 667 (1975)
Section 72 Petition	NEP petition pursuant
SF_6	sulfur hexafluoride
SHPO	Massachusetts State Historic Preservation Officer
Siting Board	Massachusetts Energy Facilities Siting Board
Siting Board Petition	NEP petition pursuant to c. 164 § 69 J

Study Area	Massachusetts, Rhode Island, and Connecticut
USEPA	United States Environmental Protection Agency
VMP	Vegetative Management Plan
YOP	Yearly Operational Plan
Zoning Petition	NEP petition pursuant to c. 40A § 3

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", "Company", or "Petitioner") to construct a new 15.4-mile overhead 345 kilovolt ("kV") transmission line along existing right-of-way ("ROW") between the existing Millbury No. 3 Switching Station and the Rhode Island border with Massachusetts. Pursuant to G.L. c. 164, § 72, the Siting Board hereby approves, subject to the conditions set forth below, the Petition of NEP for a determination that the proposed 345 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 for individual and comprehensive exemptions from the zoning bylaws of the towns of Millbury, Sutton, Northbridge, Uxbridge, and Millville, in connection with the proposed transmission facilities, as described herein.

I. INTRODUCTION

A. Summary of the Proposed Transmission Project

The proposed project in Massachusetts is part of a larger three-state transmission proposal, known as the Interstate Reliability Project ("IRP"), which is designed to address reliability needs in southern New England (Exh. NEP-1, at 1-1). The Massachusetts portion of IRP is a proposed overhead 345 kV transmission line along existing ROW, extending approximately 15.4 miles from a terminus at the Millbury No. 3 Switching Station in Massachusetts through the towns of Millbury, Sutton, Northbridge, Uxbridge, and Millville to the Rhode Island border where it continues for 4.8 miles to the West Farnum Substation; an additional 54.5-mile 345 kV segment of IRP connects the West Farnum Substation in Rhode Island with the Card Street Substation in Lebanon, Connecticut. IRP also includes additions to existing 345 kV and 115 kV facilities, and improvements to the Millbury No. 3 Switching Station and other stations in Rhode Island and Connecticut. The project's ROW in Massachusetts is presently occupied for most of its length by two 115 kV transmission lines and by the remaining structures of a double-circuit 69 kV transmission line that was taken out of service in the 1990s.

The estimated cost of the Massachusetts portion of IRP ("Project") is $100.1 million (2011$); the estimated cost of the entire IRP is $542 million (Exh. NEP-1, at 5-73 and app. 1-5, at 11). Figure 1 below shows the location of the Massachusetts and Rhode Island portions of IRP. Siting agencies in Connecticut and Rhode Island have already approved their jurisdictional segments of IRP. 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 is in Section V.B. The Company estimates that construction of IRP would be completed by the end of 2015 (id. at 1-4).

Figure 1. The Interstate Reliability Project (MA and RI portions only)

B. Procedural History

On June 21, 2012, NEP filed three petitions with the Siting Board and the Massachusetts Department of Public Utilities ("Department") relating to the IRP. In the first petition, the Company requests approval of the Project, pursuant to G.L. c. 164, § 69J ("Siting Board Petition"). A second petition seeks individual and comprehensive exemptions from the zoning bylaws of the communities along the preferred route for the Project pursuant to G.L. c. 40A, § 3 ("Zoning Petition"). The third petition requests approval for IRP pursuant to G.L. c. 164, § 72 ("Section 72 Petition").

The Siting Board Petition was docketed as EFSB 12-1, the Zoning Petition as D.P.U. 12-46, and the Section 72 Petition as D.P.U. 12-47. Pursuant to the Company's motion, on June 27, 2012, the Chair 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 12-1/D.P.U. 12-46/12-47. The Siting Board conducted a single adjudicatory proceeding and developed a single evidentiary record for the consolidated petitions ("Petitions").

The Siting Board held two public hearings, one in Uxbridge and one in Milford, to receive comments on the Project. The Presiding Officer's ruling of September 25, 2012 granted intervenor status to the Attorney General, ISO New England ("ISO-NE"), Louis C. Tusino, trustee of the Pembroke Realty Trust, and Matthew Buskill.

The Petitioner presented the testimony of the following eleven witnesses in support of the Petitions: David Beron, Diedre Matthews, Gabriel Gabremichael, Mark Stevens, Judah Rose, Daniel McIntyre, Erin Whoriskey, James Durand, John Bleyer, Dr. William Bailey, and Robert Longden, Esq. ISO-NE presented the testimony of Stephen Rourke, Brent Oberlin, Steven Judd, and Pradip Vijayan.

The Siting Board held eight days of evidentiary hearings during the period of February 28, 2013 to August 29, 2013. The hearing period was delayed by several months because of the lengthy time required for responses to numerous information requests issued by Siting Board staff. The Company, the Attorney General, and ISO-NE filed briefs on November 1, 2013. The Issues Memorandum, prepared by Siting Board staff, was issued on January 23, 2014; on

January 30, 2014, the Siting Board held a public meeting directing the staff to prepare a tentative decision approving the Company's Petitions with conditions.

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 345 kV transmission line is clearly a "facility" with respect to Section 69J. 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 an applicant to include in its petition an analysis of need for the proposed facility. Here, the Petitioner asserts that the Project is needed for reliability purposes (Exh. NEP-1, at 1-11).[1]

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 d/b/a National Grid/Hampden County Reliability Project, EFSB 10-1/D.P.U. 10-107/10-108, at 5 (2012) ("Hampden County"); New England Power Company, 7 DOMSB 333, at 346-348 (1998).

To determine whether system improvements are needed, the Siting Board: (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. NSTAR Electric Company, EFSB 10-2/D.P.U. 10-131/10-132, at 5 (2012) ("Lower SEMA"); Hampden County at 5.

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

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[1] 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 Notice of Inquiry and Rulemaking, D.T.E.98-84/EFSB 98-5 (2003), Massachusetts electric companies, including NEP, 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. Hampden County at 5-6. 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 to which it applies. A forecast is considered reliable if its data, assumptions and judgments provide a measure of confidence in what is most likely to occur. Lower SEMA at 5; Hampden County at 6.

B. Understanding the Existing Transmission System in the Study Area

The adequacy of transmission in New England is evaluated, in part, by studying the ability of the transmission system to serve load in certain subregions after the the loss of significant generation in the subregion as well as two additional unplanned contingencies (either transmission- or generation-related). In this case, the study area used by ISO-NE and the Company in their assessment of need consists of the three southern New England states of Massachusetts, Rhode Island, and Connecticut (Exh. NEP-1, app. 2-5, at 1).[2] Within the study area, ISO-NE analyzed the extent to which transmission that serves subregions is capable of sustaining loads when significant generation (one or more units) is assumed to be out of service ("OOS") followed by the unplanned loss of two significant additional resources (generation and/or transmission).

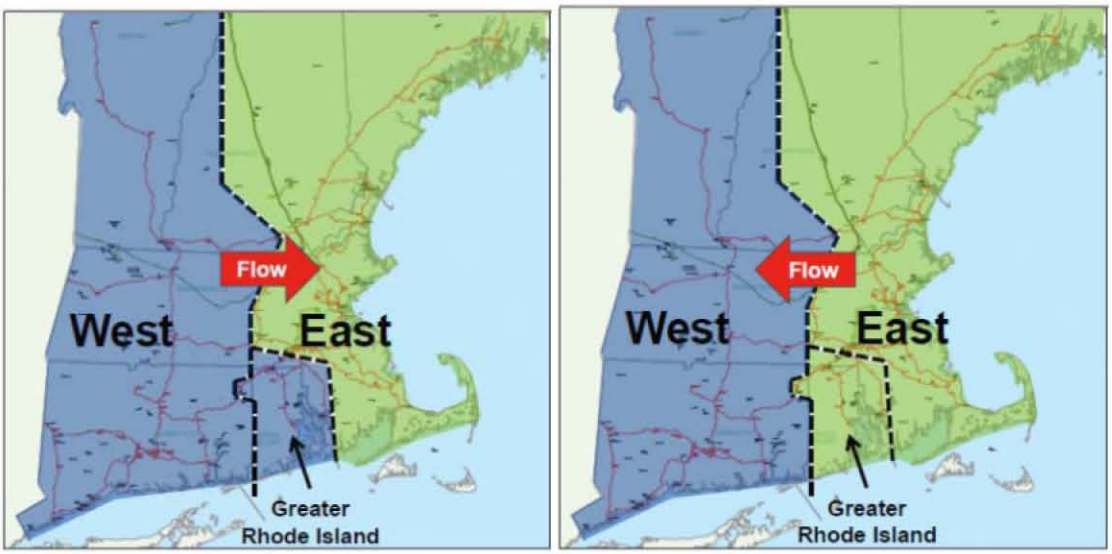
Figure 2 provides a geographical representation of the eastern and western New England subregions, which ISO-NE studied as part of an overall assessment of the need for new transmission in southern New England. The major high voltage transmission lines that serve as bridges between subregions are known as "interfaces" (Exh. NEP-1, at 2-3). The West-to-East interface divides New England approximately in half, separating the major load centers of eastern Massachusetts from those in Connecticut and western Massachusetts (id. at 2-3). When net power flows in southern New England go towards load centers in Connecticut and western

[2] ISO-NE plays a central regional role in performing detailed transmission planning studies for the region, and in supporting petitions for approval of new transmission resources before the Siting Board (see Exh. ISO-1, at 8-9).

Massachusetts, generation located in Rhode Island may be constrained from also flowing to the west due to loading limitations on the existing transmission lines (id. app. 2-5, at 7). Similarly, when net power flows go towards eastern Massachusetts, generation in Rhode Island may be constrained from also flowing to the east. As a result, Greater Rhode Island is assumed to be in the east when studying east-to-west flows, and is assumed to be in the west when studying west-to-east flows (id.).

There are three 345 kV transmission lines that cross the East-to-West Interface, two of which are shown in Figure 3 below (the third one is in southern New Hampshire).[3] Two 230 kV transmission lines and a small number of 115 kV transmission lines also cross the interface; however, these smaller transmission lines add only marginally to the transfer capability across the interface (Exh. NEP-1, at 2-4).

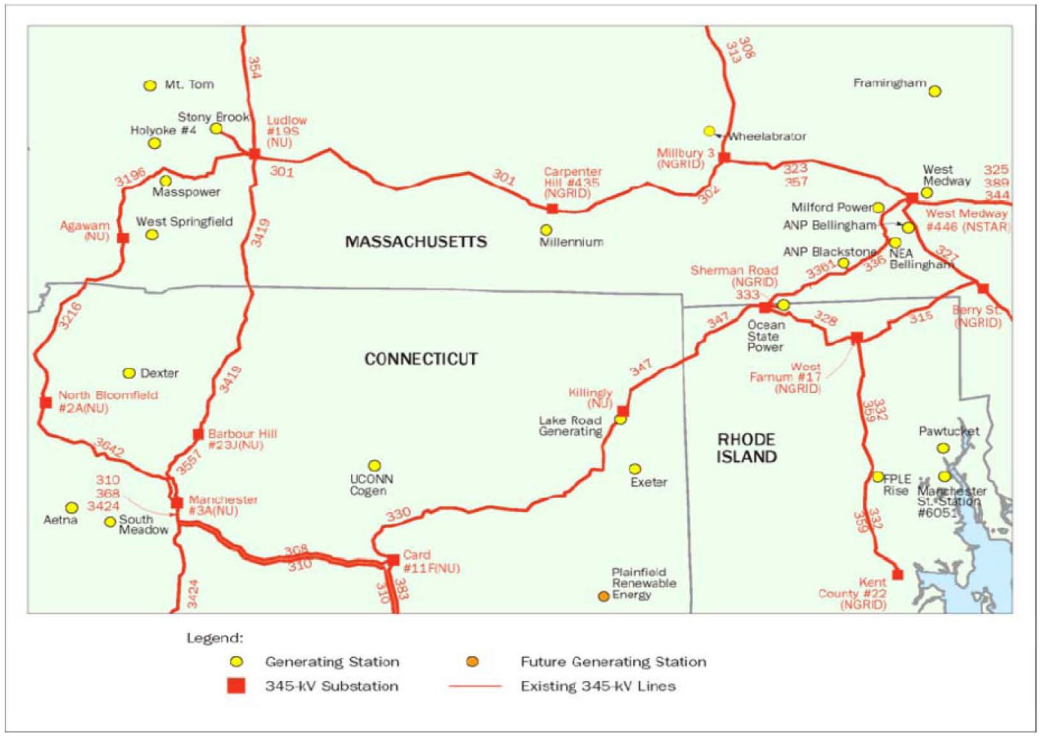
Figure 2. New England West-to-East and East-to-West Interfaces



Source: Exh. NEP-1, app. 2-5, at 8.

[3] By comparison, the West-to-East Interface includes one additional 345 kV transmission line, Line 315 from Rhode Island to Massachusetts (see Figures 2 and 3).

Figure 3. Existing 345 kV System in the Central Part of Southern New England



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

C. Description of the 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 2-2). 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 ISO-NE (id.). 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 Company is generally required to plan for system upgrades that would keep the transmission system in compliance with the applicable criteria (id.).

An N-1 contingency, as specified by NERC, NPCC, and ISO-NE standards and criteria, is characterized as an unplanned single event causing the loss of one or more system elements, such as a generator, a transmission line, or a bus section (Exh. NEP-1, at 2-1, n.1). The

occurrence of two unplanned and unrelated outages within a short period of time is referred to as an "N-1-1" contingency event (id.). ISO-NE plans the bulk power transmission system to be able to withstand unplanned N-1 and N-1-1 events by modeling system impacts of unplanned contingencies.[4] The modeling results demonstrate whether contingencies could cause certain elements of the transmission system to become loaded beyond their temperature-based capability ratings (i.e., thermal violations) or system voltages to fall outside the range of acceptable limits (i.e., voltage violations) (id. at 2-9).

Currently, NERC transmission planning standards are prescriptive concerning what specific N-1 and N-1-1 contingencies should be studied in a transmission planning study. However, NERC standards do not provide similar prescriptive detail about the "base case" conditions (e.g., generator availability) that should be used in planning studies before N-1 and N-1-1 contingencies are applied. ISO-NE has suggested that NERC provide greater specificity concerning the critical conditions that are properly included or excluded in a base case (Tr. 5, at 840).[5] In the absence of such NERC standards, ISO-NE asserts that it is not required by NERC to develop or evaluate sensitivity cases for use in a planning model that would alter the levels of stress incorporated in a base case (id. at 840-842). Instead, ISO-NE maintains that it is appropriate for ISO-NE to develop a base case that includes as much stress as can reasonably be expected to occur and use it to identify the relevant system impacts (id. at 841-842).

2. Load Forecasting Methodology

The load forecast used in the Company's Petitions relies upon a ten-year planning horizon based on ISO-NE's 2012 Capacity, Energy, Loads, and Transmission ("CELT") Report (Exh. NEP-1, app. 2-5, at 2). During the course of the proceeding the Company updated its

4 The bulk electric system broadly includes all transmission facilities that are necessary for operating the interconnected transmission network. See North American Electric Reliability Corporation, 146 FERC ¶ 61,199, at ¶ 4 (2014).

5 FERC has also expressed its concern that allowing complete discretion to the transmission modeler over base case conditions "does not provide any parameters or criteria for such an entity to define the base case in a rational and consistent manner" Mandatory Reliability Standards for the Bulk-Power System, 117 FERC ¶ 61,084 at ¶ 1046 (2006).

power flow analysis for certain base cases to reflect the results of the 2013 CELT Report (RR-EFSB-64).

The ISO-NE load forecast used for transmission planning studies is a 90/10 forecast (i.e., where the summer peak temperature has a ten percent chance of being exceeded) that focuses on peak demand load levels during the ten-year horizon from 2013 to 2022 (Exh. NEP-1, app. 2-5, at 19). ISO-NE develops a 10-year econometric forecast for New England and for each of the six New England states. Western Massachusetts Electric Company, EFSB 08-2/D.P.U. 08-105/08-106 at 31 ("GSRP"). ISO-NE's load forecast relies upon regression analyses, which relate historical electricity use to historical demographic and economic measures such as average income per household, the total number of households, real income and gross state product (id.). The forecast then uses individual forecasts of the same economic measures to determine expected future electricity use and demand levels (id.).

ISO-NE's forecast accounted for demand response ("DR") resources, which are split into two categories: passive DR and active DR (Exh. NEP-1, app 2-5, at 20). Active DR is dispatchable peak load reduction used when a forecasted or real-time capacity shortage occurs on the system (id.). Passive DR is the reduction of demand resulting from energy efficiency ("EE") programs (id.). ISO-NE modeled demand reductions due to DR and EE at the levels of the most recent forward capacity auction ("FCA") at the time of the study (FCA-6) (id.).[6]

The Company has provided sufficient information to permit a general understanding of its forecasting method and has provided evidence that it uses appropriate historical data, independent variables, and quantitative methods. Therefore, the Siting Board finds that NEP's load forecast is reviewable, appropriate, and reliable.

3. The Company's Base Case Assumptions

ISO-NE developed three individual base cases that reflect stressed conditions for net power flows into eastern New England, western New England, and Rhode Island. ISO-NE then modeled the effects of N-1 and N-1-1 transmission contingencies in each of these stressed

[6] ISO-NE now forecasts EE over a ten-year forecast period, as compared to its historical approach that incorporated EE into its forecast using the results of the most recent FCA exclusively (Exh. NEP-1, app. 2-5, at 20).

subregions to determine whether forecasted loads under summer 90/10 peak conditions could reliably be served through 2022 (Exh. NEP-1, app. 2-5, at 2).[7] ISO-NE also modeled two sensitivity cases for the study year 2022 (id.).

ISO-NE typically uses a generic approach to establishing the level of stress to apply to a study area prior to modeling N-1 and N-1-1 transmission contingencies. Since 2006, this generic approach has assumed that the two generation units that would have the greatest impact on the modeling results would be assumed out of service (Exhs. EFSB-19; EFSB-41, at 14; NEP-1, app. 2-4, at 28).[8] In this case, in addition to the "two generator out" assumption, ISO-NE developed its base case for resource availability using a host of generator and transmission assumptions shown below in Table 1.

Table 1. ISO-NE Base Case Common Resource Availability Assumptions

Base Case Assumption	ISO-NE Reason for Assumption
Hydro-Quebec Phase II, New Brunswick and New York ties assumed out of service.	Reflects absence of long-term contracts that ISO-NE maintains are necessary to assume the availability of power flowing over the ties (Exh. EFSB-ISO-141, at 4).
Quick start units de-rated by 20 percent (specific units assumed out of service to reflect the 20 percent de-rating).	Due to the infrequent use of the units, they have historically not always responded when dispatched (Exh. NEP-1, app. 2-5, at 26).
Wind power output de-rated by 95 percent of nameplate capacity for onshore locations, and the lesser of the Qualifying Capacity or 80 percent of wind capacity for offshore locations.	Based on forecasted level of output on a hot summer day (Exh. EFSB-41, at 14).
Run-of-the-river hydro de-rated by approximately 90 percent of nameplate capacity.	Low hydro assumptions were adopted to represent dry summer conditions and limited flow (Exh. EFSB-41, at 14; see also Exh. EFSB-ISO-141).
Pumped storage facilities de-rated by 50 percent of capacity.	Reflects potential output limitations caused by inability to complete pumping operations during off-peak hours (Exh. EFSB-ISO-41, at 15).
Resources that have dynamically de-listed in multiple (more than one) auctions assumed out of service.	This approach is intended to represent potential generation retirements (Exh. EFSB-ISO-41, at 15).
DR de-rated by 25 percent; real-time emergency generation de-rated by 100 percent.	DR based on actual performance data in 2009 (Exh. EFSB-ISO-9). Real-time emergency generation excluded because it is outside of normal system planning (Exh. EFSB-ISO-90).

[7] ISO-NE conducted multiple need assessments over the last several years, with the most recent study entitled "Follow-Up Analysis to the 2011 New England East-West Solution (NEEWS): Interstate Reliability Project Component Updated Needs Assessment," dated September 2012 (Exh. NEP-1, app. 2-5).

[8] The Company maintains that having *at least* two generators out is a reasonable assumption for purposes of the IRP study because of the large amount of generation and load requirements in eastern and western New England (Exh. EFSB-N-21).

a. Eastern New England Base Case

To model stress on transmission lines bringing power into the eastern New England load zone, ISO-NE assumed certain generation out of service in the load zone, thereby requiring the transmission system to deliver power from outside eastern New England. In its base case evaluation of this scenario, ISO-NE assumed the two largest resources serving the eastern New England load zone were out of service – the Hydro-Quebec Phase II direct-current transmission line ("HQ Phase II") and Seabrook Nuclear Station (Exh. NEP-1, app. 2-5, at 26). ISO-NE also justified its decision to assume HQ Phase II as out of service because ISO-NE interprets its tariff as requiring that all imports from outside its control area be modeled at zero megawatts in the absence of long-term contracts (Exhs. EFSB-N-141, at 4; EFSB-ISO-185). In addition, ISO-NE assumed a third resource as out of service – New Brunswick Power – as it too lacks a long-term contract for capacity with transmission or distribution companies in eastern New England. ISO-NE therefore assumed that imports from New Brunswick Power were unavailable in its base case (Exh. EFSB-ISO-141, at 4). Table 2 below sets forth the primary sources of unavailable generation and transmission.

Table 2. Base Case Conditions in Eastern New England

Out-of-Service Resources Assumed by ISO-NE	Capacity
Seabrook Nuclear Station out-of-service	1,245 MW
HQ Phase II out-of-service	1,400 MW
New Brunswick Power imports unavailable[9]	700 MW
Quick start generation out of service (represents 20 percent of 643 MW total quick start capability located in eastern New England)	129 MW
90 percent of run of river hydro not available	365 MW
Salem Harbor assumed retired	749 MW
Total resources assumed out of service	**4,588 MW**
Total resources in eastern New England assumed for 2023 (including New Brunswick Power (700 MW) and HQ Phase II (1400 MW))	**16,423 MW**

Sources: Exhs. NEP-1, app. 2-5, at 26; EFSB-ISO-90; RR-EFSB-64, at 3.

[9] A single sensitivity case was also run in which the only change to the assumptions shown in Table 2 was the availability of an additional 700 MW from New Brunswick Power, which is its typical operational limit (Exh. NEP-1, app. 2-5, at 2).

b. Western New England Base Case

To stress the East-to-West interface, generation was modeled as reduced in western New England. ISO-NE modeled four primary generating units as out of service, including the two largest generating units, Millstone Nuclear Station Units 2 and 3, together with Vermont Yankee and Berkshire Power (Exh. NEP-1, app. 2-5, at 26). ISO-NE assumed the Berkshire Power as being out of service "to reflect the equivalent demand forced outage rate for western Massachusetts generation" and it also assumed Vermont Yankee as being out of service because of the significant uncertainty surrounding its continued operation (id. at 24, 26-27).[10] Table 3 summarizes the base case conditions assumed for western New England.[11]

Table 3. Base Case Conditions in Western New England

Out-of-Service Resources Assumed by ISO-NE	Capacity
Millstone Nuclear Station Unit 3 assumed out of service	1,225 MW
Millstone Nuclear Station Unit 2 assumed out of service	877 MW
Berkshire Power assumed out of service[12]	229 MW
Vermont Yankee assumed out of service	604 MW
Quick start generation out of service (represents 20 percent of 1,640 MW total quick start capability in western New England)	328 MW
Western New England run-of-river hydro unavailable (based on assumed low flow conditions at summer peak)	347 MW
Pumped storage from Bear Swamp and Northfield Mountain de-rated by 50 percent, due to an inability to complete pumping operations during off-peak hours in the midst of a long outage	874 MW
Zero imports from New York to New England were assumed because of the absence of multi-year contracts (tie is capable of approximately 1400 MW)	1,400 MW (AC ties only)
Total resources assumed out of service	5,884 MW
Total resources available to western New England assumed for 2023 (including 1,400 MW from New York AC ties)	9,850 MW

Sources: Exhs. NEP-1, app. 2-5, at 27; EFSB-ISO-190; RR-EFSB-64, at 3.

[10] While the hearings in this case were underway, Vermont Yankee separately announced its intention to retire in late 2014.

[11] As a subset of ISO-NE's study of the East-to-West base case, ISO-NE studied the ability to import power into Connecticut (Exh. NEP-1, app. 2-5, at 27).

[12] A single sensitivity case was run, in which the only change to the assumptions shown in Table 3 was that Berkshire Power was available but West Springfield Unit No. 3 was not available (Exh. NEP-1, app. 2-5, at 27).

4. Rhode Island Base Case

To evaluate stress on the Rhode Island interface, ISO-NE modeled a reduced amount of generation that would otherwise be available in Rhode Island by assuming the two largest generating units in Rhode Island as out of service (Exh. NEP-1, app. 2-5, at 27-28). As shown in Table 4 below, the two largest units, which are the Rhode Island State Energy Generation Station ("RISE") and Franklin Square/Manchester Station Unit No. 9, represent virtually all of the resources that were assumed to be unavailable in Rhode Island.

Table 4. Base Case Conditions in Rhode Island

Out-of-Service Resources Assumed by ISO-NE	Capacity
RISE Generation Station assumed out of service	548 MW
Franklin Square/Manchester Unit No. 9 assumed out of service	149 MW
Rhode Island Quick Starts de-rated by 20 percent	2 MW
Total resources assumed out of service	699 MW
Total resources for Rhode Island assumed for 2023	1,143 MW

Sources: Exhs. NEP-1, app. 2-5, at 28; EFSB-ISO-190.

5. Summary of Year of Need for the Base Cases

ISO-NE ran its transmission performance model separately for each of the base and sensitivity cases identified above, and determined that thermal violations would occur under certain N-1-1 contingencies that would require new transmission: (1) for eastern New England before 2012; (2) for western New England and Connecticut by 2016-2017; and (3) for Rhode Island before 2012 (Exh. NEP-1, app. 2-5, at 46-48). In the case of Rhode Island, certain N-1-1 contingencies modeled for the year 2022 also led to a voltage collapse of the Rhode Island transmission network (id. at 43). The results indicate that Rhode Island would need additional energy resources before 2012 to resolve its thermal violations, although this shortfall is relatively small – 27 MW in 2012, 19 MW in 2013, 39 MW in 2014 and 27 MW in 2015 (Exh. EFSB-ISO-141(1) at 4).[13] Eastern New England is the only one of the four subregions studied where the power flow analysis also indicated potential N-1 violations, in addition to

[13] The Rhode Island legislature mandated a distributed generation ("DG") contract program requiring 40 MW of newly installed DG by 2014 (Exh. EFSB-21). Implementation of this program should further reduce the Rhode Island shortfalls.

N-1-1 violations, by 2022 (Exh. NEP-1, app. 2-5, at 36-39). As the reliability issues associated with eastern New England appear to present the most severe challenges at this time, the Siting Board focuses its analysis principally on eastern New England, and to a lesser extent on Rhode Island and western New England.

6. Changes After 2012 ISO-NE Needs Assessment

Following ISO-NE's most recent Needs Assessment in September 2012 upon which the Company's Petitions were based, ISO-NE conducted two subsequent forward capacity auctions – FCA-7 in February 2013 (before evidentiary hearings were held in this case) and FCA-8 in February 2014 (after evidentiary hearings in this case had concluded).[14] Two new generators entered the market in eastern New England through FCA-7: (1) Footprint Power (674 MW); and (2) Cape Wind (74 MW).[15] In addition, ISO-NE issued a more recent CELT Report in May 2013, with an updated energy and demand forecast, as well as an updated EE forecast for New England. Further, as part of the FCA notice requirements, a number of existing generating units have announced their intention to retire, including Brayton Point, Vermont Yankee and Norwalk Harbor (RR-EFSB-64(S2)). Accordingly, Siting Board staff sought to update the record in this case to determine whether additional energy resources, such as the IRP, are needed in light of more recent developments.

7. Alternative Base Case Assumptions Requested by Staff

At the end of evidentiary hearings, staff requested that the Company prepare additional power flow model runs to: (1) update input assumptions based on more recent information; and (2) evaluate how sensitive the model results were to material changes in base case assumptions. The first consideration is discussed in Section III.C.6, above. The second consideration arose because of the reported difficulty by ISO-NE in determining the probability or likelihood of any

[14] NEP submitted a partial revised petition on September 28, 2012 to reflect new information included in ISO-NE's September 2012 updated needs assessment.

[15] This value is Cape Wind's Qualifying Capacity ("QC"). Cape Wind has a proposed total nameplate rating of 468 MW (Exh. EFSB-ISO-141, at 2, n.2.

particular base case occurring (Exhs. EFSB-ISO-79; EFSB-ISO-81; EFSB-ISO-82; EFSB-ISO-83; EFSB-ISO-84; EFSB-ISO-87; EFSB-ISO-132; EFSB-ISO-180). In addition, discovery responses raised questions concerning whether the OOS generating units that were chosen for the base case were appropriate based on actual operating experience during peak periods (e.g., HQ Phase II has delivered approximately 1,400 MWs over historical peak periods). To test the robustness of the Company's analysis, staff requested sensitivity cases that emerged from discovery and examination in the case, and were intended to be consistent with established planning standards. Accordingly, as shown in Tables 5A and 5B below, staff proposed that additional base case assumptions be tested using FCA-7 information and the 2013 CELT Report.

Table 5A. Staff Additional Base Case Conditions in Eastern New England

Resource	Case 1-A (2018 and 2023)	Case 1-B (2018 and 2023)	Case 2-A (2018 and 2023)	Case 2-B (2018 and 2023)
Phase II HVDC	1400 MW	1400 MW	1400 MW	1400 MW
New Brunswick	735 MW	124 MW	735 MW	124 MW
Seabrook	OFF	OFF	OFF	OFF
Mystic 9	OFF	OFF	695 MW	695 MW
Pilgrim	702 MW	702 MW	OFF	OFF
Footprint	674 MW	674 MW	674 MW	674 MW
Cape Wind	84 MW	84 MW	84 MW	84 MW

Source: Exh. NEP-12.

Table 5B. Staff Additional Base Case Assumptions in Western New England

Resource	Case 3-A	Case 3-B
Millstone 2	OFF	OFF
Millstone 3	OFF	OFF
Berkshire Power	236 MW	236 MW
Vermont Yankee	OFF	OFF
Mt. Tom	157 MW	157 MW
Norwalk Harbor	OFF	OFF
NY-NE AC ties	0 MW	1400 MW NY to NE

Source: RR-EFSB-64, at 2.

8. Results of the Various Power Flow Modeling Analyses

a. Eastern New England

As shown in Table 6, below, up to three potential thermal overloads are seen under N-1 conditions in 2022, with no voltage performance issues (Exh. N-1, at 2-25). Potential thermal overloads and voltage performance issues under N-1 and N-1-1 contingencies are shown regardless of the amount of imports from New Brunswick (id.). Overall, adding New Brunswick Power as an available resource at 700 MW had some beneficial effect in reducing line loadings and the number of thermal overloads (although it did not completely eliminate them); it had no effect on voltage issues, however. The N-1-1 contingency analysis shows up to 21 overloaded elements in 2022 (assuming New Brunswick imports at 0 MW). There would also be two voltage performance issues by 2022 regardless of the assumed New Brunswick import levels under N-1-1 contingencies (id.).

Table 6. Year 2022 Thermal Overloads and Performance Issues: West-to-East Scenario

	N-1 Contingencies			N-1-1 Contingencies		
	Elements Loaded 95-100 percent[16]	**Thermal Overloads**	**Voltage Performance Issues**	**Elements Loaded 95-100 percent**	**Thermal Overloads**	**Voltage Performance Issues**
New Brunswick Power @ 0 MW (Base Case)	2	3	0	4	21	2
New Brunswick Power @700 MW (Company Sensitivity Case)	1	2	0	9	10	2

Source: Exh. NEP-1, at 2-25.

The Company provided additional power flow analyses using sensitivity base case assumptions requested by staff. The Company also provided additional power flow model runs on its own initiative that reflect certain alternative base case assumptions, which the Company offered for a more complete record (RR-EFSB-64; RR-EFSB-64(S1); RR-EFSB-64(S2); RR-

16 Although transmission lines between 95 and 100 percent are not technically overloaded, they are indicative of thermal loading problems that may occur just over the ten-year study horizon if loads continue to grow (Exh. NEP-1, at 2-25).

EFSB-64(S3)).[17] The results are summarized in Table 7 below. According to the Company, the majority of the overloaded transmission elements identified in each scenario is overloaded under multiple contingency pairs that largely involve various breaker failures (RR-EFSB-64(S2) at 10 n.5).

Table 7. Potentially Overloaded Elements in 2023 – Staff Assumptions (West to East)

	Case 1-A	Case 1-B	Case 2-A	Case 2-B
345 kV Overloads	2	5	2	4
115 kV Overloads	8	10	8	11
Type of contingency	N-1-1	N-1-1	N-1-1	N-1-1
Year of first overload	2013-14	Prior to 2013	2014-2015	Prior to 2013

Sources: RR-EFSB-64, at 2; RR-EFSB-64(S1) at 2.

The Company provided the results of its additional power flow analyses to compare the performance of the transmission system, with and without the IRP, in the event of the retirement of either the Brayton Point generating units or the Canal generating units. In conducting this analysis, the Company stated that it used the staff assumptions, including the assumption that 1,400 MW is available over the HQ Phase II interface (RR-EFSB-64, at 3). The results are summarized in Table 8.

[17] ISO-NE also conducted a spreadsheet analysis following the FCA-7 auction that used the FCA-7 results to analyze whether there would be any change in the year of need (Exh. EFSB-ISO-141). However, this spreadsheet analysis was conducted before the 2013 CELT Report was issued, and did not alter the base case assumptions originally relied upon by ISO-NE and the Company in the Petition (id.).

Table 8. Potentially Overloaded Elements in 2023 – Additional Retirements (West to East)

Primary Retirement Assumption	**Brayton Point Retirement**		**Canal Retirement**	
	Without IRP			
Additional units assumed out-of-service (OOS)	Seabrook OOS	Seabrook OOS Mystic 9 OOS	Seabrook OOS	Seabrook OOS Mystic 9 OOS
345 kV overloads	1	8	2	7
115 kV overloads	9	13	7	15
	With IRP			
	Brayton Point Retirement		**Canal Retirement**	
345 kV overloads	0	0	0	0
115 kV overloads	0	1	1	2

Source: RR-EFSB-64, at 3.

After evidentiary hearings had concluded, the Company submitted additional information indicating that ISO-NE had received numerous Non-Price Retirement ("NPR") requests commencing with the 2017-18 capacity commitment period for approximately 2,480 MW of electric generation, including the following units: (1) Brayton Point Units 1-4; (2) Brayton Diesel Units 1-4; (3) Bar Harbor Diesels; (4) Medway Diesels; (5) Bridgeport Harbor 2; (6) John Street Units 3, 4, and 5; (7) Ameresco SEMA Demand Response ("DR"); and (8) EnerNOC DR (RR-EFSB-64(S2)). Brayton Point in Somerset, at 1,535 MWs, is the largest of these generating stations.[18] The great majority of the capacity represented by these retirement requests was from resources located in eastern New England (RR-EFSB-64(S2)). These retirements are in addition to Vermont Yankee's recent retirement announcement, which represents an additional 604 MW.

NEP submitted a further update stating that ISO-NE had performed a reliability power flow analysis for Brayton Point's NPR that demonstrated a need for Brayton Point Units 1-4 (RR-EFSB-64(S3)). As a result, ISO-NE rejected Brayton Point's request to retire Units 1-4 (id.). The Company also presented the results of ISO-NE's sensitivity analysis, which modeled the full IRP in service in order to understand the impact of the IRP on the reliability of the system. This sensitivity analysis shows that even with the full IRP in service, there is a

[18] Brayton Point consists of the following units: Unit 1 (239.2 MW), Unit 2 (238.9 MW), Unit 3 (612 MW), Unit 4 (435 MW), and four diesel units (9.9 MW) (RR-EFSB-64(S2) at 7).

continuing reliability need for Brayton Point Unit 1 (239 MW), but not for Brayton Point Units 2, 3, and 4 (RR-EFSB-64(S3) at 2).

b. Western New England

As shown in Table 9A, below, there were no thermal overloaded elements or voltage performance issues in western New England under N-1 conditions in 2022, using the modeling assumptions shown in Table 3, above (Exh. NEP-1, at 2-26). Under N-1-1 contingency conditions, thermal overloads could occur on up to seven transmission lines in western New England in 2022 (assuming Berkshire Power is out of service). There were no potential voltage performance issues in 2022 (id.).

Table 9A. Thermal Overloads and Performance Issues in 2022: East to West Scenario

Case	N-1 Contingencies			N-1-1 Contingencies		
	Elements Loaded 95-100 percent	Thermal Overloads	Voltage Performance Issues	Elements Loaded 95-100 percent	Thermal Overloads	Voltage Performance Issues
Berkshire Power OOS	0	0	0	2	7	0
W. Springfield Unit 3 OOS	0	0	0	5	3	0

Source: Exh. NEP-1, at 2-26.

The Company also provided results, shown below in Table 9B, from the power flow analysis based on the alternative base case assumptions shown above in Table 5B.

Table 9B. Thermal Overloads in 2023 East to West (using staff's alternative assumptions)

	Case 3-A	Case 3-B
345 kV overloads	3	0
115 kV overloads	5	0

Source: RR-EFSB-64, at 2.

c. Rhode Island

Table 10, below, shows that Rhode Island would experience no thermal or voltage performance issues under N-1 conditions in 2022 (Exh. NEP-1, at 2-27). Under certain N-1-1 contingency conditions, potential voltage collapse may occur. ISO-NE's transmission modeling does not identify the thermal overloads that could also result from these contingencies (id.).

Therefore, according to the Company, Table 10 understates the number of thermal overloads that may result from N-1-1 contingencies (id.).

Table 10. Thermal Overloads and Performance Issues: Rhode Island Scenario

Year	N-1 Contingencies			N-1-1 Contingencies		
	Elements Loaded 95-100 percent	**Thermal Overloads**	**Voltage Performance Issues**	**Elements Loaded 95-100 percent**	**Thermal Overloads**	**Voltage Performance Issues**
2022	0	0	0	one or more	two or more	collapse

Source: Exh. NEP-1, at 2-27.

9. Positions of the Parties

NEP maintains that the base case assumptions used by ISO-NE "impose stress on the system that is severe, but reasonable" and clearly demonstrate the need for IRP (Company Brief at 43). NEP contends that there is a particular need for ISO-NE to assume more units out of service than in some other parts of the country because the New England region is at the far northeastern end of the Eastern Interconnection, with limited ties to the west (Company Brief at 46, *citing* Tr. 4, at 634).

NEP maintains that IRP is the product of repeated planning studies on deficiencies and interrelated needs in southern New England first conducted in 2004 and updated several times (Company Brief at 23). The Company states that ISO-NE's 2012 updated needs analysis shows that the system will be unable to withstand single and multiple contingencies as the system approaches or exceeds expected peak loads over the forecast period (id. at 28). In addition, the Company states that the ISO-NE March 2013 supplemental analysis accounting for FCA-7 results confirmed a continuing need for the IRP (id. at 30).

NEP argues that the large number of recently announced generation retirements reinforces the need for the IRP, and that this is true even with other more optimistic assumptions used in the sensitivity cases requested by staff (Company Brief at 35). The Company argues that analyses using staff's requested assumptions and dispatches, standing alone, "are not an adequate basis for transmission planning analysis and that relying on them without considering the assumptions set forth in ISO-NE's 2012 follow-up needs analysis could put the reliability of the New England transmission system at risk" (id. at 36).

The Company notes that it undertook the following sensitivity analyses using the staff's requested base case assumptions in order to provide the Siting Board with a more complete understanding of the performance of the regional transmission system under contingencies:

- West-to-East stress, based on the staff's base case assumptions, but also assuming the retirement of Canal Station or Brayton Point, and Seabrook modeled out of service or both Seabrook and Mystic 9 modeled out of service ("Retirement Sensitivities");
- East-to-West stress, based on the staff's base case assumptions, but with flows over the New England to New York AC ties set at the average historic scheduled flows and at the maximum flows for peak load days ("NY-NE Interface Sensitivities").

(Company Brief at 36, *citing* RR-EFSB-64(1)).

NEP contends that the Retirement Sensitivities and the NY-NE Interface Sensitivities show overloaded transmission system elements "that would be resolved with IRP in service" (Company Brief at 36-37). According to NEP, "[t]he recently announced retirements, as well as potential future generation retirements, make the need for the robust transmission system that the IRP will provide more acute and immediate" (id. at 38).

NEP maintains that the Siting Board should find that ISO-NE's transmission planning studies, as they were originally submitted in the Company's Petition, used reasonable system planning criteria and reviewable and appropriate methods for determining system reliability (Company Brief at 23). NEP contends that the design of system stress from generator outages, also known as "critical system conditions," is properly left to ISO-NE, the planning authority for the New England region (id. at 43). According to the Company, ISO-NE's base cases impose stress on the system that is severe, but reasonable, and that such testing ensures that the transmission system is designed so that it can be operated reliably under a broad range of reasonably foreseeable conditions (id.). The Attorney General agrees with NEP on this point (Attorney General Brief at 13).

ISO-NE argues that there is a need to increase the eastern New England import capability and to take action to avoid thermal overloads on the central 345 kV East-West path (ISO-NE Brief at 11, *citing* Exh. ISO-NE-1, at 13). According to ISO-NE, recent generation retirements following ISO-NE's September 2012 needs analysis only make the need for the IRP more clear (ISO-NE Brief at 18). ISO-NE states that, even if the staff's alternative base case assumptions

were to be relied upon, there are numerous overloads that would occur during the planning horizon, both on the 345 kV and the 115 kV networks (id.).

ISO-NE states that the base case conditions were reasonably stressed, "because in many cases those stressed conditions have been seen in some form in actual operating experience" (ISO-NE Brief at 20). ISO-NE also maintains that the particular resource outages represented in the base case should "be viewed as a proxy for other conditions that could have a similar effect on the transmission system" (id., *citing* Tr. 5, at 825).

ISO-NE maintains that it is reasonable to take "something of a conservative approach" to base case assumptions given the serious adverse safety and economic consequences of potential electric supply disruptions (ISO-NE Brief at 24). In addition, although the probability of the base case conditions actually occurring may seem low, ISO-NE contends that there are numerous examples of low-probability events actually occurring on the New England grid (id.).

The Attorney General maintains that the evidence and testimony demonstrate that there is a need for the Project (Attorney General Brief at 12). According to the Attorney General, the Company used reviewable and appropriate methods for assessing system reliability based on load-flow analyses (id. at 13).

D. Analysis and Findings on Need

The Siting Board has reviewed the various power flow modeling results presented in this proceeding, which include individual reviews of the modeling results from: (1) ISO-NE's power flow studies relying on ISO-NE's original base case assumptions; (2) NEP's power flow studies using Siting Board staff's alternative base case assumptions; (3) NEP's power flow studies based on its alternative retirement scenario analysis; and (4) ISO-NE's most recent Brayton Point power flow studies that were conducted to understand the implications of Brayton Point's retirement for the overall ISO-NE system.

ISO-NE's base case modeling shows that there is the potential for as many as 21 separate transmission elements experiencing thermal overloads in 2022, with each element overloading under one or more combinations of N-1-1 contingencies, when using ISO-NE's base case assumption that neither HQ Phase II nor New Brunswick Power is available to serve eastern New England (see Table 6 above). This modeling analysis is quite conservative, however, as it

assumes a base case scenario where the two largest resources (HQ Phase II and Seabrook) that serve eastern New England are assumed out of service, and New Brunswick Power is also assumed to be out of service – even before studying the effects on the system of two additional contingencies (i.e., N-1-1) (see Table 2 above).

These modeling results can be put in clearer perspective, however, when reviewing the results of Siting Board staff's requested alternative base case, which assumes, among other things, that HQ Phase II and New Brunswick Power are available to serve eastern New England, but that Seabrook and Mystic 9 are the two unavailable units (see Table 5A, Case 1-A). In that scenario, up to ten separate transmission elements could overload in 2023, with each element overloading under one or more combinations of N-1-1 contingencies. Under these assumptions, the earliest modeled transmission element overload would occur during the 2013-2014 period (see Table 7).

To provide further context for these results, the Company modeled a scenario in which it assumed staff's base case conditions (e.g., HQ Phase II and New Brunswick Power are both available to serve), but that Brayton Point generating station is assumed retired (see Table 8). NEP's Brayton Point retirement scenario analysis proved quite timely in that only weeks after the Company conducted it, Brayton Point's owners requested that the entire generating station be permitted to retire in 2017. Under this set of base case assumptions, there is the modeled potential for up to 21 separate transmission elements experiencing thermal overloads by 2023, including eight 345 kV lines and 13 115 kV lines.

During the course of this proceeding, staff requested that the Company conduct a number of additional model runs based on alternative base cases for the purpose of understanding the breadth of potential conditions under which the existing transmission system might be inadequate in the next ten to 20 years. The additional model runs were useful for this purpose, and support the conclusion that additional transmission is needed to facilitate transfer of power among regions of southern New England. Considering the full range of these separate power flow study results, the need for the Project is clear. The Siting Board finds that there is a need for additional energy resources in Massachusetts and, more broadly, across the southern New England region.

We note that in this case the Company did not provide in its Siting Board Petition an evaluation of need supported by a wide range of base cases. A broader range was developed during the course of the proceeding. A decision concerning whether additional resources are needed should be based on sufficient modeling to provide a broader understanding of need than is provided by only one set – or even a few sets – of base case assumptions. This case illustrates how modeling results can vary greatly depending upon which base case assumptions are adopted. Consideration of multiple base cases is especially valuable where proponents are unable to ascribe statistical probabilities to the likelihood of specific resources being unavailable individually or in combination, which was the case here.

Rather than relying on a single set of base case assumptions for modeling purposes, the Siting Board shall require future applicants to evaluate and submit multiple model runs, consistent with the facts and circumstances of each case, to demonstrate the sensitivity of the results to material changes in base case assumptions. This directive is also consistent with FERC's finding that "it would be appropriate for planning entities to conduct sensitivity studies to 'bracket' the range of probable outcomes. Thus, without having to anticipate 'every conceivable critical operating condition,' planning entities will have a means to identify an appropriate range of critical operating conditions." Mandatory Reliability Standards for the Bulk-Power System (NOPR), 117 FERC ¶ 61,084 at ¶ 1047 (2006). Moreover, the Siting Board encourages future applicants to more fully describe project need through the use of probabilistic planning methodologies, including statistical measures of resource unavailability.

IV. ALTERNATIVE APPROACHES 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: (1) other methods of transmitting or storing energy; (2) other sources of electrical power; or (3) a reduction of requirements through load management.[19] In implementing its statutory mandate, the Siting Board requires a petitioner to show that, on

[19] G.L. c. 164, § 69J also requires an applicant to present "other site locations." This requirement is discussed in Section V.A, below.

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. Lower SEMA at 53; New England Power Company, EFSB 09-1/D.P.U. 9-52/9-53, at 19 (2011) ("Worcester Decision"); GSRP at 41.

B. Identification of Project Approaches for Analysis

IRP is one of four major transmission projects that together make up the New England East-West Solution ("NEEWS"), which also includes: (1) GSRP (completed in 2013); (2) the Rhode Island Reliability Project (completed in 2013); and (3) the Central Connecticut Reliability Project (Revised Need Study completed in 2013; Revised Solution Study to be completed in 2014) (Exh. NEP-1, app. 3-1, at 1-1). ISO-NE selected these four NEEWS projects, in combination, as its preferred approach to address reliability concerns identified for southern New England.[20] Each of the NEEWS projects includes the installation of a new 345 kV line, improvements to the existing 115 kV system, and substation upgrades (among other components); collectively they are designed to increase bi-directional power flows across the southern New England East-West interface and also increase power transfer capabilities between Massachusetts, Connecticut, and Rhode Island (id.).

In developing the IRP portion of NEEWS, ISO-NE and the study participants conducted an initial Need Assessment in April 2011 (followed by a related Solutions Study Report in February 2012) (Exh. NEP-1, app. 1-4 and 1-5). The Solution Study assessed how numerous possible solution options would perform under stressed conditions with projected peak load and a series of transmission outage scenarios in order to determine whether those options would be able to reliably support a range of transmission requirements (id.). Over the course of these successive studies, ISO-NE and the study group consistently selected IRP as one of its proposed four NEEWS projects (id.). ISO-NE noted that IRP not only resolved all the needs identified in the needs analysis, but also stood out as the best option after a comparison of electrical

[20] The need for the four components of NEEWS came out of studies done over the 2004-2008 timeframe by the Southern New England Regional Working Group (consisting of ISO-NE, National Grid USA, and Northeast Utilities) (Exh. NEP-1, app. 1-5, at p. 2).

performance factors, costs, and natural/human environmental impact factors (Exh. NEP-1, app. 3-3 at 8).

As a potential alternative to the Project, the Company considered: (1) a "no action" alternative; (2) different locations for adding new overhead 345 kV transmission lines in central New England; (3) an underground 345 kV transmission line; (4) a number of non-transmission alternatives ("NTAs") individually and in combination; and (5) a hybrid solution consisting of scaled-back transmission upgrades to the 115 kV transmission system in Massachusetts plus NTAs ("Hybrid Alternative") (Exh. NEP-1, at 3-1). In its analysis of alternatives, the Company focused on the ability of the transmission system to move sufficient power from the west to east within southern New England because the most recent Southern New England Regional Working Group analysis of NEEWS indicated that the need to expand the west-to-east transfer capability was immediate, while the need to expand the east-to-west transfer capability was less urgent (id. app. 1-5, at 1, and app. 3-2, at 3).

The Company rejected the no action alternative because "continued reliance on the existing system configuration without any new facilities or resources would not provide a solution to the existing transmission reliability need in [southern New England]" (Exh. NEP-1, at 3-2). The Company also determined that building only the Connecticut and Rhode Island portions of the IRP, without the Millbury to West Farnum section (the "Modified Project") would not resolve all of the identified thermal overloads from contingencies (Exh. NEP-1, app. 3-2, at 9-10).[21] The Company asserted that, while an underground route would reliably meet the identified need with fewer permanent environmental impacts, such an approach could present significant operational issues (voltage control and the potential for lengthy outage restoration times) and would cost $340.5 million versus $100.1 million for the Project (Exh. NEP-1, at 66).

The Company next focused its analysis of project approach alternatives on the feasibility of demand-side NTAs, such as EE and DR, and supply-side NTAs such as new central generation and distributed generation ("DG") to resolve the identified reliability need without the

[21] See ISO-NE "Follow-Up Analysis to 2011 New England East-West Solution (NEEWS): Interstate Reliability Project Component: Updated Needs Assessment," September 2012.

construction of the Project (Exh. NEP-1, app. 3-1). This analysis, prepared for the Company by ICF Resources International ("ICF"), evaluated the availability, feasibility, and projected costs of NTAs individually, collectively and in combination with various transmission improvements (id., app. 3-1 and 3-2). ICF's initial study, prepared in December 2011, reflected data included in ISO-NE's 2011 IRP Needs Study Update, the results of FCA-4, and the 2010 CELT Report; ICF's revised study in June 2012 (that evaluated the Hybrid Alternative of 115 kV transmission upgrades in Massachusetts in lieu of a new 345 kV Massachusetts line) was issued prior to ISO-NE's Needs and Solution Studies Update in September 2012. A revised ICF study used FCA-5 results and reflected the announced closure of all Salem Harbor units and AES Thames as well as higher levels of EE and DG.

At the request of Siting Board staff, the Company supplemented the ICF studies with a spreadsheet-based analysis that incorporated more current input data on loads, generation, energy efficiency, and other information based on the ISO-NE 2013 CELT report (Exh. EFSB PA-42). In addition, the spreadsheet analysis also included alternative base case sensitivities requested by staff as well as additional sensitivity cases proffered by the Company (id.).

C. Overview of ICF's Analysis

In the two ICF studies noted above, ICF evaluated the ability of the following potential Project approaches to address the identified need:

- One type of NTA (EE, DR, DG or new central generation) alone;
- A combination of NTAs (new central generation, EE, DR, and DG);
- The Connecticut-to-Rhode Island segment of IRP only – with no construction in Massachusetts – plus NTAs;
- A "Hybrid Alternative" consisting of the Connecticut and Rhode Island sections of IRP, plus scaled-back transmission upgrades to the existing 115 kV system in Massachusetts, supplemented by NTAs (id.).

For each type of NTA in ICF's initial 2011 Study, ICF developed a Reference Case and an Aggressive Case forecast. The Reference Case projection was based on the achievement of then-current state goals and approved funding levels. The Aggressive Case projection assumed

that the NTA resource would grow at a more rapid rate such that by 2020 the amount of that NTA would exceed the Reference Case level by 17 percent (Exh. NEP-1, app. 3-1, at 5-2).

To evaluate the various NTAs, ICF developed a power flow model using scenarios similar to those prepared by ISO-NE at the time in its base case evaluation of need (id., app. 3-1, at 2-1 to 2-5). ICF studied whether these project alternatives would eliminate modeled thermal and voltage violations, and if so, how they would compare to the Project based on reliability, cost, and environmental criteria (id., app. 3-1, at 4-2 to 4-9; app. 3.2, at 2-7 to 2-8).

D. Potential NTA Resources

1. Energy Efficiency

ICF initially provided a projection of the amount of EE that would be available in 2015 and 2020 based on the amount of EE that had been contracted through ISO-NE's Forward Capacity Market ("FCM") Auction #4 for the 2013-2014 capacity year.[22] ICF added an estimate of incremental EE amounts resulting from procurement mandates and incentive programs of individual New England states (Exh. NEP-1, app. 3.1, at 5-1 to 5-31).[23] For Massachusetts, Connecticut and Rhode Island, ICF developed two projections of EE through 2020: a Reference Case projection that was based on the achievement of existing state goals and on expected legislation in the various states; and an Aggressive Case projection in which the amount of EE grows at a more rapid rate (id., app. 3-1, at 5-2). For Massachusetts, ICF assumed incremental summer peak EE gains of 145 MW per year for the entire state in the Reference Case and 179 MW per year in the Aggressive Case, both through 2020 (id., app. 3-1, at 5-12, 5-13).

Table 11 below shows ICF's projections of EE for each of the three southern New England states and also indicates ISO-NE's EE projections incorporated in its September 2012 Needs Report (Exh. NEP-1, app. 2-5, at 57) and ISO-NE's 2013 CELT Report

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22 Forward Capacity Auction four ("FCA-4") was held in August 2010 for resources that would be delivered for a three-year period beginning in the June 2013.

23 Later in the proceeding, in response to an EFSB information request, ISO-NE provided its updated 2013 forecasts of EE as well as the result of the FCA-7 (Exhs. EFSB-PA-42; NEP-JR-3, at 3-4). The Company analyzed the impact of these updated projections on the need for the Project (Exh. EFSB-PA-42).

(Exh. EFSB-ISO-171). ICF noted that its projections of EE included an estimated 5.5 percent reduction in distribution losses that would be associated with not having to generate and transmit power to load (Exh. NEP-1, app. 3-1, at 5-15, 5-16).

Table 11. Comparison of Total EE Forecasts for 2015 and 2020 for Southern New England (Effective On-Peak Summer MWs)

	ICF EE Forecast (MW)		ISO-NE 2012 Needs Report (MW)	ISO-NE 2013 CELT (MW)
	Reference	Aggressive		
2015				
Connecticut	416	434	389	370
Massachusetts	666	700	704	700
Rhode Island	103	114	129	124
2015 Total	1185	1248	1222	1194
2020				
Connecticut	592	705	516	413
Massachusetts	1391	1595	1265	1193
Rhode Island	198	266	236	216
2020 Total	2181	2566	2017	1822

Sources: Exh. NEP-1, app. 3-1, at 5-5 to 5-14; Exh. NEP-1, app. 2-5, at 57; and Exh. EFSB-ISO-171.

ICF observed that its projections of the amount by which EE can be expected to reduce load in southern New England are, in fact, very similar to those of more recent ISO-NE forecasts (Exh. NEP-1, app. 3-2, at 4).[24] ICF stated that the projected levels of EE alone would not be sufficient to eliminate the thermal overloads predicted by its models (Exh. NEP-1, app. 3-1, at 5-17 to 5-18). In its June 2012 update, ICF increased its estimates of EE in Massachusetts and Rhode Island to better account for actual levels achieved in 2011 (Exh. NEP-1, app. 3-2, at 4).

[24] As shown in Table 11 above, ICF's initial EE Reference forecast is close to, and in some cases even higher than more recent data would indicate. The ICF Aggressive forecast shows EE levels that exceed those in the 2013 CELT.

Nevertheless, ICF still concluded that EE alone would not be an adequate alternative to the Project (id. at 32).[25]

2. Distributed Generation

ICF provided projections of the amount of DG that it expected to be installed in southern New England (Exh. NEP-1, app. 3.1, at 5-3 to 5-4). ICF's projections of on-peak DG capacity assumed that 75 percent of the DG capacity would be photovoltaic ("PV") and 25 percent would be wind capacity. ICF further assumed that the effective on-peak capacity of PV is 28 percent of nameplate capacity, while the effective on-peak capacity of wind is ten percent of nameplate capacity (id.). For its Reference Case and Aggressive Case projections of DG, ICF started with the DG capacity that had cleared FCA-4 for delivery in 2013-2014, and then added a constant annual increment based on historical growth rates and prevailing state program goals at the time (id.). ICF stated that even with its Aggressive Case projections, DG alone would be insufficient to reduce the level of peak load below the critical load level ("CLL") at which ISO-NE forecasts suggest that thermal violations are likely to occur (Exh. NEP-1, app. 3-2, at 32).

Table 12, below, presents ICF's DG projections, as well as a comparison to more recent DG projections on the record provided by ISO-NE and Synapse Energy Economics (Exhs. NEP-1, app. 3-1, at 5.1.1; EFSB-8; EFSB-36). As illustrated in Table 12 below, even ICFs Aggressive Case projections of effective on-peak DG (both PV and wind) are considerably lower than more recent projections by ISO-NE and Synapse (which are PV only).[26] Specifically, the latest ISO-NE projections of DG (PV only) in southern New England are 79 MW higher in 2015 and 232 MW higher in 2020 than ICF's Aggressive Case. Synapse's DG projection for 2021 (which includes PV and fuel cells) is 405 MW higher than ICF's Aggressive

[25] Exhibit 2-1 in ICF's second report indicates that all forms of NTAs together would not be sufficient to resolve the identified need (Exh. NEP-1, app. 3-2, at 32).

[26] ICF's lower DG forecasts are due, in part, to outdated assumptions about state programs that encourage the development of DG (Exh. NEP-1, app. 3-1, at 5-2; Tr. 8, at 1103). The extent of the difference is even greater than it appears as the ICF figures include wind and PV capacity, whereas ISO-NE and Synapse provide PV-only figures.

Case for 2020.[27] However, as will be discussed further in Section IV.E, "NTAs Combined" below, the substitution of either ISO-NE's or Synapse's higher DG projections for those of ICF would not provide sufficient additional local resources to reduce southern New England loads below the CLL.

Table 12: Projections of Effective On-Peak Distributed Generation Capacity (MW)

	ICF Reference Projection		ICF Aggressive Projection		ISO-NE DG Forecast Working Group Projection (2/11/2014)		Synapse Forecast
	2015	**2020**	**2015**	**2020**	**2015**	**2020**	**2021**
Connecticut	57	68	60	78	56.5	118.6	196
Massachusetts	103	122	114	169	214.9	383.1	448
Rhode Island	26	38	27	40	8.8	17.5	48
Southern New England Total	186	228	201	287	280.2	519.2	692

Sources: Exhs. NEP-1, app. 3-1, at 5-2; EFSB-36; EFSB-8. ICF and Synapse projections of effective on-peak capacity have been adjusted to reflect a 28 percent availability factor, while ISO-NE's projection assumes a 35 percent availability factor on peak. For the years 2015 and 2016, ICF appears to have used an Aggressive Case projection for DG that is lower than its Reference Case, which is counterintuitive. The numbers in the table above for the Aggressive Case reflect staff adjustments to the Aggressive Case 2015 projections of DR to make it higher than the Reference Case 2015 projection by an amount equal to one year's assumed increment in DR effective capacity (i.e., 10.7 MW). For years 2016 through 2020, staff assumed that the Aggressive Case DR forecast increased by 10.7 MW per year.

3. Additional Generating Resources

The addition of central generating resources within the eastern section of southern New England[28] would serve to reduce stress and reliability problems on transmission lines used to bring in power from neighboring zones (Exh. NEP-1, app. 3-1, at 6-1 to 6-9). Therefore, additional central generation is another form of NTA (id.). In its initial study, ICF prepared a forecast of new generating resources in the eastern portion of southern New England based on

[27] Synapse projected nameplate PV capacity in 2021 of 2,470 MW. ICF's 28 percent capacity factor has been applied to Synapse's capacity by Siting Board staff in order to reflect on-peak effective capacity.

[28] The eastern section of southern New England includes ISO-NE's zones known as Northeast Massachusetts/Boston and Southeast Massachusetts, plus a small portion of the West Central Massachusetts zone.

new generating resources listed in the ISO-NE Interconnection Queue[29] ("the Queue") as of April 1, 2011 (id., app. 3-1, at 6-1). ICF asserts that the Queue is the best available indication of where new generating resources are likely to be located in the future. ICF reported that its power flow modeling indicated that the new generation in the eastern portion of southern New England, estimated at 401 MW of summer peak capacity,[30] would reduce the number of modeled thermal violations in the region by 56 percent in 2015, and by 53 percent in 2020 – but would not eliminate such violations (id.). [31]

ICF initially relied on the information in the ISO-NE Queue as of April 1, 2011 (Exh. NEP-1, app. 3-1, at 6-1). However, since that date there have been withdrawals from and additions to the Queue, as well as significant announced retirements of existing units. In ICF's Updated Reference Case, ICF assumed that all existing Salem Harbor units and the AES Thames plant would retire (a decrease of 932 MW of supply in southern New England) (Exh. NEP-1, app. 3-2, at 31).

NEP stated that prior to FCA-8, ISO-NE had received the following NPR requests commencing with the 2017-2018 capacity commitment period: (1) Brayton Point Units 1-4; (2) Brayton Diesel Units 1-4; (3) Bar Harbor Diesels; (4) Medway Diesels; (5) Bridgeport Harbor 2; (6) John Street Units 3, 4, and 5; (7) Ameresco SEMA Demand Response ("DR"); and (8) EnerNOC DR (RR-EFSB-64(2S)). The sum of these retirement requests equals

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29 The ISO-NE Queue consists of generation resources seeking permission to interconnect with the ISO-NE-administered transmission system. The ISO-NE Queue is updated monthly.

30 ICF assumed that new wind resources would have an effective peak summer capacity of ten percent of nameplate (Exh. NEP-1, app. 3-1, at 5-13). With this assumption, Cape Wind, with its nameplate capacity of 462 MW, was counted as a 46 MW capacity resource.

31 ICF assumed that between 1,281 and 1,302 MW of new generation would be added in all of southern New England by 2015 and that 2,850 MW would be added by 2020. However, new generation resources added outside of the eastern portion of southern New England would not serve to reduce the stress on west-to-east flows in southern New England. Therefore, it is assumed that the reduction in thermal violations reported in Exhibit 6-7 of Exh. NEP-1, app. 3-1, was primarily associated with the generation added in the eastern portion of southern New England.

approximately 2,480 MW, of which 1,535 MW are at Brayton Point in Somerset. The great majority of the capacity represented by these retirement requests is from resources located in eastern New England. These retirements are in addition to Vermont Yankee's recent retirement announcement, which represents an additional 604 MW. ICF expressed concern that these recently announced retirements of generating capacity, particularly in the eastern section of southern New England, and the potential retirement of other older coal and oil-fired units (such as Canal and the Mystic #7 unit) would impose significant additional stress on the adequacy of southern New England's system capacity (Exh. NEP-1, app. 3-2, at 32).

4. Active Demand Response

Active DR refers to contracts that ISO-NE has with some electric consumers in which those customers are paid to reduce or eliminate their normal load when requested by ISO-NE during stressed system conditions (Exh. NEP-1, app. 3-1, at ES-6). ICF did not prepare a forecast of future levels of DR, but instead estimated the feasibility of obtaining enough DR to plug the gap between the load reductions provided by other NTAs (EE, DG, and generation) and the overall load reduction required to avoid thermal overloads or voltage problems (Exh. NEP-1, app. 3-1, at ES-7). ICF stated that the amount of DR located in southern New England that cleared FCA-5 (DR required to perform in the period June 2014 through May 2015) was 971 MW (id., app. 3-1, at ES-9). The level of DR in southern New England committed in FCA-5 represented an increase of "roughly 350 MW to 400 MW" over the amount of DR committed in FCA-1 (id.).

ICF stated that it would be difficult to expand the amount of DR, as demonstrated by the amount of DR capacity that has delisted in recent FCAs (Exh. NEP-JR-3, at 7). ICF contends that the reliability of DR when called upon has decreased (id. at 6) and that new ISO-NE rules requiring DR to bid into the daily energy market beginning with FCA-8 (for the 2017-2018 capacity supply period) would likely further decrease the amount of DR willing to bid for a capacity supply obligation (id. at 8). ICF noted the possible introduction of more stringent qualification rules for DR, such as those introduced recently in the PJM Interconnection, which would likely reduce interest in supplying DR and increase its cost (id. at 8-9). ICF asserts that,

as a result of these factors, it would be difficult for ISO-NE not only to attract new DR capacity, but also to retain existing DR participants (id. at 9).

Based on procurement costs in the most recent Forward Capacity Auction at the time of the ICF study (FCA-4), in which DR resources were obtained at a cost of $30/kW-year, ICF calculated that to fill the resource gap with DR would cost New England ratepayers $540 per MWh (assuming 50 hours per year of load interruptions) (Exh. NEP-1, app. 3-1, at E-6). Using econometric studies based on industry valuations of lost load ("VOLL"), ICF calculated that the economic cost to participating customers for interrupted load would be approximately $8,412 per MWh (id., app. 3-1, at E-14). ICF estimated that if sufficient DR resources could be obtained, the costs (using VOLL) for DR to solve the resource gap (after other NTAs) for Massachusetts alone would range from a low of $261 million per year in 2015 (assuming Aggressive Case estimates for other NTA resources) to a high of $1.02 billion per year in 2020 (assuming Reference Case estimates for other NTA resources) (id. app. 3-1, at E-13).

E. NTAs Combined

In order to determine whether the MW amounts of NTAs (EE, DG, new generation and DR) projected in sections IV.D.1 through IV.D.4, above, are sufficient to eliminate the need for the Project, ICF relied on ISO-NE's projections of Critical Load Level ("CLL"). CLL is the load level above which power flows from west to east in southern New England begin to cause transmission line overloads (Exh. NEP-1, app. 3-1, at 2-3 to 2-5). To determine the amount of NTAs required to eliminate the need for the project, ICF subtracted the CLL from the ISO-NE projected peak load in the eastern section of southern New England (id.).

As shown in Table 13 below, ICF estimated the amount of NTA capacity, including new generating resources, EE, and DG, available in southern New England through 2020 to achieve the load reduction required to reach the CLL. ICF then subtracted the projected MWs of all NTAs in southern New England from the MWs required to lower projected load to the CLL (id.). If the resulting megawatts were positive, that indicated that the projected quantity of NTAs was insufficient to meet the needed load reduction (id.).

ICF presented two estimates of future NTA resources: a reference case that represents ICF's best estimate based on then-current state programs, FCM results and the ISO-NE new generation queue; and an aggressive case that represents "higher, yet reasonably achievable growth" in resources (Exh. NEP-1, app. 3-1, at 5-2). In both cases, there remains a significant resource gap unmet by NTAs – although these figures do not include DR.[32]

Table 13: ICF Evaluation of Non-Transmission Alternatives to Alleviate Thermal Overloads in Southern New England[a]

	Reference Case (MW)		Aggressive Case (MW)	
	2015	**2020**	**2015**	**2020**
Total Resources Needed to Eliminate Identified Reliability Violations[b]	3,312	6,610	3,312	6,610
Less: New Generating Resources from the ISO-NE Interconnection Queue[c]	896	1,790	896	1,790
Less: Incremental EE and DG[d]	342	1,439	405	1,883
Resource Gap Unmet by NTAs	2,074	3,381	2,011	2,937

Source: Exh. NEP-1, app. 3-2, at 25, 26, except as noted.
a. Resource needs and NTAs aggregated across southern New England (Exh. NEP-1, app. 3-2, at 24).
b. Total megawatts of NTAs (new generation, EE, DG and active DR) that would be required to reduce loads sufficiently to eliminate all thermal overloads (Exh. NEP-1, app. 3-2, at 26).
c. ICF assumed addition of specific units from among 2,850 MW in the ISO-NE Queue as of April 1, 2011; most units in the queue were in western New England and thus less useful for relief of west-to-east stress (Exh. NEP-1, app. 3-1, at 6-1, 6-2, D-3).
d. Exh. NEP-1, app. 3-1, at 5-16, and app. 3-2, at 26. The incremental EE and DG result from ICF's updating of its base year numbers for Massachusetts and Rhode Island to reflect actual results through 2011.

ICF stated that there are great uncertainties associated with projections of the megawatts of NTAs required to reduce load to the CLL (Exh. NEP-1, app. 3-2, at 36-56). These uncertainties include the potential for higher load growth (as a result of more rapid economic

32 ICF asserted that historically DR participants in southern New England "have not performed in a manner that ensures comparable capacity benefits to physical assets such as transmission or power generation facilities" (Exh. NEP-1, app. 3-1, at C-1 and C-2). Based on ISO-NE DR performance assumptions for FCA-6, historical performance rates (MWs provided as a percentage of MWs obligated to be supplied) by DR resources in southern New England has ranged from a low of 64 percent in the Southeastern Massachusetts load zone to a high of 100 percent in the Rhode Island and West/Central Massachusetts load zones) (id. at C-2). ICF also notes that the amount of DR MWs under contract has declined precipitously in New England in the most recent FCAs (Exhs. JR-3, 6-8; EFSB PA-42 at 2-3).

growth and/ or changing weather patterns), retirement of existing generating resources, insufficient state budgets to achieve EE and DG goals, and inability to attract and retain active DR resources (id., app. 3-2, at 37-39). ICF's sensitivity analyses of these uncertainties raised the required capacity of NTAs by 840 MWs to 1,943 MWs as the amount necessary to prevent forecasted 2020 loads from breaching the CLL, at which thermal violations would occur (id., app. 3-2, at 42).

F. The Hybrid Alternative

The Company took the additional step of evaluating whether the Project could be replaced by a combination of NTAs and a scaled-back transmission solution involving upgrades of existing 115 kV lines instead of a new 345 kV line (Exh. NEP-1, app. 3-2, at 1). ICF updated the Reference Case it had used to evaluate NTAs alone, to reflect changes in generator availability and to reflect an expectation of a doubling of energy efficiency peak load reductions relative to the Initial NTA Assessment (id., app. 3-2, at 31). [33] ICF evaluated a set of upgrades to 23 miles of existing 115 kV lines (plus two transformers) that would provide service under these conditions over the period from Project completion to 2020 (id., app. 3-2, at 4). Not including the cost of NTAs,[34] the conceptual-level cost estimate for the 115 kV upgrades is $75 million for the reference case (-25%/+50%), which is considerably less than the $121 million cost of the 345 kV line from Millbury to West Farnum (id., app. 3-2, at 9). However, ICF also reported the levels of upgrades that would be required in five sensitivity cases (such as retirement of Canal Station, or a higher peak demand growth rate) and cautioned that due to the need to design and permit the 115 kV upgrades, implementation of the Hybrid Alternative would delay the in-

33 This ICF assessment included the announced retirements of the Salem Harbor and AES Thames power plants (Exh. NEP-1, app. 3-2, at 4). The only significant new generation proposals in the ISO-NE interconnection queue for eastern New England were Brockton Power and Cape Wind. ICF elected to model Cape Wind in only some cases and Brockton Power in none (id. at 5).

34 The costs of state programs to expand EE and DG were not considered as part of the capital costs of the Project Alternatives. Similarly, the cost of new central generating facilities was assumed to be borne by independent developers and not treated as a Project cost.

service date of the Project, leaving the transmission system vulnerable to potential thermal overloads for an additional 18 months (id., app. 3-2, at 15).

ICF estimated that the cost of the Hybrid Alternative transmission upgrades would be $75 million, or about 62 percent of the cost of the Project. However, the cost estimates of the Hybrid Alternative transmission upgrades were less precise (-25%/+50%) than those of the Project (which were -25%/+25%) and therefore would be likely to increase (id., app. 3-2, at 16).

The potential 115 kV upgrades would need to be significantly expanded in each of five sensitivity cases ICF evaluated relating to load growth, amounts of EE and DG, and generator retirements. ICF determined that the average cost of the 115 kV transmission upgrades required in the reference case and five sensitivity cases would be $156 million (id., app. 3-2, at 15, 47). Any delay the Hybrid Alternative might impose would also make it necessary to include additional costs associated with retaining generators requesting permission to retire (id., app. 3-2, at 15-16).

G. Updated Analysis with Sensitivity Cases Requested by Staff

At the request of Siting Board staff, ICF performed a spreadsheet analysis of NTA solutions that included: (1) imports from Hydro-Quebec and New Brunswick into eastern New England representing an average flow on selected peak load days; (2) inclusion of Footprint Power and Cape Wind by June 2016; (3) updated 2013 CELT load forecasts; and (4) a second generator out in eastern New England (in lieu of assuming HQ Phase II is unavailable) (Exh. EFSB-PA-42(R)). Under this scenario, ICF stated that a spreadsheet analysis resulted in a resource gap of 286 MW by the revised end date of 2022, with smaller gaps in the intervening years (id. at 1). ICF stated that it may be feasible to fill such a gap from 2016 to 2022, but maintained that it would be challenging to do so and that it is doubtful that such an NTA would provide an actual solution to transmission reliability issues (id. at 2).

ICF illustrated the variability of its analysis to assumptions about the generator availability and future NTA levels by exploring sensitivity cases. One sensitivity case assumed retirement of Brayton Point Units 1 through 4; this increased the 2022 gap from 286 MW to 1,772 MW, with a 1,178 MW gap as early as 2013 (Exh. EFSB-PA-42(R) at 3). A sensitivity case with HQ Phase II modeled as unavailable instead of a second eastern Massachusetts

generator increased the 2022 gap from 286 MW to 681 MW (id.). ICF opined that achieving these levels of NTA integration to address the resource gap would likely be costly, difficult, and time-intensive, and it questioned whether enough customers would participate (id. at 11). ICF further suggested that many unknown issues and risks make the NTA approach far less robust than the Project (id. at 10).

ICF enumerated several reservations about the analysis requested by staff. ICF noted that in performing only a spreadsheet analysis and not a load flow analysis, it was unable to distinguish the efficacy of a generation resource placed centrally in the load zone from another in a more peripheral location (Exh. EFSB-PA-42(R) at 2). ICF also asserts that some of its earlier evaluations of DR were insufficiently pessimistic, largely based on continuing decreases in active DR bids into the FCM (id. at 2-4). ICF repeated its earlier views on solar as expensive and intermittent (id. at 4-6). ICF also expressed concerns about relying on Hydro-Quebec and New Brunswick imports for reliability purposes absent firm, long-term contracts (id. at 6-7). ICF also voiced concern about power plant retirements following removal of the price floor in FCA-8 (to be held in 2014) and in successive capacity auctions (id. at 7-8). Finally, ICF stated that performance of an NTA would be sensitive to variations in the rate of growth of peak demand (id. at 8).

H. Positions of the Parties

ISO-NE argues that together with the transmission owners, it devoted substantial efforts to identifying a range of potential transmission solutions, from which it selected IRP as the best (ISO Brief at 27). ISO-NE further argues that the September 2012 Solution Study confirmed that IRP continued to meet the identified need (id. at 28). The Attorney General reviewed the case record with respect to NTAs and the Hybrid Alternative, and argues that the Hybrid Alternative involves a substantial amount of speculation, risk, and cost uncertainty (AG Brief at 15-16). The Attorney General concludes that IRP is superior to alternative approaches in terms of cost, environmental impact, reliability, and ability to address the identified need (id. at 17).

I. Analysis and Findings

The record in this case illustrates how quickly facts that are central to NTA analysis can change, such as new generator additions and withdrawals, existing unit retirements, developments in public policies relating to EE, DR, and DG (particularly renewables), and various other market and economic conditions. Over the course of this proceeding, the Company evaluated the most promising means of avoiding, delaying, or modifying the Project to assess whether a less expensive means of satisfying the need could be identified. The Company's analyses confirmed that NTAs such EE, DR and DG and new central generation facilities under contract in the FCM, either alone or in combination, would not fully resolve the thermal violations that already exist under the contingencies in the eastern region of southern New England that ISO-NE evaluated.

In this case, for the first time in the Siting Board's history, a transmission project applicant offered a hybrid solution that includes both NTAs and a scaled-back transmission project that theoretically could meet reliability needs. The Company gave ample consideration to various hybrid solutions and determined that, while feasible, they were neither cost-effective nor particularly robust in the face of various uncertainties such as additional generator retirements or more rapid growth in peak load requirements. The record demonstrates that a combination of an upgraded 115 kV system in Massachusetts (in lieu of the proposed 345 kV IRP line), plus additional NTAs (such as EE, DG and DR), would not provide the equivalent reliability benefits of the Project, would be more costly, and would not offer any other significant identified advantages.

This proceeding occurred during a time of significant change in the electric power sector, with an unprecedented wave of generation retirement announcements, a surge in distributed power generation such as wind and photovoltaics, and some signs of market interest in new, more efficient and flexible central station projects such as Footprint Power. Given the long lead time to assess system needs, develop a transmission proposal, gain siting and permitting approval and, finally, commence and complete construction, compared to the relatively short time span required for a generator to exit the market, the importance of robust, long-term solutions such as IRP is increasingly apparent.

The NTA studies in this case also point out two important methodological realities that warrant continuing attention by the Siting Board, ISO-NE, and stakeholders: (1) at present, there are limitations on the ability of DR to provide a long-term solution to system capacity needs; and (2) as currently viewed in planning studies, the intermittent production profile of DG resources (such as photovoltaic power) severely limits the ability of this rapidly growing power source to defer or avoid traditional transmission projects. The role of DR in New England in fulfilling its potential of providing sustained long-term capacity benefits, and thereby deferring or avoiding long lead-time, capital-intensive transmission upgrades or other types of system capacity enhancements, is in need of continuing review by the Siting Board and others. With regard to DG resources, we note that ISO-NE has recently convened a working group to address how system planning can better evaluate the capacity benefits provided by DG facilities, despite their intermittent profile (absent storage technologies).

Given the extent and urgency of additional resources needed to ensure reliability, and the limitations in meeting such needs with the NTAs evaluated, the proposed Project would provide an effective and timely solution. In view of the above considerations, the Board finds that the Company's Project is the best approach among the numerous project alternatives considered in providing a robust solution to meeting reliability requirements at the least 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.

Hampden County at 35; Lower SEMA at 53-54; 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 345 kV transmission line between the Millbury No. 3 Switching Station and the West Farnum Substation (Exh. NEP-1, at 4-1). The Company stated that these two endpoints were selected because the most recent ISO-NE study indicated that the most urgent reliability need was the addition of a 345 kV line between those two stations (Exh. NEP-1, app. 3-3, at 37). The Company's study area is bounded by the Millbury No. 3 Switching Station to the north, the West Farnum Substation to the south, Interstate Route 395 to the west and Interstate Route 495 to the east (Exh. NEP-1, at 4-1). The Company stated that it did not consider route locations beyond these limits because it anticipated that any resulting routes would be significantly longer and result in greater environmental impacts and higher costs (id.).

The Company identified six potential routes within the study area, all of which employed existing utility or transportation corridors in order to avoid the costly and lengthy process of acquiring land or easements (Exh. NEP-1, at 4-3, 4-13 to 4-29). The Company stated that it used seven general criteria to identify the potential routes: (1) maximize the use of existing linear corridors; (2) minimize the need to acquire land or easements; (3) minimize impacts on densely developed areas; (4) minimize impacts to environmental resource areas; (5) minimize potential construction constraints (e.g., road crossings, work on ROWs owned by another utility); (6) minimize access constraints to facilitate maintenance work; and (7) minimize costs (id. at 4-3, 4-4, 4-30).

As shown in Table 14 below, three of the potential routes used existing overhead electric transmission corridors and three routes combined segments of existing overhead electric transmission corridors with segments of either railroad corridor, highway corridor, or gas pipeline corridor.

Table 14. Description of Six Route Alternatives

Alternative	ROW Description and Existing Uses	Miles (Total/MA only)	Control of ROW
Route 1	Follows active railroad line most of route and connects to NEP ROW near MA/RI border	21/16.2	Providence/Worcester Railway Co. and NEP ROW
Route 2	Median strip of divided limited access State Route146; connects to NEP ROW near MA/RI border	22/15.4	MassHighway for Route 146; NEP ROW
Route 3 **Route 3A**	Majority of MA route follows active Tennessee Gas Pipeline ROW and connect to NEP ROW near MA/RI border	23.1/14.3 22/17.3	Tennessee Gas Pipeline to NEP ROW
Route 4	Follows existing NEP ROW southeast from Millbury. ROW contains two active 115 kV lines and empty towers used for a former 69 kV line	20.2/15.4	NEP
Route 5	Follows existing NEP ROW east to West Medway, then southeast to Wrentham and finally southwest to West Farnum	37.1/30.4	NEP owns majority of ROW, but requires agreement with NSTAR for use of 2.5 miles of ROW
Route 6	Combines initial portion of Rt. 5 to W. Medway with use of 14.2 miles of NSTAR ROW from West Medway to Uxbridge where it connects to NEP ROW	35.2/30.4	NEP controls 16.2 miles of the ROW in MA while NSTAR controls 14.2 miles

Sources: Exh. NEP-1, at 4-16 to 4-30; RR-EFSB-30.

Using the criteria noted above, the Company deemed Routes 1, 2, and 3 as unsuitable due to land acquisition issues (with the associated costs and potential delays) and other concerns regarding densely developed areas, construction constraints, and system operations (Exh. NEP-1, at 4-13). The Company then focused its review on the remaining Routes (Routes 4, 5, and 6) in Table 14, above (id. at 4-16 to 4-30).

The next step in the Company's route selection process was to evaluate, score and rank the three remaining candidate routes to determine a preferred route ("Primary Route") and a geographically distinct Noticed Alternative Route. The Company compared the three candidate routes with respect to environmental impacts, reliability benefits, and costs. The Company evaluated environmental impacts relating to the following considerations: residential land use; commercial/industrial land use; open space; road crossings; historical/archeological sites; wetlands; rare species; water crossings; outstanding resource waters; areas of critical

environmental concern; tree removal; and vernal pools (Exh. NEP-1, at 4-33). The Company contends that for the Massachusetts portion of the three routes, Route 4 is preferable to Routes 5 and 6 for all environmental impact categories (id. at 4-35 to 4-36). The Company further contends that, Route 4 also has less environmental impact than Routes 5 and 6 considering both the Massachusetts and Rhode Island line segments of the respective routes (id. at 4-32 to 4-37).[35] The Company asserts that the residential environmental impacts for Route 4 are largely temporary and would occur only during construction rather than being permanent impacts related to ongoing operation of the line (Exh. EFSB-RS-1).

The Company estimated the costs to build the Massachusetts portions of each of the three routes and noted that the cost of Route 4 ($69.5 million) would be significantly less than the projected costs of Routes 5 ($198.1 million) or Route 6 ($181.2 million) (Exh. NEP-1, at 4-40). With respect to reliability, the Company stated that all three routes would employ the same basic overhead transmission technology, would require the same substation improvements, would meet relevant reliability standards, and would "generally provide comparable system reliability" (Exh. NEP-1, at 4-39, 4-40).

As the Primary Route, the Company selected Route 4, which had the least environmental impact and the lowest projected construction cost while meeting the reliability need (id.). In order to select the Noticed Alternative Route, the Company relied upon a comparison of the environmental impacts and geographic diversity of Routes 5 and 6 (Exh. NEP-1, at 4-41). The Company observed that Routes 5 and 6 have approximately the same overall weighted scores on environmental impact when the Massachusetts and Rhode Island portions of the Project are combined (id. at 4-41). However, the Company noted that on two criteria that it considers key to facilitating the permitting of overhead transmission lines – residential land use and tree removal – Route 5 is superior, as it avoids a significant portion of the total residential impacts and the tree removal impacts (id.). Therefore, the Company selected Route 5 as its Noticed Alternative Route.

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[35] The Company made this determination using a weighting methodology that reflects the Company's judgment as to the relative importance of the individual environmental impacts.

In past decisions, the Siting Board has found various criteria to be appropriate for identifying and evaluating route options for transmission lines and related facilities. These criteria include natural resource issues, land use issues, community impact issues, cost and reliability. Hampden County at 38; Lower SEMA at 55; 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.

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

3. Geographic Diversity

The Company described its Noticed Alternative Route as being 100 percent geographically diverse from the Primary Route, while Route 6 shares approximately 33 percent of the Primary Route (Exh. NEP-1, at 4-41). Although the Company selected a Noticed Alternative Route that offers 100 percent diversity from the Primary Route, the Company stressed its understanding that Siting Board precedent does not require that a noticed alternative route be 100 percent diverse from the primary route. Rather, it contends that Siting Board precedent merely suggests that there be "some measure of geographic diversity" between the primary and noticed alternative routes (Exh. EFSB-RS-6). The Company stated that it selected Route 5 as the Noticed Alternative based on its reduced environmental impacts on residential land use and reduced acreage of tree removal rather than its 100 percent route diversity (id.). The Siting Board finds that the Company's Noticed Alternative Route for the Project reflects some measure of geographic diversity.

4. Conclusions on Route Selection

The Company has: (1) 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 (2) 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.

The Siting Board notes that the Massachusetts portion of the Company's Noticed Alternative Route is approximately twice the length of the Project's Primary Route and is estimated to cost almost two and a half times more to construct than the Project using the Primary Route (Exh. NEP-1 at 5-72). Further, the Noticed Alternative Route crosses Areas of Critical Environmental Concern ("ACECs") in Upton, uses higher poles, and requires significantly more tree clearing than the Primary Route. Given that the designation of a Noticed Alternative Route requires that the Company expend significant funds,[36] and has the potential to raise concern among abutters and others in the impacted communities,[37] the Siting Board intends to give further consideration in the future as to whether its present requirement of a noticed alternative route is warranted in all cases.

B. Analysis of the Primary and Alternative Route

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

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[36] The Company estimates that it had spent $750,000 on the development of the Noticed Alternative Route through November 2012 to identify and inventory environmental impacts, develop preliminary engineering designs, analyze permit requirements, develop and distribute community outreach materials, provide legal notice to abutters and hold a public hearing in Milford (in addition to the hearing in Uxbridge) (RR-EFSB-33). This estimate excludes any Company's expenses during discovery and evidentiary hearings (id.).

[37] The Siting Board has not selected a noticed alternative route instead of a company's preferred route in the past 20 years.

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. Hampden County at 39; Lower SEMA at 57; Russell Biomass LLC, 17 DOMSB 1, at 34 (2009) ("Russell").

Accordingly, in the sections below, the Siting Board examines the environmental impacts, reliability and cost of the proposed facilities 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 Route and the Alternative Route 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. Introduction

Using the Primary Route for the Project, NEP would install a 345 kV overhead transmission line along existing ROWs approximately 15.4 miles from the Company's Millbury No. 3 Switching Station in Millbury, Massachusetts, through the towns of Millbury, Sutton, Northbridge, Uxbridge, and Millville to the Rhode Island border (Exh. NEP-1, at 5-2 to 5-3). The Primary Route would follow a ROW that is generally 250 feet wide and is presently occupied by two 115 kV transmission lines and steel lattice transmission towers (without wires) that remain from two 69 kV transmission lines that were taken out of service (id.).

Using the Alternative Route for the Project, NEP would install a 345 kV overhead transmission line from the Millbury No. 3 Switching Station along three existing ROWs for approximately 29.2 miles in Massachusetts through Millbury, Sutton, Grafton, Upton, Milford, Medway, Bellingham, Franklin and Wrentham to the Rhode Island border (id. at 5-3 to 5-4).[38] Presently, several transmission lines of different voltages are in the three ROWs, which vary in

[38] Both routes continue in Rhode Island to the West Farnum Substation: the Primary Route for another 4.8 miles and the Alternative Route for 7.9 miles (Exh. NEP-1, at 5-2 to 5-3).

width (id.). With use of either the Primary or Alternative Route, the Company would make additions to existing 345 kV and 115 kV facilities in Massachusetts and improvements to the Millbury No. 3 Switching Station (id. at 5-2 to 5-4). The two routes are shown in Figures 4 and 5, below.

Figure 4. Map of the Primary Route

Figure 5: Map of the Alternative Route

Sources: Exh. NEP-1, figures 5-2, 5-9.

3. Environmental Impacts

a. Land Use and Historic Resources Impacts

In general, both the Primary and Alternative Routes are located in lightly populated rural and suburban areas. On average, the Primary Route has approximately ten residences and/or other sensitive receptors per mile that fall within 300 feet of the edges of the ROW; the Alternative Route has approximately twelve per mile. The most prevalent land use along both the Primary Route and the Alternative Route is open land, including ROWs previously cleared and maintained by the Company for use as utility corridors (Exh. NEP-1, at 5-17 to 5-18). Beyond the edges of the cleared ROWs of both routes are significant forested areas that generally provide 300 feet or more of buffer (id.). Other land use classifications common to portions of each route include residential, commercial/industrial, agricultural, non-forested wetlands, water bodies, transportation, and other (such as cemetery, urban, public/institutional) (id.). As shown for each route in Table 15 below, the Company reported that sensitive receptors within 300 feet of the ROWs include residences, businesses, hospitals, schools (and school athletic fields), day care centers, places of worship, and farms (Exh. EFSB-LU-1, Att. (a), Att. (b)).

Table 15. Comparison of Residence Counts and Other Sensitive Receptors Within 300 Feet of ROW Edge

	Primary Route (15.4 miles)			**Alternative Route (29.2 miles)**		
Distance from ROW Edge	Residences	Other	Total	Residences	Other	Total
0- 25′ of ROW	9	1	10	10	3	13
25-50′ of ROW	10	0	10	26	7	33
50-100′ of ROW	20	0	20	47	6	53
100-200′ of ROW	41	2	43	109	11	120
200-300′ of ROW	58	5	63	127	8	135
Total	**138**	**8**	**146**	**319**	**35**	**354**

Sources: Exhs. EFSB-LU-1, Att.(a), Att.(b); EFSB-EMF-6

With regard to archeological resources, NEP conducted an analysis of both routes and determined that a Paleo-Indian pre-contact site is located within the Primary Route ROW. Given this finding, the Company developed an Archaeological Site Avoidance and Protection Plan ("ASAPP"), approved by the U.S. Army Corps of Engineers ("ACOE"), the Massachusetts State Historic Preservation Officer ("SHPO"), and Tribal Officers (Exh. EFSB-LU-14(S)). Based on NEP's ASAPP and associated Project modifications, the Company reported that the ACOE determined that the Project would not adversely affect the Paleo-Indian site identified within the Primary Route ROW (id.). The Company stated that it had also agreed to take avoidance and protective measures to protect certain items along the ROW identified as potentially significant by the tribal officers and the tribes they represent (id.).

Historic districts and other significant historic resources are nearby on both the Primary and Alternative Routes. The Company stated that, in conjunction with the Massachusetts Historical Commission ("MHC"), it would develop a strategy to minimize impacts to any historic districts currently listed, or with the potential for listing, on the Massachusetts or National Historic Registers (id.; Exh. NEP-1, at 5-31).

Table 16. Archeological and Historic Resource Impacts of the Primary and Alternative Routes

	Primary Route	**Alternative Route**	**Millbury No. 3 Switching Station** **(Same Upgrade for Primary and Alternative Route)**
Archeological Resources	Nine sites of potential archeological significance; one Paleo-Indian site within the ROW; seven pre-contact Native American sites near ROW.	No archeological resources identified.	No archeological resources identified.
Historic-MHC-Architectural Resources	Three historic districts now listed on the MHC or National Historic Register. One remnant 19th century foundation No adverse impacts anticipated.	Two listed historic districts near ROW. MHC shows 13 areas & 175 individual properties not yet evaluated that are near alternative ROW and have potential for listing on Massachusetts or National Historic Register.	No historic resources identified.

Sources: Exhs. NEP-1, at 5-29 to 5-34; EFSB-LU-1, Att. (a), Att. (b); EFSB-LU-6; EFSB-LU-8; EFSB-LU-13; EFSB-LU-14.

The Company explained that installation of new facilities would result in many more acres of tree removal/pruning along the Alternative Route than the Primary Route (Exh. NEP-1, at 5-23, 5-34 to 5-37). NEP anticipated that in most cases along both routes, remaining forest area would be sufficient to maintain present wildlife habitat (id.). The Company expected an expansion of habitat area of herbaceous plants, shrubs, and short trees where larger trees would be removed. (id.). Regardless of the transmission route selected, NEP expected to remove 0.6 acres of vegetation in previously disturbed areas at the Millbury No. 3 Switching Station to accommodate proposed storm water improvements (id. at 5-36).

Table 17. Vegetation and Species Impacts of the Primary and Alternative Routes

	Primary Route	**Alternative Route**	**Millbury No. 3 Switching Station (Same Upgrade for Primary and Alternative Route)**
Removal/Tree Pruning (Impacts in Acres)			
Tree Removal in Forested Uplands - in ROW Off ROW	9.0 2.8	87.8 n/a	n/a
Tree Removal in Forested Wetlands	1.3	7.4	n/a
Tree pruning	9.6	16.6	n/a
Total	22.7	111.8	0.6
Additional Vegetation Control (Herbicides)			
Herbicides	Herbicides currently used for vegetation maintenance. No additional herbicides necessary beyond those currently applied.	Need to increase herbicide use above current levels for vegetation management following tree clearing.	None
Rare Species and Impacts on Rare Species Habitat			
Description and count: listed rare/endangered species	Four state-listed wildlife species and two state-listed plant species at a total of three locations. No federally listed species present.	Five state-listed wildlife species, no state-listed plant species at a total of six locations. No federally listed species.	No state-listed wildlife or plant-species. No federally listed rare or endangered species.
Rare Species Habitat Impact (acres of trees removed)	1.3	4.1	None

Source: Exh. NEP-1, at 5-34 to 5-37, 5-45 to 5-49.

The Company stated that it would put in place mitigation plans under the Natural Heritage and Endangered Species Program ("NHESP")[39] to reduce impacts to rare species and habitats along either route (Exh. NEP-1, at 5-45 to 5-49).[40] NEP reported that NHESP had determined that the Project would result in a "take" of a state-listed rare species (the wood turtle) in Uxbridge. NEP further reported that NHESP permits a project resulting in a "take" of a state-listed species only if the Project meets the standards for issuance of a MESA Conservation and

[39] NHESP regulates state-listed endangered, threatened, and special concern plant and wildlife species pursuant to the Massachusetts Endangered Species Act ("MESA") (Exh. NEP-1, at 5-46).

[40] Specifically, the Company would consult with NHESP to determine whether protection of rare species habitat might require time-of-year restrictions for certain aspects of construction (Exh. NEP-1, at 5-48, 5-49).

Management Permit ("CMP") (Exh. EFSB-RS-1). The Company applied for a CMP in response to the NHESP's "take" determination (Exh. EFSB-RS-1(S3)). NHESP issued a CMP to the Company on May 30, 2013 (see Exh. EFSB-RS-1(S3)(Att. 1)).

The Company stated that Smithfield, Rhode Island, would be the principal staging and laydown site for the Massachusetts and Rhode Island portions of the Project; supplemental staging and laydown would occur at One Lackey Dam Road in Douglas, Massachusetts. Supplemental materials storage for work at the Millbury No. 3 Switching Station would occur at 15 Harback Road in Sutton, Massachusetts (Exhs. EFSB-LU-4(S2); EFSB-LU-4(S3)).[41] The Company described the One Lackey Dam Road property as industrially zoned, located inside a fenced sand and gravel pit, and approximately 2,385 feet from the nearest residence (Exh. EFSB-LU-4(S2)). The Company indicated that the 15 Harback Road property was paved and located within the secure, industrially zoned facilities of a manufacturer of prefabricated steel buildings (Exh. EFSB-LU-4(S3)). NEP stated that Project traffic would, on average, access the 15 Harback Road storage area two to three times per week (id.).[42]

While the types of land use impacts are similar for both routes, the length of the Alternative Route is significantly greater, resulting in more extensive land use impacts. As summarized in Tables 16 and 17 above, the land use impacts of the Project, including historic and archeological resources, tree clearing, tree pruning, vegetation removal and control, rare species, and rare species habitat impacts are greater along the Alternative Route than the Primary Route. Accordingly, the Siting Board finds that the Primary Route is preferable to the Alternative Route with respect to land use and historic resource impacts.

The Siting Board notes the Company will work with the ASAPP and as otherwise directed by the Massachusetts SHPO to avoid and protect historic resources; further, the

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41 NEP explained that, in keeping with Company practice, its contractor would be responsible for final siting of Project staging and laydown in Massachusetts (Exh. EFSB-LU-4(S)).

42 The Company stated that entry to the Harback Road storage area would be via Route 146 and Harback Road (Exh. EFSB-LU-4(S3)). The Company indicated that the access way to the storage area accommodates large trucks and trailers (id.). The Company also reported that the closest residences are 300 feet and 350 feet away from the storage area (id.).

Company will avoid and protect historic resources as directed by the MHC. The Siting Board also notes that the Company (1) has consulted with the NHESP with regard to establishing a CMP and time-of-year restrictions for rare species habitat protection, as necessary, with specific attention to the wood turtle and its habitat; (2) NHESP has approved the Company's CMP; and (3) the Company has provided a copy of its NHESP-approved CMP to the Siting Board.

The Siting Board further notes recent modification of the Company's storage, staging, and laydown arrangements to include storage, staging, and laydown areas -- at One Lackey Dam Road in Douglas, Massachusetts and at 15 Harback Road in Sutton, Massachusetts, in addition to the principal area planned for Smithfield, Rhode Island. Both Massachusetts staging areas are located at sites currently used for industrial purposes consistent with proposed Project activities. The Siting Board reminds the Company that it must notify the Siting Board of any further modifications or additions to NEP's storage, staging, and laydown for the Project. Given implementation of the mitigation measures and conditions, the Siting Board finds impacts on land use, historic resources, and archeological resources along the Primary Route would be minimized.

b. Wetland and Water Resource Impacts

The Company presented information, summarized in Table 18 below, regarding potential impacts to wetlands and water resources along the Primary and Alternative Routes.

Table 18. Impacts to Water Resources/Wetlands/Vernal Pools

	Primary Route	Alternative Route	Millbury No. 3
Affected Wetlands (Acres)	Temporary: 12.65	Temporary: 57-63	None in construction area
	Permanent: 9.35	Permanent: 42-47	
	Total: 22	Total: 99 - 110	
Vernal Pools	One Certified Vernal Pool ("CVP"); 16 Potential Vernal Pools ("PVP")	Two CVPs; eleven PVPs	None in construction area
Waterbody Crossings	Eleven perennial streams; three rivers; one pond	21 perennial streams; two rivers; one pond	None in construction area

Source: Exh. NEP-1, at 5-38 to 5-45.

NEP has a current Vegetation Management Plan ("VMP") and a Yearly Operational Plan ("YOP") approved by the Department of Agricultural Resources ("DAR") under DAR's ROW regulations, 333 CMR 11.04(4)(c)(2) (Exh. EFSB-LU-5). The intent of these regulations and

plans is to prevent contamination of water resources and wetlands during vegetation maintenance activities (id.).

NEP described erosion controls and general best management practices ("BMPs") it would implement to minimize impacts to wetland and watercourse resources (Exh. NEP-1, at 5-44 to 5-55). The Company proposed to offset any permanent, temporary, and secondary wetland impacts (id.). Specifically, the Company indicated that it would cooperate with Massachusetts Department of Environmental Protection ("MassDEP") to meet that agency's wetland mitigation requirements; [43] with MassDEP and the ACOE to satisfy state and federal wetland impact mitigation requirements during the Section 401 and 404 permitting process; and with local Conservation Commissions to meet wetland and water resources mitigation requirements at the municipal level (id.).[44] NEP stated it would need to set aside lands to comply with ACOE Section 404 Permit requirements for impact mitigation, and that the Company owns sufficient land for the Primary Route to meet the set-aside requirement (Exhs. EFSB-LU-3; EFSB-LU-10). The Company indicated it may need to acquire additional land to meet the Section 404 set aside for the Alternative Route (Exh. EFSB-LU-3).

As indicated in Table 18 above, use of the Alternative Route would result in greater wetlands impacts and more extensive water-related impacts, including waterbody crossings and vernal pool impacts. Accordingly, the Siting Board finds that the Primary Route is preferable to the Alternative Route with respect to wetland and water resources.

The Company is proposing mitigation, including implementation of erosion controls and general BMPs, and to offset any permanent, temporary, and secondary wetland impacts as required by local, state, and federal agencies including local Conservation Commissions, MassDEP, and the ACOE. In addition, the Company has a VMP to address herbicide use.

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43 M.G.L. c. 131, § 40 and 310 CMR 10.00 address MassDEP's wetland mitigation requirements. The Company has entered into a Memorandum of Agreement with MassDEP, consistent with G.L. c. 21A, § 18(d) seeking Fast Track review and approval of IRP in Massachusetts (Exh. NEP-1, at 5-44 to 5-45).

44 The Company has received Orders of Conditions from the Conservation Commissions of the Massachusetts communities along the Project route where impacts to wetlands might potentially occur, i.e., Millbury, Sutton, Northbridge, Millville, and Uxbridge (Exhs. EFSB-W-4; EFSB-RS-1(S)).

Therefore, the Siting Board directs the Company to ensure that under its continuing vegetative management program, any application of herbicides is consistent with utility right-of-way Integrated Vegetation Management Practices and applicable rules and regulations of the Commonwealth. Given the mitigation and condition, the Siting Board finds that impacts to wetlands and water resources along the Primary Route would be minimized.

c. Noise Impacts

The Company's noise analysis is based on assessing noise impacts (primarily from construction within the ROW) to sensitive receptors within 50 feet of the ROW edge (Exhs. EFSB-NO-6; EFSB-NO-6(a) (Att.)).[45] NEP reported that noise levels of construction equipment associated with transmission line installation along either route would range from approximately 60 A-weighted decibels ("dBA") (for pickup trucks) to 90 dBA (for dump trucks and heavy duty mowers) measured at 50 feet from the noise source (Exh. NEP-1, at 5-57). The Company also indicated that helicopters might be used for removing towers, setting new structures, or line stringing in areas where access was otherwise difficult (id.). NEP anticipated short-term noise associated with helicopter use would range from approximately 83 to 91 dBA.

With regard to noise impacts, construction activities, sequencing, and associated noise levels would be similar for either the Primary or Alternative Route. However, as noted above, the route length and number of sensitive receptors along the Alternative Route are significantly greater than they are along the Primary Route; consequently, noise impacts associated with the Project along the Alternative Route would be greater than along the Primary Route. Accordingly, the Siting Board finds that the Primary Route is preferable to the Alternative Route with respect to noise impacts.

The Company would not install any new noise-generating equipment at the Millbury No. 3 Switching Station, where NEP has proposed Project-related improvements (Exh. EFSB-NO-20). In addition, the NEP stated that the Switching Station is more than 1,000

[45] See Table 12 above, for a breakdown of receptor locations for the Primary and Alternative Routes (Exh. NEP-1, at 5-19).

feet from the nearest residence and the Company did not anticipate noise impacts of construction at this location (id.).

To mitigate noise impacts of construction, the Company stated it would: require well-maintained equipment with functioning mufflers; prohibit extended idling of construction equipment; operate stationary noise generating equipment, such as whole tree chippers and compressors, away from nearby residences as it is able to do so; confine the operation of noise generating equipment to daylight hours to the extent practicable; comply with the requirements of local noise ordinances, if any, and seek variances only when absolutely necessary; and, coordinate with ROW abutters when unusual levels of noise might be generated adjacent to their residences for extended periods, such as in the case of a rock-drilled foundation excavation of unusually long duration (Exh. EFSB-NO-1). The Company proposed: (1) a Monday through Friday construction day beginning at 7:00 a.m. and continuing for ten-to-twelve hours, depending on season and daylight; and (2) Saturday construction beginning at 7:00 a.m. but ending no later than 5:00 p.m. regardless of the season (Exhs. EFSB-NO-1; EFSB-NO-13). The Company anticipated construction noise of only limited duration along the ROW at any given location (Exhs. EFSB-NO-1; EFSB-NO-14; EFSB-NO-18).[46]

Transmission line construction is noisy by nature, however; accordingly, to ensure mitigation of Project noise impacts to the extent possible, the Siting Board directs the Company to conduct weekday construction from 7:00 a.m. to 6:00 p.m., to conduct no work on Sundays and holidays, and to begin Saturday work at 9:00 a.m. rather than at 7:00 a.m. as the Company has proposed, and to end work on Saturday no later than at 5:00 p.m. Should the Company find that construction performed outside these hours or on holidays or Sundays is necessary, the Company shall seek written permission from the relevant municipal authority prior to the

[46] The Company estimated that at a given location, vegetation removal would require one to two weeks; installation of erosion and sediment controls and access road improvements and maintenance would require one day to one week; removal and disposal of existing transmission line components would require two days; installation of foundations and structures would require two days to two weeks usually, but as many as three weeks or more depending on the depth and hardness of rock encountered; the actual work of conductor and shield wire installation would require two to three hours; and ROW restoration would require one day (Exhs. NEP-1, at 5-57; EFSB-NO-7).

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 whether Sunday, holiday or extended weekday or weekend construction should occur, the Company may file a written request for prior authorization from the Siting Board, provided that it also notifies the relevant municipal authorities in writing of such request.

Furthermore, the Siting Board directs the Company, in consultation with the towns of Millbury, Sutton, Northbridge, Uxbridge, and Millville to develop a combined or, separately for each town, a community outreach plan for construction of the Project. The outreach plan(s) should, at a minimum, set forth procedures for providing prior notification to affected residents of: (1) the scheduled start, duration, and hours of construction; (2) any construction the Company intends to conduct that, due to unusual circumstances, must take place outside the hours detailed above; (3) the availability of web-based Project information; and (4) complaint and response procedures including the Company's contact information.

The Siting Board finds that, with the implementation of the Company's proposed mitigation, in addition to implementation of conditions limiting construction hours and development of a community outreach plan, noise impacts resulting from the construction of the Project along the Primary Route would be minimized.

d. Visual Impacts

The Company presented information, summarized in Table 19, below, regarding potential visual impacts along the Primary and Alternative Routes.

Table 19. Visual Impacts (Changes in Pole Heights and Residential Views)

Current View of Existing Facilities for Residences ≤ 300' from ROW			
	Primary Route	Alternative Route	Millbury No. 3 **(Same Upgrade for Primary and Alternative Route)**
No view	55	90	No change
Partially obstructed	93	220	
Unobstructed	4	37	
Change in View, Post-Construction for Residences ≤ 300' from ROW			
	Primary Route	Alternative Route	Millbury No. 3
Residences ≤ 300' from ROW	152	347	No change
no change	134	253	
minor change	10	44	
moderate change	3	31	
major change	5	19	
residences w/ some change	18	94	
% residences w/ some change	12 percent	27 percent	
Pole Heights			
	Primary Route	Alternative Route	Millbury No. 3
New structure heights	Avg. height existing: 75 ft. Typical new: 85-90 ft. Height range: 60-140 ft.	Comparable pole heights but a longer route	The proposed structures within the Millbury Switching Station will not exceed the height of existing structures

Sources: Exhs. NEP-1, at 5-2 to 5-5, 5-54; EFSB-V-9; EFSB-V-9(a) Att.; EFSB-V-10(a)Att.; EFSB-LU-6.

NEP stated that the construction of Line 366 along either the Primary Route or the Alternative Route would be on steel H-frame structures, with construction on steel monopole structures at a limited number of locations (Exh. NEP-1, at 5-3 to 5-5; Tr. 1, at 161-162). According to the Company, typical structures would be approximately 85 feet to 90 feet tall; existing structures along both routes are 75 feet tall on average (Exh. NEP-1, at 5-3 to 5-5). The Company anticipated that the height of structures for the Project in Massachusetts along the Primary or the Alternative Route would range from 60 feet to 140 feet (id.).

The Company indicated that along either the Primary or Alternative Route, it would use the shortest support structures feasible for the Project given the voltage of the transmission line and the safety clearances required (Exh. NEP-1, at 5-3 to 5-5). As shown in Table 19, relative to the Primary Route, the Alternative Route would result in more significant visual impacts of the Project for a greater number of nearby residents. In addition, the longer length of the Alternative Route would result in a greater number of new structures than on the Primary Route

(RR-EFSB-9). Accordingly, the Siting Board finds that the Primary Route is preferable to the Alternative Route with respect to visual impacts.

To minimize visual impacts of the Project along the Primary Route, the Company stated it would install new structures near existing 115 kV transmission line equipment or at the previous location of the dismantled 69 kV transmission line equipment (Exh. NEP-1, at 5-55). The Company also submitted a Visual Mitigation Plan to address visual impacts to property owners (Exhs. EFSB-V-10(S); EFSB-V-10(a)(S) Att.). Under provisions of the Visual Mitigation Plan, the Company has proposed a protocol for contacting all owners of properties within 300 feet of the ROW where construction of the Project might negatively affect the view (Exh. EFSB-V-10(a) Att.). As part of the Visual Mitigation Plan, the Company would provide property owners with access to landscaping services (including fences or walls) through their own contractors or contractors engaged by the Company (id.). The Visual Mitigation Plan would establish a budget and specific requirements for the Company in connection with its obligations to affected property owners along the Primary Route (id.).

In several recent transmission line cases the Siting Board has directed the petitioners to implement an off-site screening program consisting of vegetative plantings and/or other screening. Here, the Company has proactively developed its own off-site screening program, referred to as the Visual Mitigation Plan described above. The Siting Board commends the Company for addressing the need to mitigate the visual impacts associated with the construction of the proposed transmission line along the Primary Route. However, while the intent and concept of the Visual Mitigation Plan generally address the issue of visual mitigation, to be consistent with other recently approved projects, the Siting Board directs the Company to incorporate the following requirements into its Visual Mitigation Plan:

(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 therefor; (iv) a general description of the types of off-site landscaping provided; and (v) the average cost of landscaping per property.

The Siting Board finds that, with the Company's proposed placement of new structures to minimize visual impacts, and with the condition regarding the implementation of the off-site

screening program described above, visual impacts from construction of the Project along the Primary Route would be minimized.

e. Magnetic Field Impacts

The Company modeled pre-Project and post-Project magnetic field levels in milligauss ("mG") for the Primary Route and the Alternative Route under existing and proposed configurations for both annual average loading ("AAL") and annual peak loading ("APL") (Exhs. NEP-1, at 5-62 to 5-71; NEP-1, at 5-1 to 5-63).[47] Table 20 below, shows the AAL magnetic field level comparison for existing conditions and modeled magnetic field levels for 2020, post-Project.

For the Primary Route, there are approximately 19 residences within 50 feet of the edges of the ROW, and 20 residences within 50-100 feet of the edges of the ROW (see Table 15 above; Exh. EFSB-EMF-6). For the Alternative Route there are approximately 36 residences within 50 feet of the edges of the ROW, and 47 residences within 50-100 feet of the edges of the ROW (See Table 15).

[47] Depending on patterns of power demand on the bulk transmission system, magnetic fields can change hourly, or over longer time periods (Exh. NEP-1, app. 5-2). NEP explained that it used forecasted AAL for modeling magnetic fields because AALs provide good predictions of the magnetic fields on any randomly selected day of the year (Exh. NEP-1, app. 5-2, at 2). NEP also calculated magnetic fields for annual peak loading ("APL") to capture maximum loading that might occur for a few hours or days during the year (id.).

Table 20. Magnetic Field Levels – Primary Route[48]

Segment	Annual Average Magnetic Field Levels, Pre- and Post-Construction, mG									
	West Side of ROW (w/ number of homes within 50′)				Maximum on ROW		East Side of ROW (w/ number of homes within 50′)			
	50′ off ROW		Edge-of-ROW		Maximum		Edge-of-ROW		50′ off ROW	
	Pre	Post	Pre	Post	Pre	Post	Pre	Post	Pre	Post
MA-1A	0.5	10.5 (5)	0.9	29.5	20	94.5	3.3	6.0	1.3	3.3 (3)
MA-2	N/A	9.9 (3)	N/A	28.4	N/A	97.0	N/A	28.4	N/A	9.9 (0)
MA-3	0.3	10.4 (3)	0.6	29.2	9.8	94.9	1.1	3.7	0.4	2.4 (3)
MA-7	0.4	2.0 (3)	0.8	4.2	32.7	100.0	1.0	27.4	0.5	9.3 (2)

Sources: Exhs. NEP-1, at 5-64; EFSB-EMF-7

Magnetic field levels decrease as the distance increases from the transmission line (Exh. NEP-1, at 5-62). With respect to Project construction along the Primary Route, the Company stated that magnetic field levels would increase from existing levels on both ROW edges and in almost all ROW cross-sections, with larger increases on the west ROW edge adjacent to the proposed 345 kV transmission line (id. at 5-63). For the Alternative Route, the existing modeled magnetic field levels are more varied and somewhat higher than along the Primary Route (id. at 5-66). However, with Project construction along the Alternative Route, magnetic field levels would decrease from existing levels along some of the cross-sections (id. at 5-66 to 5-67).[49]

The Company considered different phasing configuration of the new 345 kV line in order to minimize magnetic field levels (Exh. NEP-1, app. 5-2, at 15). The Company explained that the proposed configuration is the aggregate optimal phasing which resulted in the minimum magnetic fields at the edge of the ROW taking all segments together, for 2020 AALs (id.). In

48 To model magnetic fields, the Company divided up the Massachusetts portion of the Primary Route into eight segments (Exhs. NEP-1, at 5-64; EFSB-EMF-1). Table 20 does not include Segments MA-1, MA-4, MA-5, and MA-6 since there are no homes within 50 feet of the edge of the ROW; zero to three homes within 50 to 100 feet of the edge of the ROW; and the pre- and post-project magnetic field levels identified by the Company are similar (Exh. EFSB-EMF-1).

49 Along the Alternative Route, existing AAL magnetic field levels range from 0.5 mG to 39.5 mG at the ROW edge; post construction, these levels would range from 2.2 mG to 26.1 mG in 2020 (Exh. NEP-1, at 5-67).

addition to optimizing phasing, the Company asserted that by locating the proposed line on an existing ROW and using the Primary Route, which minimizes the number of residences in proximity to the ROW, it has taken reasonable and prudent steps to minimize magnetic field levels (id. at 5-71). The Company also evaluated a number of mitigation alternatives including: (1) structure height increases; (2) placing the new line closer to the center of the ROW; (3) delta or vertical configurations; (4) reducing the spacing between phase conductors; (5) phase rolls (optimal phasing for each segment); (6) undergrounding the transmission line; (7) passive shielding loops; and (8) split phasing (Exh. EMF-2; RR-EFSB-23). The Company concluded that the items listed above would be either too costly and/or not cost-effective, could increase environmental impacts such as visual, land use, and construction noise impacts, and could potentially increase magnetic field levels in some locations along the ROW (RR-EFSB-23).

The record shows that calculated magnetic field levels would decrease in some sections along the Alternative Route, while magnetic field levels along the Primary Route would increase in all sections. Fewer homes, however, are within 50-foot of the Primary Route ROW edge than within the same area of the Alternative Route. Further, calculated magnetic field levels along both the Primary Route and Alternative Route ROWs would be within approximately the same range with construction of the Project. The Siting Board therefore finds that the Primary Route and Alternative Route are comparable with respect to magnetic fields.

The Project would incorporate certain measures to minimize magnetic field levels, including, but not limited to: (1) the location of the Project on an existing ROW, which creates some magnetic field cancellation; (2) use of phase arrangements that maximize such magnetic field cancellation; and (3) selection of a ROW with a relatively small number of nearby residences. The Company considered some additional measures to reduce magnetic field impacts for residences near the ROW. Those measures, however, would increase Project costs substantially and could increase environmental impacts; they potentially would reduce magnetic field impacts in some parts of the ROW but increase magnetic field impacts elsewhere. The Siting Board finds that the magnetic field impacts from transmission line construction and operation along the Primary Route would be minimized.

f. Traffic

The Company asserted that Project construction would have minimal traffic impacts (Exh. NEP-1, at 5-60). The Company plans to deliver vehicles, equipment, and material to laydown yards first, then to the ROW along a route that would minimize inconvenience to the public (Exh. EFSB-T-3). NEP indicated that its principal staging and laydown area would be in Smithfield, Rhode Island, with possible supplemental use of the Millbury No. 3 Switching Station (Exh. EFSB-LU-4). The Company anticipated temporary roadway closures, 37 for the Primary Route and 66 for the longer Alternative Route, to string new transmission lines over public roadways (Exh. NEP-1, at 5-60). The Company stated that its contractor would coordinate with local police departments to arrange traffic management as required (Exh. EFSB-T-3).

According to the Company, construction crew traffic, approximately 75-to-100 workers daily, would travel during Project installation from staging to construction areas along either the Primary or the Alternative Route (Exh. NEP-1, at 5-59 to 5-61). The three major construction activities – site prep, drilling, and transmission line construction – would be spread out along the ROW, not concentrated in one location (id.). NEP reported that the location of the Millbury No. 3 Switching Station was at the end of a short, dedicated road with no outlet; 15-to-20 construction crew vehicles would enter and exit the site daily over approximately 20 months (id.).

The potential traffic impacts of the Project along both the Primary and Alternative Routes would be minimal. For both routes, the Company has indicated the possible use of two staging and equipment laydown areas – an area at the Millbury No. 3 Switching Station and a site in Smithfield, Rhode Island. Based on Company estimates, twice as many road closures would be necessary to string transmission lines over roadways if the Project were constructed along the Alternative Route than if constructed along the Primary Route. Furthermore, the longer Alternative Route would extend the Project's temporary traffic construction impacts beyond the duration of such impacts along the Primary Route. Consequently, the Siting Board finds that the Primary Route is preferable to the Alternative Route with respect to traffic impacts.

The Company has proposed mitigation measures to minimize traffic impacts of the Project, including, but not limited to, development and implementation of traffic management

plans, appropriate signage for work zones, the use of flaggers, selection of the shortest feasible delivery routes for materials, use of police details when and where appropriate, timely communication of Project schedules to local officials and residents, and acquisition of all necessary state highway permits (Exh. NEP-1, at 5-60 to 5-61).

Because the Company has not yet finalized its plans to mitigate traffic impacts of the Project, the Siting Board directs the Company, in consultation with municipalities and Company contractors, to develop and implement a traffic management plan to minimize traffic disruption. The Company's plan shall include, but not be limited to, the following measures: (1) signs erected to identify construction work zones; (2) police details and/or flagmen to direct traffic near public road crossings; (3) police details and/or flagmen to direct traffic at construction work sites along roads; and (4) the use of the shortest feasible construction material delivery routes. Given the above mitigation and condition, the Siting Board finds that the traffic impacts from construction and operation of the transmission line along the Primary Route would be minimized.

g. Air Impacts

As a transmission facility, operation of the proposed Project along either the Primary Route or the Alternative Route generally would not contribute to air impacts. Emissions from construction vehicles are a concern, however. The Company has committed that all diesel-powered non-road construction equipment with engine horsepower (hp) ratings of 50 and above used for 30 or more days over the course of Project construction will have EPA-verified (or equivalent) emission control devices installed, such as oxidation catalysts or other similar technologies (Exh. NEP-1, at 5-15). NEP also stated that it would, in keeping with Company policy, use ultra-low sulfur diesel fuel and require that all construction vehicles (whether operated by the Company or by a construction contractor) limit vehicle idling to no more than five minutes in most cases (id.).[50]

[50] In accordance with the Massachusetts anti-idling requirements (M.G.L. c. 90, § 16A; c. 111, §§ 142A – 142M; and 310 CMR 7.11), the Company would limit idling time to five minutes unless engine power were necessary for the delivery of materials or to operate vehicle accessories such as power lifts (Exh. NEP-1, at 5-15).

The Company indicated that proposed changes at its Millbury No. 3 Switching Station would have potential implications for air impacts of the Project (Exh. EFSB-A-4). The Company reported that five circuit breakers using sulfur hexafluoride gas ("SF_6") are presently in place at the Switching Station, with a total of 1,825 pounds of SF_6 (id.). NEP explained that upgrades performed as part of the Project would result in the replacement of three of the five existing circuit breakers and the addition of four new circuit breakers at the Switching Station, resulting in nine circuit breakers with a total SF_6 quantity of 3,285 pounds (id.).[51,52] NEP indicated it would not store any SF_6 on site in conjunction with the Project (id.).

NEP stated that its Project-related SF_6 leakage rate would likely be less than 0.5 percent per year, and that this rate would be consistent with NEP's procurement specifications (i.e., purchase of circuit breakers with an SF_6 leakage rate of less than 0.5 percent per year) (Exhs. EFSB-A-4; EFSB-A-8; RR-EFSB-13).[53,54]

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51 The Massachusetts Clean Energy and Climate Plan for 2020 identifies SF_6 as a non-toxic but highly potent greenhouse gas ("GHG") and estimates one pound to have the same global warming impact as eleven tons of CO_2. See G.L. c. 21N. Reducing SF_6 emissions is an important policy goal of the Clean Energy and Climate Plan. The Siting Board's mandate requires it to ensure the consistency of new energy facilities with the Commonwealth's current health, environmental protection, and resource and development policies. In accordance with this mandate, the Siting Board reviews the Company's proposed use of SF_6 to ensure reduction of SF_6 emissions to the maximum extent possible.

52 The Company reported that it has a total nameplate capacity of 106,014 pounds of SF_6 for all equipment at its Massachusetts facilities (Exh. EFSB-A-2).

53 NEP distinguished between the design SF_6 emission rate and the manufacturer-provided commercial guarantee for the annual average emission rate of the proposed equipment (Exh. EFSB-A-8). The Company stated that it would use circuit breakers with a design emission rate of not more than 0.1 percent per year (id.). The Company specified that the manufacturer (Mitsubishi) of the equipment it would use guaranteed SF_6 emissions of no more than 0.5 percent per year (id.). The Company reported, based on a review of equipment suitable for its Project, that the design emission rates and guaranteed annual average rates for its proposed circuit breakers were standard for the industry (id.).

54 NEP provided vendor data stating that, while Mitsubishi does not test or guarantee its circuit breaker to the 0.1 percent level, its field data and original design verification data are consistent with a 0.1 percent leakage rate (RR-EFSB-14(S2)).

With respect to mitigation, NEP reported that it entered into an SF_6 Emissions Reductions Partnership Memorandum of Understanding ("MOU") with the USEPA in December 2003 (Exh. EFSB-A-3). NEP explained that, in the course of construction and operation of the Project, it would activate elements of the Company's SF_6 reduction program, including, but not limited to, monitoring, prioritizing, and repairing leaking SF_6 equipment, and providing SF_6-specific training to its maintenance employees (Exhs. EFSB-A-4; EFSB-A-7(A)).

The Company reported that the improvements for its Millbury No. 3 Switching Station, and therefore the use of SF_6, would be the same whether construction of the Project occurred along the Primary or the Alternative Route (Exh. NEP-1, at 5-5).

The Siting Board notes that air impacts along the Primary Route and the Alternative Route would be comparable in nature, but that the greater length of the Alternative Route and the resulting longer duration of construction would produce greater construction equipment air impacts. The Siting Board finds construction along the Primary Route is preferable to the Alternative route with respect to 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.

As NEP has agreed, the Siting Board directs that the Company ensure 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. In terms of SF_6 air impacts, NEP has proposed installing circuit breakers at its Millbury No. 3 Switching Station with a guaranteed SF_6 emissions rate of no more than 0.5 percent per year and a design annual SF_6 leakage rate of less than 0.1 percent, along with pressure switches with alarms and leak

detection equipment.[55] The Company would also comply with USEPA SF_6 reporting requirements. In addition, the Siting Board directs the Company to inform the Board if it adds SF_6 to any equipment at its Millbury No. 3 Switching Station or replaces any equipment at the Millbury No. 3 Switching Station due to SF_6 loss within five years of the completion and initial operation of the Project, after which time the Company will consult with the Siting Board to determine whether the Siting Board will require continuing reporting, as deemed appropriate.[56] The Company will also annually submit to the Siting Board a copy of its annual SF_6 report to MassDEP.

With the diesel retrofit conditions noted above and the Company's reliance on new equipment to help minimize future SF_6 leakage rates, the Siting Board finds that, potential emissions impacts from the Project's construction and operation along the Primary Route would be minimized.

h. Other

The Company indicated that construction of its Project would involve certain hazardous materials including Mineral Oil Dielectric Fluid ("MODF") in voltage transformers and station service transformers, acid in batteries, and diesel fuel in an emergency generator at its Millbury No. 3 Switching Station (Exh. EFSB-S-2). The Company also anticipated the need to dispose of hazardous paints (containing lead and cadmium) in conjunction with removal of existing 69 kV metal transmission structures along the Primary Route ROW in preparation for Project

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55 In April 2014, MassDEP promulgated final regulations that require companies to purchase new gas-insulated switchgear with a manufacturer's guaranteed SF_6 emission rate of one percent or less. The new regulations also include requirements for maintenance and handling of SF_6, and require that National Grid and NSTAR comply with a declining SF_6 emission rate standard by 2020 (see 310 CMR 7.72).

56 In the Hampden County Decision, the Siting Board directed NEP to provide a compliance filing within one year of operation of the West Hampden Substation detailing the actual SF_6 leakage rate at the Substation. Hampden County at 66. In the instant case, the Company has stated that it is not technically feasible to measure the SF_6 leakage rate of the breakers to determine if they are meeting the design leakage rate (Tr. 3, at 431-434, 447-452).

construction (id.). [57] To ensure safe handling and storage of hazardous substances during construction and operation of the Project, the Company stated it would ensure its contractors' adherence to regulatory requirements, best management practices, and a Project-specific spill prevention, containment, and response plan (Exh. EFSB-S-2).[58]

With specific reference to the Primary Route, the Company stated that it would, to the extent possible, recycle any materials generated by dismantling of transmission structures along the Primary Route ROW (Exh. NEP-1, at 5-10). NEP indicated that it would transfer any components not salvageable, together with debris the Company was unable to recycle, to an approved off-site disposal facility, and would do so in accordance with all applicable laws and regulations (id.).

The Company indicated that throughout Project construction, an environmental monitor would be employed to enforce compliance with all federal, state and local permitting requirements and NEP policies (Exh. NEP-1, at 5-15). NEP stated that as part of its public outreach during construction, the Company would coordinate with local police departments and emergency responders to inform them of construction activities as they occur in each municipality (Exh. EFSB-S-4). The Company declared that it would also require each of its contractors to prepare a Health and Safety Plan for the contractor's employees (id.).

The Siting Board notes that the Company's plans for hazardous material and solid waste management and for the health and safety of residents and workers engaged on its Project would be comparable whether the Project were constructed along the Primary or the Alternative Route.

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57 NEP submitted copies of National Grid's Guidance Document EG-1702 and National Grid Safety Procedure F-608 (Exhs. EFSB-S-2(b)(Att.); EFSB-S-2(c)(Att.). The Company stated that it would manage removal of painted metal structures in accordance with National Grid's Guidance Document EG-1702, with work methods conducted in accordance with National Grid Safety Procedure F-608 (Lead Compliance Plan) (Exh. EFSB-S-2). The Company specified that it would use containment controls and high efficiency particulate air vacuum collection techniques to contain and collect fugitive paint chips that might be generated during the removal of the steel towers (id.). NEP further explained that it would remove to a secure container and dispose of recovered paint chips at a National Grid-approved receiving facility (id.).

58 The Company provided copies of the applicable guidance documents and plans (Exhs. EFSB-S-1(a)(Att.); EFSB-S-1(b)(Att.); EFSB-S-2(a)(Att.); EFSB-S-2(c)(Att.)).

The Siting Board consequently finds potentially hazardous material and solid waste impacts, as well as related safety impacts comparable along either the Primary or the Alternative Route. The Siting Board also recognizes, however, that the Company has proposed comprehensive mitigation, discussed above. Based on the Company's proposed mitigation, the Siting Board finds that impacts from potentially hazardous material and solid waste associated with the Project along the Primary Route would be minimized. In addition, the Siting Board finds that potential safety impacts from the Project's construction along the Primary Route would be minimized.

4. Cost

The Company estimated total Project cost along the Primary Route at $67,420,000 and along the Alternative Route at $216,480,000 (Exh. EFSB-C-1(R)). Table 21, below, indicates these as well as additional costs, including: (1) costs of site preparation for construction are under "labor"; (2) "labor" and "material" costs together cover any costs for transmission line construction/installation; (3) transmission line operation and maintenance ("O&M") costs include vegetation management, annual inspections, ROW access road maintenance, and any support costs; and (4) substation O&M costs include SF_6 gas monitoring, equipment testing, inspection and maintenance, and associated support costs (id.).[59]

[59] NEP stated that the replacement of existing air blast circuit breakers with SF_6 circuit breakers would result in a net reduction of O&M cost after Project completion despite an increase in the total number of circuit breakers (Exh. EFSB-C-1(R)).

Table 21. Estimated Costs of the Primary and Alternative Routes (2011$)

	Primary Route	Alternative Route	69 kV Removals	Millbury No. 3
Material	$12,440,000	$48,910,000	$0	$10,632,000
Labor (Construction)	$29,310,000	$85,550,000	$1,390,000	$9,350,000
ROW (Acquisition)	$0	$0	$0	$0
Engineering, Permitting, Indirects (includes costs of environmental analysis)	$11,910,000	$37,830,000	$310,000	$4,345,000
Escalation	$5,710,000	$18,340,000	$140,000	$2,601,000
AFUDC	$0	$0	$0	$0
Contingency	$8,050,000	$25,850,000	$260,000	$3,672,000
Total	$67,420,000	$216,480,000	$2,100,000	$30,600,000
Annual O&M	$42,000	$45,000	$0	($8,000)

Sources: Exhs. NEP-1, at 5-73; EFSB-C-1(R)

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, 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.

As Table 21 shows, annual Project O&M costs as well as ROW acquisition costs would be comparable for both the Primary and Alternative Route. The greater length of the Alternative Route however would increase overall Project costs significantly. Accordingly, the Siting Board finds that the Primary Route is preferable to the Alternative Route with respect to cost.

5. 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. Both the Primary and Alternative Routes would

use 345 kV overhead transmission lines, and the Company stated that the design of the transmission line along either route would result in a transmission system that fully meets the requirements and relevant reliability standards (Exh. NEP-1, at 5-73 to 5-74).

The main reliability difference between the Primary Route and the Alternative Route is the greater length of the Alternative Route (id. at 5-73). The Company asserts that the longer Alternative Route would require more structures and more circuit miles of conductors, which would increase exposure to contingencies (id. at 5-73 to 5-74). Nonetheless, based on the same overall design and use of overhead 345 kV technology, the Company concludes that reliability is comparable regardless of which route is selected (id. at 5-74; Company Brief at 179). On this basis, the Siting Board finds that reliability is comparable for the Primary and Alternative Routes.

6. Conclusion

The Siting Board finds that the information provided by the Company regarding the Project's environmental impacts is substantially accurate and complete. In comparing the environmental impacts of the two routes, the Siting Board finds above that the Primary Route is preferable to the Alternative Route with respect to land use and historic resources impacts, water resource and wetlands impacts, noise impacts, visual impacts, traffic impacts, air impacts, and safety, and that the Primary Route and Alterative Routes are comparable with respect to hazardous materials and solid waste impacts, and magnetic field impacts.

The Siting Board notes that the two routes both use existing ROWs and thus share the advantage of avoiding the environmental impacts of construction through a new corridor. Furthermore, while both ROWs pass through relatively undeveloped areas, fewer residences are proximate to the Primary Route than to the Alternative Route. The shorter length and fewer nearby sensitive receptors to the Primary Route combine to make it the preferable route with respect to environmental impacts. Given the above comparison, the Siting Board finds that the Primary Route is preferable to the Alternative Route with respect to environmental impacts. Finally, the Siting Board finds that the Primary Route is preferable to the Alternative Route with respect to cost and the Primary Route and the Alternative Route are comparable with respect to reliability. 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.

Based on the information presented in Section V.B, above, the Siting Board finds that, with the implementation of the Company's proposed measures, the specified mitigation and conditions included herein, and compliance with all local, state and federal requirements, the environmental impacts of the proposed Project along the Primary Route would be minimized.

Based on its 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 proposed Project along the Primary Route would achieve an appropriate balance among conflicting environmental concerns as well as between environmental impacts, reliability, and cost.

VI. CONSISTENCY WITH POLICIES OF THE COMMONWEALTH

A. 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.

B. Analysis and Conclusions

1. 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. 14 of the Acts of 1997, Section 1(a) and (h). In Section III.D above, the Siting Board found that the Project would improve the reliability of electric service in Massachusetts and New England. In addition, in Section V.B.3.g, the Siting Board requires the Company to use only retrofitted off-road construction equipment to limit emissions of particulate matter 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.3, the Siting Board finds that the Project's magnetic field, traffic, hazardous materials, and air impacts have been minimized. Accordingly, subject to the Company's specified mitigation and the Siting Board's conditions set forth in Section X, below, the Siting Board finds that the Company's plans for construction of the Project are consistent with current health policies of the Commonwealth.

2. Environmental Protection Policies

In Section III.B.3, 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 IX, below, for a discussion of the applicability of 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.

3. 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. In Section V, the Siting Board reviewed the process by which the Company sited the Project. The Siting Board finds that the Project would be located wholly within existing overhead utility ROWs and an existing switching station in Millbury. Therefore, the Project would encourage the reuse and

revitalization of existing energy infrastructure to help ensure the provision of reliable electric service in the Commonwealth and New England. Additionally, the Project has been designed and conditioned to avoid or minimize impacts to natural and cultural resources.

Subject to the specific 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.

VII. 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 Millbury Zoning Bylaws ("Millbury Zoning Bylaw"), the Town of Sutton Zoning Bylaw ("Sutton Zoning Bylaw"), the Town of Northbridge Zoning Bylaw ("Northbridge Zoning Bylaw"), the Town of Uxbridge Zoning Bylaw ("Uxbridge Zoning Bylaw"), and the Town of Millville Zoning Bylaw ("Millville Zoning Bylaw") for the proposed transmission line and related switching station improvements. The Company also seeks a comprehensive zoning exemption from each municipality's zoning bylaw.

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 bylaw under G.L. c. 40A, § 3 must meet three criteria.[60] First, the petitioner must qualify as a public service corporation.

[60] 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:

Save the Bay, Inc. v. Department of Public Utilities, 366 Mass. 667 (1975) ("Save the Bay"). Second, 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"). Finally, the petitioner must establish that it requires exemption from the zoning ordinance or bylaw. Boston Gas Company, D.T.E. 00-24, at 3 (2001) ("Boston Gas").

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 at 3-4; Berkshire Power Development, Inc., D.P.U. 96-104, at 26-36 (1997) ("Berkshire Power").[61]

> 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.

[61] 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 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

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. Hampden County at 81. 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) ("NY 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; NY 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;[62] and (3) the environmental impacts or

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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 at 31.

62 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

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, 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 the need for, or public benefits of, the Project, the Siting Board found in Section III.D, above, that additional energy resources are needed for reliability. In Section IV, the Siting Board analyzed a number of different project approaches other than the Company's proposed 345 kV transmission line that the Company might use to meet the reliability need (such as a hybrid alternative utilizing a 115 kV transmission line; and NTAs including EE, DR and DG) and concluded 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.3, the Siting Board reviewed the environmental impacts of the Project and found that, while the Project may result in some local adverse impacts, the impacts of the proposed Project would be minimized with the implementation of certain mitigation and conditions. 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 identifiable adverse local impacts. Accordingly, the Siting

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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); NY Central Railroad at 591.

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. New England Power Company d/b/a National Grid, D.P.U. 12-02, at (2012); NSTAR Electric Company, D.P.U. 11-80, at 4 (2012); Tennessee Gas Company, D.P.U. 92-261, at 20-21 (1993).[63]

b. Introduction

The Company asserts that the only way the Project can be built without any risks of delay associated with the failure to obtain permits, is to obtain zoning exemptions from all zoning provisions that could potentially be interpreted as requiring zoning relief (Exhs. EFSB-Z-6 through EFSB-Z-10). Specifically, NEP asserts that unless the requested individual exemptions are granted, there is some likelihood that the provisions of the bylaws from which exemptions are requested would result in adverse interpretations, burdensome requirements, delays, and undue expenses, as well as contribute to legal uncertainty, as part of the zoning review (Exh. NEP-2-1, at 5). The Company also argues that the requested zoning exemptions are required because: (1) the provisions of the bylaws are likely to conflict with state and industry standards;

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[63] 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).

(2) constructing the Project would require variances, which are difficult to obtain, constitute a legally disfavored form of relief, and are susceptible to overturn on appeal; (3) construction of the Project would require special permits which contain findings that can be subjective in nature, with the opportunity for appeals; (4) zoning bylaws are, in general, difficult to apply to energy infrastructure projects; and (5) the discretionary and subjective nature of the permit-granting criteria governing such issues as variances, special permits, and site plan review may result in burdensome or restrictive conditions (Exh. NEP-2-1, at 5; Company Brief at 184-185). In addition, the issuance of use variances is expressly prohibited in Uxbridge; not expressly authorized in Sutton and Millville; allowed in Millbury; and allowed only in non-residential zones in Northbridge (Exh. EFSB-Z-14 (rev)).

c. List of Exemptions Sought

In addition to the general reasons cited above, Tables 22 through 26, below, summarize: (1) each of the specific provisions of the zoning bylaws from which the Company seeks exemptions; (2) the relief available from the towns through the local zoning process; and (3) the Company's argument as to why it cannot comply with the identified zoning provisions and/or why the available zoning relief is inadequate.

Table 22. The Company's Position – Millbury Zoning Bylaw Exemptions

Individual Zoning Exemption Requested	Available Relief from Town	Why Project Cannot Comply: Company's Position
Use Regulation Article 2, Section 23.2	Special Permit	The transmission line is not allowed as of right in the Suburban II zoning district.
Pre-Existing Nonconforming Use Article 1, Section 16.32	Special Permit	The transmission line may be a change or substantial extension of a pre-existing nonconforming use in the Suburban II zoning district.
Earth Transfer Article 3, Section 36.3	Variance	Excavation required to construct could be considered "earth transfer or relocation" which is prohibited in the Floodplain District.
Floodplain District Article 3, Section 36.4	Special Permit	The transmission line is not allowed as of right in the Floodplain District. A Special Permit for uses and structures to be located in a floodplain is granted only upon a showing of good or sufficient cause.

Individual Zoning Exemption Requested	Available Relief from Town	Why Project Cannot Comply: Company's Position
Pre-existing Use in a Floodplain District Section 3140	Special Permit	The transmission line may be a change or substantial extension of a pre-existing nonconforming use in the Floodplain District.
Height and Setbacks Article 2, Sections 23.32, 25.3, and 26.3	Variance	The transmission line exceeds the maximum height in the Industrial I, Business II, and Suburban II zoning districts; and a component at the Switching Station exceeds the maximum height in the Industrial I zoning district.
Fence/Fence Height Article 1, Section 16.32; Article 3, Section 35.7	Special Permit	The new fence may be a "reconstruction, extension or structural change" of a pre-existing nonconforming structure. If the fence is not a pre-existing nonconforming structure, the fence would exceed the maximum height restriction.
Yard Setback Article 2, Sections 23.32, 25.3, and 26.3	Variances	The transmission line may not comply with yard setback requirements
Vegetation Removal Article 3, Section 35.6; Article 2, Sections 25.3 and 26.3	Special Permits	The transmission line would require vegetation removal in general, and vegetation removal in yard setbacks.
Wetland Fill Article 3, Section 35.23	Special Permit	The transmission line requires wetland fill activities.
Site Plan Approval Article 1, Section 12.41	Site Plan Approval	Site plan review is required for the Switching Station. Site Plan review can be discretionary. The Company asserts that it must have the discretion to design the Project in a manner that is consistent with established utility standards in order to ensure reliable operation.
Parking and Loading Article 3, Sections 33.2 and 33.4	Variance	The Switching Station will not comply with the minimum parking and loading requirements as the Project will not include any parking or loading facilities.

Source: Exh. NEP-2, at 17-18.

Table 23. The Company's Position – Sutton Zoning Bylaw Exemptions

Individual Zoning Exemption Requested	Available Relief from Town	Why Project Cannot Comply: Company's Position
Use Regulation Article III, Section A.4	Special Permit	The transmission line is not allowed as of right in the R-1 or B2 zoning districts.
Pre-Existing Nonconforming Use Article 1, Section C.2.a	Section 6 Finding	Replacing the existing 69 kV line with the new transmission line may be a change or substantial extension of a pre-existing nonconforming use in the B2 zoning district.

Individual Zoning Exemption Requested	Available Relief from Town	Why Project Cannot Comply: Company's Position
Groundwater Protection District Article 3, Section 36.3	Special Permit	The transmission line is not allowed as of right in the Groundwater Protection District.
Setbacks Article III, Section B.3, Table 2, and footnote 11	Variance	The transmission line will not comply with yard setback or zoning district requirements.
Site Plan Approval Article IV, Sections C.2 and C.3	Site Plan Approval and Waiver	Site plan review is required for the transmission line. Site Plan review can be discretionary. The Company asserts that it must have the discretion to design the Project in a manner that is consistent with established utility standards in order to ensure reliable operation.
Signage and Sign Setbacks Article IV, Section A and Section A.3.b.7	Variance	The transmission line will not comply with signage or signage setback requirements. The Project includes warning signs on the transmission poles and structures required by the Department.

Table 24. The Company's Position – Northbridge Zoning Bylaw Exemptions

Individual Zoning Exemption Requested	Available Relief from Town	Why Project Cannot Comply: Company's Position
Table of Height and Bulk Regulations	Variance	The transmission line exceeds the maximum height in the B-3 and I-2 zoning district.
Table of Area Regulations	Variance	The transmission line may not comply with yard setbacks.
Site Plan Article X, Sections 173-49.A	Site Plan Approval	Site plan review is required for the transmission line. Site Plan review can be discretionary. The Company asserts that it must have the discretion to design the Project in a manner that is consistent with established utility standards in order to ensure reliable operation.
Table of Area Regulations, Note 8 Setbacks and Visual Buffers	Variances	As portions of the transmission line are located in an I-2 Zoning District that abuts a residential zoning district, the line may not comply with setbacks and would require a visual buffer.
Grading Restrictions Article V, Section 173-18.2.A	Special Permit	The transmission line will not comply with grading restrictions, which prohibit final slopes of 15 percent or greater on 50 percent or more of the property.
Signage Article VII, Sections 173-22.B, 173-23, and 173-24	Variance	The transmission line will not comply with signage requirements. The Project includes warning signs on the transmission poles and structures required by the Department.

Sources: Exhs. NEP-2, at 25; NEP-2-1, at 24.

Table 25. The Company's Position –Uxbridge Zoning Bylaw Exemptions

Individual Zoning Exemption Requested	Available Relief from Town	Why Project Cannot Comply: Company's Position
Use Regulations Article III, § 400-10 and Appendix A, Table of Use Regulations	Special Permit	The transmission line is not allowed as of right in the R-A Zoning District.
Pre-existing Nonconforming Use Article III, §400-12.B	Special Permit for Section 6 Finding	The transmission line may be a change or substantial extension of a pre-existing nonconforming use in the R-A Zoning District.
Use Regulations Article III, §400-10 and Appendix A, Table of Use Regulations	None Available	The transmission line is expressly prohibited in the R-C, A, I, and B Zoning Districts.
Pre-existing Nonconforming Use Article III, §400-12.F	Special Permit	Reestablishment of a pre-existing nonconforming use for a de-energized 69 kV line may be required.
Floodplain and Groundwater Protection Overlay Districts Article III, §§400-37 and 400-38	None Available	The transmission line is prohibited in the Floodplain and Groundwater Protection Overlay Districts that affect the R-C, A, I, and B Zoning Districts.
Height Restrictions Article IV, §400-13 and Appendix B, Table of Dimensional Requirements; Article III, §400-14.B	Variance	The transmission line will exceed the maximum height restriction in general and may exceed the maximum height restrictions for corner lots.
Setbacks Article IV, §§400-13 and 400-14, and Appendix B, Table of Dimensional Requirements	Variance	The transmission line may not comply with yard setbacks.

Source: Exh. NEP-3, at 28-29.

Table 26. The Company's Position – Millville Zoning Ordinance Exemptions

Individual Zoning Exemption Requested	Available Relief from Town	Why Project Cannot Comply: Company's Position
Use Regulation Article 111, Sections 1(A)(2) and 2(F)(4)	Special Permit	The transmission line is not allowed as of right in the VR Zoning District.
Setbacks Article IV, Section 2, Schedule of Dimensional Requirements	Variance	The transmission line may not comply with yard setbacks. It is difficult for a linear project to demonstrate unique conditions relating to soil, shape or topography in order to be granted a variance.

Individual Zoning Exemption Requested	Available Relief from Town	Why Project Cannot Comply: Company's Position
Signage Article V, Sections 1(C) and 1 (G)	Special Permit	The transmission line will not comply with signage requirements. The Project includes warning signs on the transmission poles and structures required by the Department.

Source: Exh. NEP-2, at 31.

d. 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. Hampden County at 85-86; New England Power Company, EFSB 09-1/D.P.U. 09-52/09-53, at 75-77 (2011) ("Worcester"); 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. Hampden County at 86; Worcester at 76-77; see also, GSRP at132-133.[64]

[64] 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).

With respect to outreach to local authorities, the Company stated that it engaged in substantial and good faith consultations with numerous officials of the towns of Millbury, Sutton, Northbridge, Uxbridge and Millville regarding the applicability of the respective zoning bylaws to the Project and its intention to seek the necessary zoning exemptions (Exh. NEP-2, at 6).[65] The towns of Millbury, Sutton,[66] Northbridge, Uxbridge and Millville have all written letters of support for the Board's granting of both individual and comprehensive zoning exemptions (Exhs. NEP-2-1 (Att. E; Att. G; Att. I; Att. K; Att. M; Att. S)). In addition, the Company conducted outreach to the town governments, and none of the towns elected to intervene in the proceeding (Exh. EFSB-Z-16).

e. Analysis and Findings

The Company has identified in Tables 22 through 26, the provisions of the bylaws from which it seeks exemption to minimize delay in the construction and ultimate operation of the Project.

Based on the information detailed in Tables 22 through 26 above, the Company would need to seek numerous variances and Special Permits, as well as three Site Plan approvals from the five towns. The Department concurs with the Company that variances are difficult to obtain, constitute a disfavored form of relief, and are susceptible to being overturned on appeal. Consequently, the need to obtain variances is likely to result in an adverse outcome, a burdensome requirement, or an unnecessary delay. Further, the Uxbridge Zoning Bylaw expressly prohibits the granting of use variances, therefore, no relief can be obtained from the

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65 The Company conducted zoning meetings with: (1) the Millbury Town Planner, and the Building Inspector; (2) the Sutton Town Planner, and the Building Inspector; (3) the Northbridge Inspector of Buildings; (4) the Uxbridge Inspector of Buildings and Zoning Enforcement Officer; and (5) the Millville Building Commissioner and Zoning Officer (Exhs. EFSB-Z-1 through EFSB-Z-5).

66 In a December 28, 2011 letter to the Company, the Town of Sutton stated it would support such exemptions "provided the Town and its citizens will have an opportunity to comment on the Project at a public hearing in one or more of the Massachusetts towns in which the Project will be located and that the notice of such public hearing will be sent to abutters of the Project, as well as Town officials" (Exh. NEP-2-1, (Att. G)). The Board notes that the public comment hearing held in Uxbridge afforded such an opportunity.

Town. The Department also concurs with the Company that the potentially discretionary and substantive nature of conditions associated with the granting of Special Permits may result in restrictive or burdensome conditions. Additionally, substantive requirements of a Site Plan approval could conflict with established industry standards for design and construction. Thus, requiring the Company to seek Site Plan approval may result in denial of such approval, which would preclude construction of the Project. Both Special Permits and Site Plan approval may be appealed, thus delaying, or prohibiting Project implementation.

The Siting Board finds that the substantive sections of the Millbury, Sutton, Northbridge, Uxbridge, and Millville Zoning Bylaws, included in Tables 22 through 26 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 22 through 26 are required for construction of the Project, within the meaning of G.L. c. 40A, § 3. Additionally, we find that the Company engaged in good faith consultation with the towns of Millbury, Sutton, Northbridge, Uxbridge and Millville. Accordingly, the Siting Board grants the Company's request for the individual zoning exemptions listed above in Tables 22 through 26.

B. Comprehensive Zoning Exemptions

1. Standard of Review

The Company has requested a comprehensive exemption from the Millbury, Sutton, Northbridge, Uxbridge, and Millville Zoning Bylaws. 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. Hampden County at 93; Worcester 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 the applicability of local zoning provisions to the Project and any local concerns; and (4) the affected communities do not oppose the issuance of the comprehensive exemption. Hampden County at 89; Worcester at 82; GSRP at 136-137.

2. Company Position

The Company asserts that the Project is needed immediately in order to implement system improvements to meet and enhance system reliability, thereby avoiding substantial public harm (Exhs. NEP-2-1, at 32). NEP asserts that under both N-1 and N-1-1 contingencies, the system currently experiences thermal overloads and voltage performance issues and, therefore, the Project is time sensitive (Company Brief at 208).

The Company opines that due to the number of zoning provisions across the five towns and the unique attributes of the IRP compared to the usual type of project regulated at the local level, it would be imprudent to take the risk of seeking only individual exemptions given the scope, cost, and importance of the Project (RR-EFSB-20). The Company points to the greater regulatory certainty provided by the granting of a comprehensive zoning exemption with regard to all current and future provisions of the zoning bylaws (Company Brief at 210). Further, NEP asserts that any design change that may be necessary to mitigate environmental impacts of the Project could be promptly implemented (id.). The Company concludes that the granting of a comprehensive exemption would ensure the timely completion of the Project (id.).

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 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).

The Siting Board has considered and granted comprehensive exemptions that have typically involved reliability-based projects that were time sensitive, and spanned several municipalities, where conflicting interpretations could arise. Hampden County, at 92-93; Worcester, at 82; GSRP, at 137. Here, the Project is located across five towns, encompassing a distance of 15.4 miles. Importantly, as discussed in Sections III.B through III.D above, the IRP is needed to address important and immediate reliability issues in southern New England. In addition, the Company engaged in substantial good faith consultations with numerous officials of the towns of Millbury, Sutton, Northbridge, Uxbridge and Millville regarding the Project, and each of the five towns has written a letter of support for the Board's granting of a comprehensive zoning exemption. The Department finds that completion of the Project is time sensitive and that delay may result in substantial public harm.

Finally, the Environmental Controls of the Millbury Zoning Bylaw, Section 35 regulate not only the nature and characteristics of the facility to be constructed, but also the on-going operation of the proposed facility.[67] Were the Siting Board to grant a comprehensive zoning exemption from the Millbury Zoning Bylaw, local zoning control over certain relevant environmental considerations listed in Section 35 would no longer be applicable to the ongoing

[67] Section 35 contains Sections 35.1, 35.21, 35.22, 35.23, and 35.3 through 35.7 (Exh. NEP-2-1 (Att. N) at 74-75).

operation of the proposed facility. 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, with the exception of the individual exemptions detailed in Section VI.A, above: Sections 35.23 – Wetland Fill, 35.6 – Vegetation Removal, and 35.7 – Fences, which the Siting Board finds are required.

The Siting Board finds that the Company has met the burden of demonstrating that substantial public harm could result from delays in commencement and completion of the Project as affected by municipal zoning provisions in Millbury, Sutton, Northbridge, Uxbridge, and Millville. Accordingly, the Siting Board approves the Company's request for a comprehensive exemption from the Millbury, Sutton, Northbridge, Uxbridge, and Millville Zoning Bylaws, with the exception related to the enforcement of Sections 35.1, 35.21, 35.22, 35.3, 35.4, and 35.5 of the Millbury 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. 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 Millbury, Sutton, Northbridge, Uxbridge, and Millville Zoning Bylaws set forth in Tables 22 through 26 subject to the conditions set forth in Section X. The Siting Board further approves the Company's Petition for comprehensive exemptions from the Millbury, Sutton, Northbridge, Uxbridge, and Millville Zoning Bylaws, with the exception related to the enforcement of Sections 35.1, 35.21, 35.22, 35.3, 35.4, and 35.5 of the Millbury Zoning Bylaw, subject to the conditions set forth in Section X.

VIII. 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."[68]

The Department, in making a determination under G.L. c. 164, § 72, is to consider all aspects of the public interest. Boston Edison Company v. Town of Sudbury, 356 Mass. 406, 419 (1969). Section 72, for example, permits the Department to prescribe reasonable conditions for the protection of the public safety. Id. at 419-420. All factors affecting any phase of the public interest and public convenience must be weighed fairly by the Department in a determination under G.L. c. 164, § 72. Town of Sudbury v. Department of Public Utilities, 343 Mass. 428, 430 (1962). 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 III through V, and with implementation of the specified mitigation measures proposed by the Company and the conditions set forth by the Siting Board in Section X, below, the Siting Board finds pursuant to G.L. c. 164, § 72 that the proposed transmission line is 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.

[68] 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.

IX. 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.[69]

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 have minimal GHG emissions as it is an overhead transmission line.[70] As such, the Project would not have direct emissions from a stationary source or indirect emissions from energy consumption. The Siting Board addressed indirect emissions from off-road construction vehicles and equipment and SF_6 emissions for the Millbury Substation in Section V.B.3.g, above, and imposed conditions to minimize such emissions.

In Section V.B.3, 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

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69 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 requirements. G.L. c. 164, § 69I

70 The Secretary's Certificate on the Environmental Notification Form issued on December 30, 2011 states: "The Interstate Reliability Project is subject to the MEPA Greenhouse Gas (GHG) Emissions Policy and Protocol ('the Policy') because it requires an Environmental Impact Report. I have determined that this project will produce minimal greenhouse gas emissions. I therefore find that this project falls within the Policy's *de minimis* exception." Exh. NEP-5, app. B, at 9.

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.

X. DECISION

The Siting Board's enabling statute directs the Siting Board to implement the energy policies contained in G.L. c. 164, §§ 69H to 69Q, to provide a reliable energy supply for the Commonwealth with a minimum impact on the environment at the lowest possible cost. G.L. c. 164, § 69H. 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 southern New England under certain contingencies, and thus additional energy resources are needed in Massachusetts and more broadly across the southern New England region.

In Section IV.I, 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.

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.6, above, the Siting Board 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.B.3, above, the Siting Board reviewed 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.

In Section VI, 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 Project using the Primary Route, as described herein, subject to the following Conditions A through I.

In addition, the Siting Board has found pursuant to G.L. c. 164, § 72 that NEP's proposed facilities are necessary for the purpose alleged, and will serve the public convenience and are consistent with the public interest, subject to the following Conditions A through I.

In addition, the Siting Board has found pursuant to G.L. c. 40A, § 3 that construction and operation of the Company's proposed facilities are reasonably necessary for the public convenience or welfare. Accordingly, the Siting Board approves NEP's Petition for an exemption from certain provisions of the zoning bylaws of Millbury, Sutton, Northbridge, Uxbridge and Millville, as enumerated in Section VII above. The Siting Board grants the Company's Petition for a comprehensive exemption from the operation of the zoning bylaws of Millbury, Sutton, Northbridge, Uxbridge and Millville, as described in Section VII.

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

A. The Siting Board directs the Company to ensure that under its continuing vegetative management program, any application of herbicides is consistent with utility right-of-way Integrated Vegetation Management Practices and applicable rules and regulations of the Commonwealth.

B. The Siting Board directs the Company to conduct weekday construction from 7:00 a.m. to 6:00 p.m., to conduct no work on Sundays and holidays, and to begin Saturday work at 9:00 a.m. rather than at 7:00 a.m. as the Company has proposed, and to end work on Saturday no later than at 5:00 p.m. Should the Company find that construction performed outside these hours or on holidays or Sundays is necessary, 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 whether Sunday, holiday or extended weekday or weekend construction should occur, the Company may file a written request for prior authorization from the Siting Board, provided that it also notifies the relevant municipal authorities in writing of such request.

C. The Siting Board directs the Company, in consultation with the towns of Millbury, Sutton, Northbridge, Uxbridge, and Millville, to develop a combined or, separately for each town, a community outreach plan for construction of the Project. The outreach plan(s) should, at a minimum, set forth procedures for providing prior notification to affected residents of: (1) the scheduled start, duration, and hours of construction; (2) any construction the Company intends to conduct that, due to unusual circumstances, must take place outside the hours detailed in Condition D, above; (3) the availability of web-based Project information; and (4) complaint and response procedures, including the Company's contact information.

D. The Siting Board directs the Company to incorporate the following requirements into its Visual Mitigation Plan:

(i) 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;

(ii) 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;

(iii) 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;

(iv) 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;

(v) 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;

(vi) 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

(vii) 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 therefor; (iv) a general description of the types of off-site landscaping provided; and (v) the average cost of landscaping per property.

E. The Siting Board directs the Company, in consultation with municipalities and Company contractors, to develop and implement a traffic management plan to minimize traffic disruption. The Company's plan shall include, but not be limited to, the following measures: (1) signs erected to identify construction work zones; (2) police details and/or flagmen to direct traffic near public road crossings; (3) police details and/or flagmen to direct traffic at construction work sites along roads; and (4) the use of the shortest feasible construction material delivery routes.

F. The Siting Board directs that the Company ensure 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.

G. The Siting Board directs the Company to inform the Board if it adds SF_6 to any equipment at the Millbury No. 3 Switching Station or replaces any equipment at the Millbury No. 3 Switching Station equipment due to SF_6 loss within five years of the completion and initial operation of the Project, after which time the Company will consult with the Siting Board to determine whether the Siting Board will require continuing reporting, as deemed appropriate. The Company will also annually submit to the Siting Board a copy of its annual SF_6 report to MassDEP.

H. 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, 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 or its 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 or its 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.

The Secretary of the Department shall transmit a copy of this Decision and the Section 61 findings contained herein to the Secretary of the Executive Office of Energy and Environmental Affairs and the Company shall to serve a copy of this decision on the Towns of Millbury, Sutton, Northbridge, Uxbridge, and Millville; and the Boards of Selectmen of the Towns of Millbury, Sutton, Northbridge, Uxbridge, and Millville; and the Planning Boards of the Towns of Millbury, Sutton, Northbridge, Uxbridge, and Millville; and the Zoning Boards of Appeals of the Towns of Millbury, Sutton, Northbridge, Uxbridge, and Millville, within five days of its issuance. The Company shall certify to the Secretary of the Department within ten business days of issuance that such service has been made.

Stephen H. August

Stephen H. August
Presiding Officer

Dated this 16th day of May 2014

APPROVED by the Energy Facilities Siting Board at its meeting of May 15, 2014, 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, Mark Sylvia, Commissioner, Department of Energy Resources, Laurel MacKay, Designee for Commissioner, Department of Environmental Protection; Erica Kreuter, Designee for Secretary, Executive Office of Housing and Economic Development; Kevin Galligan, Public Member; and Penn Loh, Public Member.

Steven Clarke, Acting Chair
Energy Facilties Siting Board

Dated this 16th day of May 2014.

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).

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-and-

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FOR: Boston Gas Company d/b/a National Grid
Petitioner

COMMONWEALTH OF MASSACHUSETTS
Energy Facilities Siting Board

Petition of Boston Gas Company d/b/a National Grid for Jurisdictional Determination Pursuant to 980 C.M.R. § 2.09	)	EFSB 14-1

FINAL DECISION

James A. Buckley
Presiding Officer
August 14, 2014

On the Decision:

Margaret Howard

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Pursuant to 980 C.M.R. §2.09, the Energy Facilities Siting Board ("Siting Board" or "Board") determines that it does not have jurisdiction to approve or deny the construction of liquefaction equipment at Commercial Point, Dorchester, Massachusetts by the Petitioner Boston Gas Company d/b/a National Grid ("Boston Gas" or "Company").

I. INTRODUCTION

A. Petition for Jurisdictional Determination

On February 21, 2014, Boston Gas filed a petition pursuant to 980 C.M.R § 2.09 ("Petition") seeking a determination as to whether the Company's proposed installation of new liquefaction equipment[1] ("Project") at its Commercial Point Liquefied Natural Gas ("LNG") facility ("Commercial Point") at 220-238 Victory Road in Dorchester is subject to Siting Board jurisdiction and would therefore require Board approval. Boston Gas asserts that the liquefaction equipment would not constitute a "facility" under the definition of that term in G.L. c. 164, § 69G, and, therefore, would not be subject to Siting Board approval under G.L. c. 164, § 69J.

If the Board were to determine that the proposed liquefaction equipment constitutes a facility under Section 69G, then, alternatively, the Company asks that the Siting Board waive its jurisdiction pursuant to the waiver provision in 980 C.M.R. § 1.02(1). The Company's rationale for a waiver is that the new liquefaction equipment would replace existing equipment and the increase in liquefaction capacity does not significantly exceed the thresholds that allow for the exclusion of certain replacement construction activities from the long-range supply plans of gas companies under 980 C.M.R. § 7.07.[2] Boston Gas Memorandum of Law in Support of Petition at 14 ("Boston Gas Memo").[3]

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[1] Liquefaction equipment takes natural gas in a gaseous state and liquefies the gas into liquefied natural gas. Liquefaction requires chilling the gas to about -260 degrees Fahrenheit.

[2] When the Energy Facilities Siting Council was replaced by the Siting Board and the Board was placed administratively within the Department of Public Utilities ("Department"), the responsibility for reviewing long-range supply plans transferred to and remains with the Department. G.L. c. 164, § 69I (originally enacted by St. 1992, c. 141, §§ 12-14, 55). The provisions of the Siting Council's regulation 980 C.M.R. § 7.00 establishing the required contents of the long-range plans to be filed by gas companies have not been adopted or otherwise followed by the Department.

[3] Boston Gas filed the Boston Gas Memo with its Petition on February 21, 2014.

B. Procedural History

The Presiding Officer directed the Company to publish a Notice of Petition for Determination of Board Jurisdiction ("Notice") in the Boston Globe, and to send the Notice by electronic mail to all gas companies in Massachusetts, the Attorney General, various officials of the City of Boston, and the Department's generic service list for the gas industry, which includes, among others, representatives of environmental organizations. The Notice invited interested parties to submit comments on the Company's Petition; no comments were received. The Siting Board issued one set of information requests to the Company and received responses on April 17, 2014.

II. BACKGROUND

A. Existing Commercial Point Facility

Commercial Point was built in the 1960s and early 1970s as a peak-shaving LNG facility with approximately 5.5 million standard cubic feet per day ("mmscfd") of natural gas liquefaction capability, two LNG storage tanks (one 331,000 barrel ("bbl") storage tank and one 290,000 bbl storage tank), and 240 mmscfd of LNG vaporization capacity (Boston Gas Memo at 2). The initial elements constructed at Commercial Point, including the original liquefaction equipment and the 290,000 bbl tank, were placed in operation in 1969. Additional elements of Commercial Point, including the 331,000 bbl tank, were placed in service in 1971 (id.).

The 290,000 bbl LNG storage tank was dismantled in 1992; the 331,000 bbl tank remains in service (id.). The remaining LNG tank holds approximately a five-day supply at Commercial Point's full vaporization rate of 240 mmscfd (Exh. EFSB-1). The existing liquefaction system has not been used since 2002, is partially disassembled, and is no longer serviceable (Boston Gas Memo at 2). Currently, LNG is trucked in to refill the storage tank prior to the winter heating season and the LNG is vaporized for sendout to the Company's low-pressure distribution system (id.).

B. The Project

Boston Gas proposes to replace the existing inoperable liquefaction equipment at Commercial Point with new liquefaction equipment having a capacity of approximately 20

mmscfd (id.). At that rate of liquefaction, it would take approximately 57 days to fill the Commercial Point tank (Exh. EFSB-1). The Company intends to use the proposed liquefaction equipment to supply all the LNG required for vaporization and sendout from Commercial Point.[4] With the liquefaction capability provided by the Project, the Company also plans to supply by tanker truck shipments from Commercial Point a portion of the LNG required by its other Massachusetts LNG storage facilities (Exh. EFSB-10).

The new liquefaction equipment would use nitrogen-cycle cooling technology and electric motor drives for the refrigeration compressors (Boston Gas Memo at 2-3). The liquefaction equipment would include a new feed gas pretreatment system in the location now occupied by the original liquefaction system equipment (id. at 2).[5] The Project would also include:

- Construction of a new compressor building on the east side of the existing LNG storage tank to house the new liquefaction units and refrigeration compressors (Boston Gas Memo at 3);
- Installation of a new pretreatment heater on the far west side of Commercial Point, close to where the existing decommissioned pretreatment heater is located (id.);
- Construction of a new switchyard for the new electrical service (id.). The anticipated electric load of the proposed liquefaction equipment at peak capacity is approximately 15 megawatts ("MW") (Exh. EFSB-6);
- Realignment of the access driveway to the trucking station, to provide a turn-around area for trucks for a drive-through loading operation (Boston Gas Memo at 3); and
- Installation of new liquid nitrogen storage and vaporization to provide makeup supply for the new refrigeration system (id.).

The Project would be constructed within the existing Commercial Point footprint (id.). Figure 1 (attached) shows a preliminary site plan and layout of the entire Commercial Point facility, including the proposed location of the Project components.

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4 While the Company anticipates no future deliveries of LNG by tanker truck to Commercial Point after installation of the new liquefaction equipment, it did not indicate that the existing facilities at Commercial Point used to receive such shipments would be retired or dismantled (Exh. EFSB-10).

5 The pretreatment system removes water, carbon dioxide, and sulfur compounds from pipeline gas; these compounds would freeze at low temperatures and interfere with the liquefaction process (Exh. EFSB-4).

The Company stated that the construction and operation of the liquefaction equipment would be subject to regulation under the U.S. Department of Transportation's Pipeline and Hazardous Materials Safety Administration (49 C.F.R. § 193 - Liquefied Natural Gas Facilities: Federal Safety Standards); the Department's 220 C.M.R. § 112.00: Design, Operation, Maintenance and Safety of Liquefied Natural Gas Plants and Facilities; and the National Fire Protection Association's 59A Utility Liquid Propane and Gas Plant Code (Exh. EFSB-13). Regulatory authorities, such as the Department, would use these codes to inspect for compliance during construction of the Project and the ongoing operation of the entire Commercial Point facility (id.).

The Company stated that is does not expect that the Project would have significant visual impacts because the landscaping at Commercial Point would remain the same and because the existing LNG storage tank, which is the dominant visual feature on the site, would not be altered (Exh. EFSB-18). The Company does not expect that the Project would result in any increase of noise at abutting property lines or in neighboring residential areas and it intends to meet the requirement in earlier Department orders granting zoning exemptions (Boston Gas Company, D.P.U. 15513 (1967) and Boston Gas Company, D.P.U. 16457 (1970)) that noise levels at the property line not exceed ambient sound levels (Exh. EFSB-17). The Company stated that it would perform a noise study to establish the noise level at the existing facilities, including the background noise, and model the expected noise of the new facilities. The Company would verify these projections through additional noise analysis conducted during plant commissioning (Exh. EFSB-17).

Based on preliminary Project designs, the Company anticipates the need for a number of environmental and other permits and approvals. In addition to local permits and zoning approval, the Project would require: (1) the filing of a Notice of Intent under the U.S. National Pollutant Discharge Elimination System General Permit for Stormwater Discharge from Construction Activities; (2) Minor Project Modification approval under Chapter 91, the Massachusetts Public Waterfront Act; (3) Non-Major Comprehensive Plan Approval under the Massachusetts Clean Air Act; and (4) an Order of Conditions from the Boston Conservation Commission under the Massachusetts Wetlands Protection Act (Exh. EFSB-7). The Company noted that the City of Boston would not officially determine the required local permits until a

building permit application is submitted to the ISD, which the Company anticipated would occur in fall of 2014 (Exh. EFSB-5).[6]

As noted above, the Company contends that based on its anticipated natural gas supply plan the Project would eliminate the use of LNG delivery trucks to fill the Commercial Point tank (Exh. EFSB-10). Based on the average number of deliveries to Commercial Point over the last ten years, approximately 851 LNG truck deliveries per year would be avoided (Exh. EFSB-10). However, overall truck traffic at Commercial Point would increase because the Company intends to ship approximately 1,080 truckloads of LNG per year from Commercial Point to the Company's other Massachusetts LNG storage facilities instead of sourcing that LNG from Distrigas of Massachusetts or other suppliers (Exh. EFSB-10).[7]

C. Need for the Project

According to Boston Gas, LNG is essential to the reliability of its delivery system during the winter heating season (Boston Gas Memo at 4). Recently, while LNG has been the source for only about six percent of the Company's total winter season supply, it has provided approximately 42 percent of the Company's supply on peak days (id.). LNG peaking capacity has been part of the least-cost mix for meeting peak demand on the Company's system (id.). LNG also provides system reliability benefits at other times of the year by being available in case of a supply disruption, such as a pipeline or compressor station failure (id.).

For more than 30 years the Company's LNG supply has been sourced primarily from the Distrigas import terminal in Everett (Boston Gas Memo at 4). Boston Gas asserts that by installing the new liquefaction equipment the Company would be able to reduce or even

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6 The Company has held several meetings with representatives from the City of Boston, including a February 13, 2014 meeting with staff from the Inspectional Services Department ("ISD") and an April 7, 2014 meeting with staff from the Boston Redevelopment Authority ("BRA") (Exh. EFSB-5). ISD staff expressed a preference for local permitting of the Project, and the Company stated its intention to obtain any necessary zoning relief from the City of Boston. If zoning relief were unavailable or denied by the City of Boston, the Company would seek a zoning exemption from the Department (Exhs. EFSB-5; EFSB-8).

7 The Company's estimated annual average LNG traffic to and from National Grid's facilities after the Project is completed is based on the ten-year average demand at the Company's Massachusetts LNG facilities (Exh. EFSB-10).

eliminate: (1) the reliability concern relating to having one predominant source of LNG supply (i.e., Distrigas); (2) the reliability concern relating to the imported sources of Distrigas's LNG; and (3) exposure of the Company and its customers to globally priced (and recently more expensive) LNG supplies (id.).

Boston Gas identified a winter 2015/2016 construction start date as the earliest practicable date that would allow for engineering, designing, and permitting the Project. A winter 2015/2016 construction start date would enable an in-service date of September 2017. The September 2017 in-service date would allow the Company to liquefy natural gas during the spring and summer of 2018 to serve its customers in the winter of 2018/2019 (Boston Gas Memo at 4).

III. JURISDICTIONAL DETERMINATION

A. Position of Boston Gas

As an initial matter, citing both St. 1973, c. 1232, § 7 and St. 1975, c. 617, § 15, Boston Gas contends that, because the existing facility was constructed prior to the enactment of the Siting Board statute, the existing facility is not subject to the jurisdiction of the Board (Boston Gas Memo at 5-6). Consequently, the Company reasons, for the Siting Board to have jurisdiction over the Project, the Project itself must be a "facility" as defined in Section 69G (id. at 6). The Company asserts that the pertinent provision within the statutory definition of "facility" is stated in the fifth clause: "(5) a unit, including associated buildings and structures, designed for or capable of the manufacture or storage of gas…."

Boston Gas claims that, "[a]s a matter of science and common meaning, natural gas liquefaction does not 'manufacture' or 'store' gas" (Boston Gas Memo at 7). According to the Company, the manufacture of gas involves combining coal or other forms of hydrocarbons with water and heat to make gas where it did not exist (id. at 7-8). In contrast, liquefaction merely changes the physical state of natural gas, from gas to liquid (id. at 7). Furthermore, the Company states that the liquefaction equipment does not store the LNG. Rather, the liquefied natural gas must be transported to the LNG storage tank when the liquefaction process is complete (id. at 8).

Boston Gas adds that the Board's enabling statute recognizes that some types of gas are manufactured while others are not (id.). The Company notes that the word "gas" is defined to include four types of gas: natural gas, propane air, synthetic natural gas ("SNG"), and liquefied

natural gas, and then each of those four types of gas is defined (id., citing G.L. c. 164, § 69G). Boston Gas contends that SNG is a type of Section 69G-defined gas that is manufactured because it "is defined as 'a type of gas which is *made* by a facility which produces a gaseous fuel from the *manufacture*, conversion or reforming of liquid or solid hydrocarbons' G.L. c.164, §69G" (Boston Gas Memo at 9) (emphasis added).[8] Boston Gas asserts that the General Court used the words "made" and "manufacture" precisely to define SNG, but did not use those words to define LNG.[9] Boston Gas concludes that the language of Section 69G demonstrates a clear legislative intent that LNG not be regarded as a manufactured gas (id. at 10).

Citing three regulatory provisions, 980 C.M.R. §§ 7.07(2)(c)(1), 7.07(7)(c)(1) and 10.01(2)(b), Boston Gas acknowledges that some Siting Board regulations could be construed to suggest that liquefaction does involve manufacturing gas under Section 69G (Boston Gas Memo at 10). However, Boston Gas asserts that these regulations relate to filing requirements for long-term gas supply plans and are not intended to define a "facility" for jurisdictional purposes (id. at 11). Given its view that the statutory definition of "manufactured gas" is not ambiguous and does not include LNG or natural gas liquefaction as "manufacturing," the Company asserts that, even if the Siting Board intended its regulations to classify liquefaction as manufacturing gas, the regulation would be beyond the Board's statutory authority and, therefore, invalid (id. at 12).

B. Statutory Interpretation Standard of Review

Interpretation of a statute necessarily begins with the statutory text itself, because "[e]lementary rules of statutory construction require that each statute be interpreted as enacted." Commonwealth v. Gore, 366 Mass. 351, 354 (1974). In interpreting a statute, the Massachusetts Supreme Judicial Court ("SJC") attempts "to give effect and purpose to all of [the] words" in the statute and, therefore, no one statutory provision is read in isolation from the remaining provisions. Providence and Worcester R.R. Co. v. Energy Facilities Siting Board,

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8 Boston Gas indicates that propane air, as a gas that is "*produced*," would also be considered a manufactured gas within Section 69G (Boston Gas Memo at 9). However, propane air is not relevant to the issues presented in this proceeding.

9 Section 69G defines LNG as "a natural gas that has been changed into a liquid by cooling the temperature at atmospheric pressure to approximately -260°F."

453 Mass. 135, 142 (2009). If the statutory language is plain, then the words receive their "usual and natural meaning." Commonwealth v. Gore, 366 Mass. at 354. However, the Court "may look to outside sources to determine the meaning of the statute whose language is unclear." Commonwealth v. Lightfoot, 391 Mass. 718, 720 (1984). Except when the language is clear and unambiguous, the SJC gives "substantial deference" to the Siting Board to interpret the statute the Board must implement and enforce. See City Council of Agawam v. Energy Facilities Siting Board, 437 Mass. 821, 828 (2002).

C. Analysis and Findings

1. Project as Stand-Alone Facility

The entire Commercial Point complex is an existing "facility" within the meaning of G.L. c. 164, § 69G because the LNG storage tank capacity at the site is considerably greater than the storage capacity threshold of 25,000 gallons above which the Siting Board's regulations deem a gas storage unit (including multiple tanks and associated buildings and structures) to be a "facility." 980 C.M.R. § 1.01(4). However, as the Company noted, Commercial Point was constructed prior to the establishment of the Siting Board (and its predecessor, the Siting Council).[10] Therefore, the current facility is "grandfathered" and requires no approvals of the Siting Board, absent proposed changes of a magnitude and nature that would trigger jurisdiction under the Board's statutes and regulations.[11]

The record is clear that the Project would have absolutely no effect on the existing grandfathered storage capacity of Commercial Point and therefore would not trigger Siting Board jurisdiction with regard to storage of gas. The sole remaining jurisdictional question is whether the Project's liquefaction function constitutes "the manufacture of gas" and, if so, whether the

[10] As noted above, Boston Gas sought and received zoning exemptions from the Department for construction of Commercial Point. Prior to submission of this Petition, Boston Gas had not petitioned the Siting Board for any construction-related approvals pertaining to Commercial Point.

[11] See e.g. Southern Energy Canal II, L.L.C., 12 DOMSB 155, 170-171 (2001) (Board found Section 69J jurisdiction when petitioner proposed to repower the "grandfathered" Canal Unit 2 and increase generating capacity by more than Siting Board's jurisdictional threshold of 100 MW).

extent of the intended change would require Siting Board approval. Thus, the Siting Board agrees with Boston Gas that the Project requires approval pursuant to § 69J only if the Project itself (rather than the grandfathered components of the facility) is regarded as a facility under Section 69G. Had Commercial Point originally been subject to and received Siting Board approval, additional jurisdictional scope could potentially arise from any project changes to the facility that altered in any substantive way either the assumptions or conclusions reached by the Board in approving the facility. However, jurisdiction on this basis is not applicable to Commercial Point as a grandfathered facility and, therefore, our analysis is limited solely to the Project itself and whether it constitutes the "manufacture of gas."

2. Statutory Text

The Board agrees with the Company that the pertinent statutory provision is the fifth clause in the definition of "facility" in Section 69G. Accordingly, the Project as a stand-alone facility would be jurisdictional only if liquefaction involves the manufacture of gas, because the Project would not be used to store liquefied gas. The common, everyday meaning of "manufacture" is "something made from raw materials by hand or by machinery." (The Merriam-Webster dictionary website, first definition, http://www.merriam-webster.com/dictionary/manufacture, accessed on May 23, 2014). Changing natural gas (i.e., the "raw material") into liquid so that the liquid can later be converted back into the original raw material does not seem to be "manufacturing" as that term is typically used.

However, the Board must not only consider the dictionary definition of "manufacture." It must also consider the words and legislative intent of the entire statutory text. While the General Court did not define the terms "manufacture" or "manufactured gas" in Section 69G, it did define "gas" as "a term which shall include natural gas, propane air, synthetic natural gas and liquefied[12] natural gas." G.L. c. 164, § 69G.

[12] In the definition of "gas," both the West Publishing Company's annotated version and the General Court's online version of the General Laws spell the term "*liquified* natural gas," while in the stand-alone definition of LNG, both spell the term "*liquefied* natural gas" (emphasis added). As reflected in the Acts of 1974, the General Court spelled both terms as "liquefied natural gas." St. 1974, c. 852, §2, adding the pertinent definitions to G.L. c.164, §69G.

"Natural Gas" is defined as "a type of gas which originates in the ground and is predominantly methane." G.L. c. 164, § 69G. The process of removing the natural gas from the ground for delivery via pipelines to consumers would not appear to be manufacturing as the natural gas was already "made" prior to its extraction from the ground. Thus, as defined and used within G.L. c.164, §69G, the term "natural gas" is clearly not manufactured gas.

The definition of "liquefied natural gas" is "a natural gas that has been changed into a liquid by cooling the temperature at atmospheric pressure to approximately -260ºF." G.L. c. 164, § 69G. The General Court uses the verb "changed" to describe how natural gas becomes LNG, and not "made," a word more often associated with manufacturing. While perhaps not free from all ambiguity, the verb choice at least supports a statutory interpretation that LNG should not be considered to be manufactured gas because the chemical composition of natural gas does not change when it is liquefied. In that sense, liquefaction is not the manufacture of gas because the Siting Board's statute defines the input to the process (natural gas) as a type of gas.

The definition of "synthetic natural gas" is also instructive in attempting to define manufactured gas: "a type of gas which is *made* by a facility which produces a gaseous fuel from the *manufacture*, conversion or reforming of liquid or solid hydrocarbons." G.L. c. 164, § 69G (emphasis added). Boston Gas correctly points out that SNG expressly is made and manufactured, while LNG is not defined using the words "made" or "manufacture." In addition, LNG is defined using the words "natural gas," whereas the SNG definition does not use the word "natural," only "gas." Because natural gas "originates in the ground," LNG is further separated from the concept of "manufacturing."

Still, liquefaction involves refrigeration of gas to an extremely cold -260ºF, at a utility scale that may be viewed as an industrial process with respect to the amount and type of equipment required. Furthermore, the process also involves removing various impurities from the natural gas before it can be liquefied. While the "plain" statutory words tend to indicate a legislative intent to exclude liquefaction as manufacturing, the words "manufacture" and "manufactured gas" are not defined in Section 69G. In the Board's view, the words are not precise enough to conclude that the statutory text is free from ambiguity in regards to whether liquefaction could be considered manufacturing for purposes of Section 69G. Consequently, the Board will examine sources outside the statute to assist in defining "manufacture."

3. Department Use of the Term "Manufactured Gas"

Since 1990, as part of setting rates for each gas distribution company in Massachusetts, the Department has included expenses associated with the cleanup of hazardous material located at sites once used to produce "manufactured gas." The Department's policy concerning these expenses was established when it approved a settlement at the conclusion of a generic investigation into the matter in 1990. Generic Investigation of the Facts Surrounding the Ratemaking Treatment of the Costs of Investigating and Remediating Hazardous Wastes Associated With the Manufacture of Gas During the Period 1822-1978, D.P.U. 89-161 (1990) ("Generic Investigation Order"). For purposes of the Generic Investigation Order, the Department defined "manufacturing gas process" as the "now-discontinued process" of manufacturing gas from coal and other feedstock. Id. at 1.

In the Generic Investigation Order, the Department described the development of the manufactured gas industry and identified the processes and feedstock used in manufacturing the gas.[13] Id. at 10-17. The Department stated that natural gas pipelines "sounded the death knell" for the manufactured gas processes because natural gas was cheaper and had a higher British thermal unit ("Btu") content. Id. at 11. When the pipelines were extended into Massachusetts in the 1950s, gas companies converted from manufactured gas to natural gas as their base load source of supply. Id. at 11-12. The Department reported that gas companies stopped manufacturing gas in Massachusetts except for "some high Btu oil gas plants which were used for peak-shaving purposes into the 1960s and early 1970s."[14] Id. at 12.

Thus, the Generic Investigation Order uses the term "manufactured gas" to mean a gas that is made from and starts out as coal, oil or another substance that is originally a solid or liquid and not a gas. The Generic Investigation Order supports the premise that "natural" gas, whether liquefied or not, is intended to mean a type of gas different from "manufactured" gas.

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[13] The Department also described the process residuals, like coal-tar wastes, that were disposed on-site and needed to be remediated. Generic Investigation Order, at 18-24.

[14] The statutory language pertaining to manufacture of gas in Section 69G was enacted in 1974, when a few of these types of manufacturing gas plants were still in operation. St. 1974, c. 852, §§ 1, 2.

4. FERC and Department Accounting for Gas Companies

The Federal Energy Regulatory Commission's ("FERC") Uniform System of Accounts for Natural Gas Companies includes a subcategory within its Gas Production Plant accounts (Accounts 301 to 399) for "Manufactured Gas Production Plant." 18 C.F.R. § 201, Accounts 304-320. All of these accounts are for equipment that relates to producing gas from coal, oil, petroleum and other feedstock that fit the definition of "manufacturing gas process" used by the Department in the Generic Investigation Order. FERC includes an account for "liquefaction equipment," Account 363.1 (18 C.F.R. § 201). Account 363.1 is included in a different subcategory: Natural Gas Storage and Processing Plant, Other Storage Plant (Accounts 360-363.5). Thus, for FERC accounting purposes, liquefaction equipment is not used for the "manufacture" of gas.

The Department has adopted a similar regulation, "Uniform System of Accounts for Gas Companies," under 220 C.M.R. §50.00. Accounts 304 through 320 relate to "Manufactured Gas Production Plant" and Accounts 360 through 363 relate to "Gas Storage Plant." Liquefaction is discussed in a note that appears after Account 362, indicating the Department concurs with FERC that liquefaction equipment should be booked for accounting purposes as gas storage plant.[15]

Similar to the Generic Investigation Order, FERC and Department accounting regulations indicate a regulated gas industry use of the term "manufactured gas" to describe a gas that is made from coal, oil or another substance that is originally a solid or liquid and not a gas. Furthermore, the term is used to describe a type of gas that is different from "natural" gas. According to these regulatory sources, liquefaction does not involve manufacturing gas.

5. Board Regulations

The Siting Board regulations also should be examined to determine if they provide any guidance in defining "manufacture" under G.L. c. 164, § 69G.

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[15] The Company booked the existing liquefaction equipment at the Facility under Department accounts "316 – Other Reforming Equipment" and "320 – Other Equipment" (Exh. EFSB-19-revised). The Company did not offer an explanation for this discrepancy. The Company intends to book the liquefaction equipment installed as part of this Project under Department account "363 – Other Equipment" (id.).

First, Section 1.01(4) contains the definitions for the Siting Board's regulations, found at 980 C.M.R. The statutory and regulatory definitions of "facility" are identical except that the definition in 980 C.M.R. §1.01(4)(e) establishes the capacity threshold for gas manufacturing and storage facilities under the Board's jurisdiction.[16] Section 1.01(4) does not define the terms "manufacture," "manufactured gas," "liquefied natural gas" or "liquefaction."

However, two regulations use the words "liquefaction" or "liquefy": 980 C.M.R §§ 7.00 and 10.00. Section 7.00 was originally promulgated by the Siting Council. The regulation implements G.L. c. 164, § 69I, which imposes a requirement on gas companies to file a five-year forecast of gas demand and supply ("long-range plan") every two years for review and approval, which, as noted above, is now under the jurisdiction of the Department rather than the Siting Board. In pertinent part, the regulation establishes the procedure and requirements for the content of the long-range plans filed by gas companies.

Two provisions within Section 7.00 use the term "liquefaction." In listing the types of facilities that must be included in long-range plans, Section 7.07(2)(c)(1) requires a gas company to provide an inventory of existing facilities containing, among other items, "a general description of the type of facility (for example, for storage facilities: LNG storage, vapor storage; for manufacturing facilities: SNG plant, propane air facility, LNG vaporization facility, LNG liquefaction facility)[.]" Similarly, Section 7.07(7)(c)(1) makes the same categorization of storage and manufacturing facilities, with LNG liquefaction facilities falling within the manufacturing category, in describing the required listing of planned facilities.

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[16] The Board's regulation that establishes minimum size thresholds provides that:

> Facility means any "facility" described in G.L. c. 164, § 69G including:
> …
> (e) a unit including multiple tanks and associated buildings and structures, designed for, or capable of, the manufacture or storage of gas, except:
> 1) a unit with a total gas storage capacity of less than 25,000 gallons and also with a manufacturing capability of less than 2,000 MMBtu per day;
> 2) a unit whose primary purpose is research, development, or demonstration of technology and whose sale of gas, if any, is incidental to that primary purpose; or
> 3) a landfill or sewage treatment plant.

980 C.M.R. § 1.01(4)(e).

When the Siting Council was replaced by the Siting Board and the Board was placed within the Department, the responsibility for reviewing long-range supply plans was transferred to the Department (St. 1992, c. 141, §§ 12-14, 55), and remains with the Department.[17] G.L. c. 164, § 69I. The provisions of the Siting Council's regulation establishing the required contents of the long-range plans to be filed by gas companies have not been adopted or otherwise followed by the Department. For example, in the most recent long-range plan filed with the Department by Boston Gas, its petition did not contain or categorize the information as referenced in Sections 7.07(2)(c)(1) and 7.07(7)(c)(1). Boston Gas Company, D.P.U. 13-01, Petition (February 21, 2013).[18]

In any event, the text in 980 C.M.R. § 7.00 that includes an "LNG liquefaction facility" as one of several "manufacturing facilities" pertains to filing requirements for long-range plans. In that context, it was important for the gas company to identify all of its existing and future sources of supply, so that the Siting Council could assess the adequacy of the supply plan. For that assessment, it is of doubtful significance whether any particular type of plant component and its related source of supply (e.g., liquefaction equipment) were included in the manufacturing category rather than the storage category. Accordingly, it seems unlikely that the Siting Council intended its long-range supply plan filing categorizations to have jurisdictional significance.

Furthermore, Section 10.00 of 980 C.M.R. imposes siting requirements on intrastate LNG storage facilities. Section 10.01(2)(b)(1) defines "LNG Processing Equipment" as including "the installed cost of equipment used to receive, liquefy, hold and regasify LNG for delivery into the operator's distribution system." The inclusion of the term "liquefy" in the definition of LNG Processing Equipment under the regulation for the siting of intrastate natural gas storage suggests that liquefaction equipment should be considered ancillary to the storage of LNG, instead of as equipment for the manufacture of LNG. In addition, the Siting Council used the

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17 Although the Chair of the Department may refer a long-range supply plan for review and approval to the Siting Board if the plan is submitted with a petition to construct a facility pursuant to Section 69J, jurisdiction over plan filing requirements rests with the Department and not the Siting Board. G.L. c.164, § 69I.

18 The Department approved Boston Gas's 2013 long-range plan on March 20, 2014 (Boston Gas Company, D.P.U. 13-01 (2014)).

word “processing” to describe liquefaction equipment, rather than “manufacturing,” the word used in the statutory definition of “facility” (G.L. c. 164, § 69G).

Thus, our review of outside sources, including Siting Board regulations, confirms our preliminary conclusion about the relevant statutory text: that liquefying natural gas is not “manufacturing” gas. Therefore, the Board finds liquefaction equipment, as presented in this Petition, is not a “facility” as that term is defined in G.L. c. 164, § 69G.

IV. DECISION

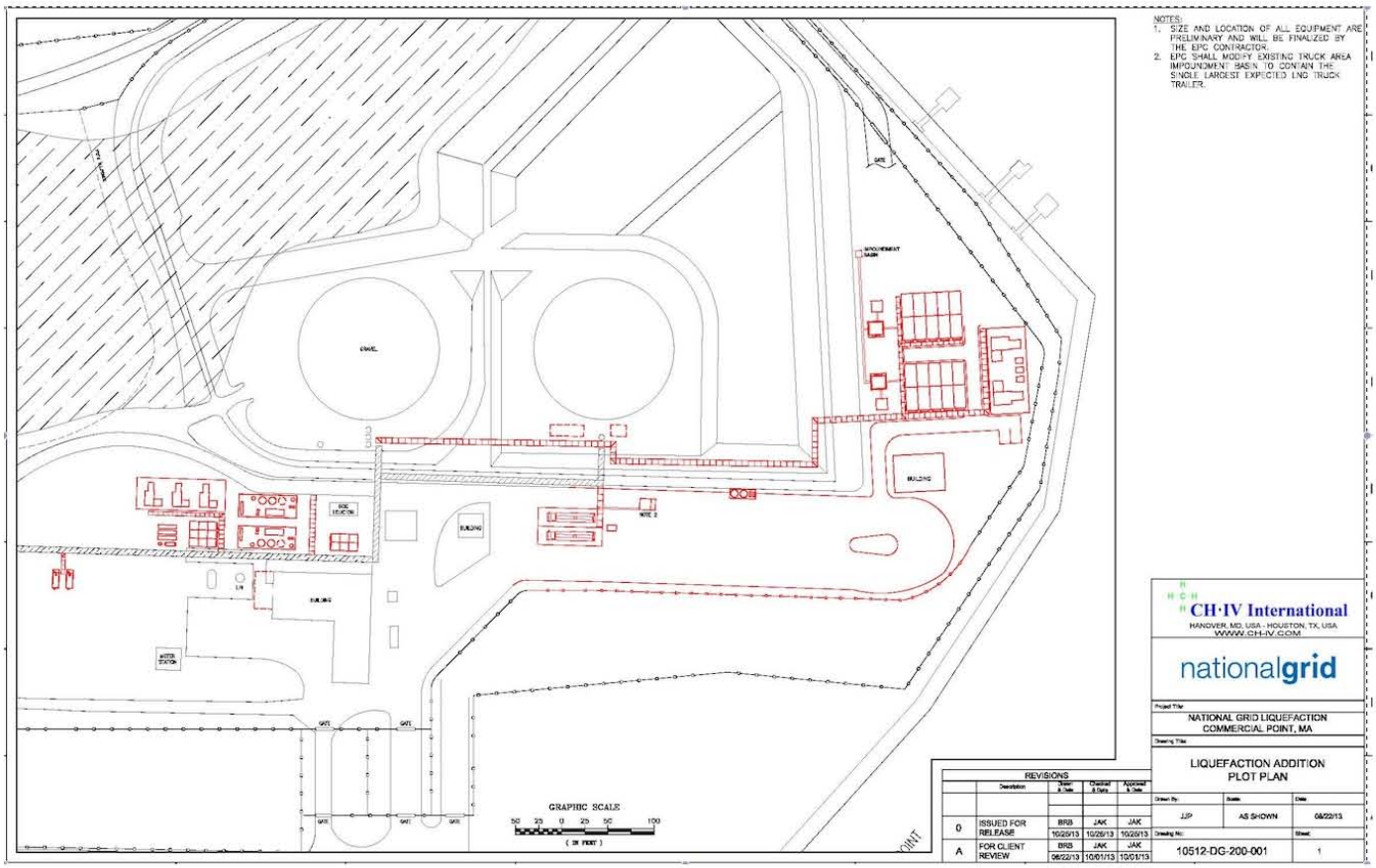
For the reasons set forth above, the Siting Board concludes that it does not have jurisdiction pursuant to G.L. c. 164, §69J to approve or deny the construction by Boston Gas of new liquefaction equipment at the existing Commercial Point storage facility.

In making this decision, the Siting Board assumes that all material facts have been stated and that the facts as represented in the Petition, the Boston Gas Memo, and the responses to information requests are accurate. Should the material facts change or be inaccurate, this Jurisdictional Determination may no longer be valid.

James A. Buckley
Presiding Officer

Dated this August 14, 2014

Figure 1. Commercial Point Liquefaction Project Plot Plan



APPROVED by the Energy Facilities Siting Board at its meeting of August 14, 2014, by the members and designees present and voting. **Voting for** approval of the Tentative Decision (as amended): Mark Sylvia, Acting Chair, Designee of the Secretary of the Executive Office of Energy and Environmental Affairs, Meg Lusardi, Commissioner, Department of Energy Resources, Ann. G. Berwick, Chair, Department of Public Utilities, Jolette A. Westbrook, Commissioner, Department of Public Utilities, Kevin Galligan, Public Member, and Dan Kuhs, Public Member. **Voting against** approval of the Tentative Decision (as amended): Laurel MacKay, Designee for Commissioner, Department of Environmental Protection.

Mark Sylvia, Acting Chair
Energy Facilities Siting Board

Dated this August 20, 2014

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 said decision, order or ruling. Within ten days after such petition has been filed, the appealing party shall enter the appeal in the Supreme Judicial Court sitting in Suffolk County by filing a copy thereof with the clerk of said court. (Massachusetts General Laws, Chapter 25, Sec. 5; Chapter 164, Sec. 69P).

COMMONWEALTH OF MASSACHUSETTS
ENERGY FACILITIES SITING BOARD

Petition of New England Power Company d/b/a National Grid for Approval to Construct and Operate Two New Underground 115 kV Transmission Lines And Related Upgrades to Two Existing Substations Pursuant to G.L. c. 164, § 69J	EFSB 13-2
Petition of New England Power Company d/b/a National Grid for Approval to Construct and Operate Two New Underground 115 kV Transmission Lines and Related Upgrades to Two Existing Substations Pursuant to G.L. c. 164, § 72	D.P.U. 13-151
Petition of New England Power Company d/b/a National Grid Pursuant to G.L. c. 40A, § 3 for Individual and Comprehensive Exemptions from the Zoning Ordinance of the City of Salem in Connection With the Proposed Construction and Operation of Two New Underground 115 kV Transmission Lines and Related Upgrades to Two Existing Substations	D.P.U. 13-152

FINAL DECISION

Stephen H. August
Presiding Officer
November 14, 2014

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John Young

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TABLE OF CONTENTS

ABBREVIATIONS

Algonquin	Algonquin Gas Transmission
Berkshire Power	Berkshire Power Development, Inc., D.P.U. 96-104 (1997)
Boston Gas	Boston Gas Company, D.T.E. 00-24 (2001)
Cape Wind	Cape Wind Associates LLC and Commonwealth Electric Company d/b/a NSTAR Electric, 15 DOMSB 1, EFSB 02-2 (2005)
CELT	Capacity, Energy, Loads, and Transmission
City	City of Salem
CMR	Code of Massachusetts Regulations
CO_2	carbon dioxide
Company	New England Power Company d/b/a National Grid
dBA	A-weighted decibels
DCR	Massachusetts Department of Conservation and Recreation
direct-buried	buried beneath public roadway without a duct bank
Department	Massachusetts Department of Public Utilities
DG	distributed generation
DOMSB	Decisions and Orders of Massachusetts Energy Facilities Siting Board
DOMSC	Decisions and Orders of Massachusetts Energy Facilities Siting Council
DPW	Salem Department of Public Works
DR	demand response
EE	energy efficiency
EIR	Environmental Impact Report
EMF	electric and magnetic fields
EFSB	Energy Facilities Siting Board
Existing Cables	the S-145 and T-146 cables

FCA	Forward Capacity Auction
Footprint	Footprint Power Salem Harbor Development LP
Footprint	Footprint Power Salem Harbor Development LP, EFSB 12-2 (2013)
Footprint Certificate	Footprint Power Salem Harbor Development LP, EFSB 13-1 (2014)
FCM	Forward Capacity Market
GHG	Greenhouse Gas
G.L. c.	Massachusetts General Laws chapter
GSRP	Western Massachusetts Electric Company, 18 DOMSB 7, EFSB 08-2 /D.P.U. 08-105/ 08-106 (2010)
Hampden County	New England Power Company d/b/a National Grid, 18 DOMSB 323, EFSB 10-1/ D.P.U. 10-107/ 10-108 (2012)
Harbor	Salem Harbor
HDD	horizontal directional drilling
HPFF	high-pressure fluid-filled
HVAC	heating, ventilation and air-conditioning
IM	Issues Memorandum
IRP	New England Power Company d/b/a National Grid, EFSB 12-1 /D.P.U. 12-46/ 12-47 (2014)
ISO-NE	ISO New England
kV	kilovolts
LSP	licensed site professional
Lower SEMA	NSTAR Electric Company, EFSB 10-2/D.P.U. 10-131/ 10-132 (2012)
LTE	Long-term emergency rating
Mass DEP	Massachusetts Department of Environmental Protection
MassDOT	Massachusetts Department of Transportation
MEPA	Massachusetts Environmental Policy Act
MBTA	Massachusetts Bay Transportation Authority

MCP	Massachusetts Contingency Plan
MECo/Westford	Massachusetts Electric Company, D.T.E. 01-77 (2002)
mG	milligauss
MHC	Massachusetts Historical Commission
MOA	Memorandum of Agreement (provided as RR-EFSB-8(S)(1))
MODF	Mineral Oil Dielectric Fluid
MVA	megavolt-amperes
MW	megawatts
MWh	megawatt-hours
NEP	New England Power Company d/b/a National Grid
NERC	North American Electric Reliability Corporation
NHESP	National Heritage and Endangered Species Program
North Shore Loop	transmission loop between Wakefield Junction and Ward Hill
NPCC	Northeast Power Coordinating Council
NPDES	National Pollutant Discharge Elimination System
NSTAR/Stoughton	Boston Edison Company d/b/a NSTAR Electric, 14 DOMSB 233, EFSB 04-1/ D.P.U. 04-5/04-6 (2005)
NY Central Railroad	New York Central Railroad v. Department of Public Utilities, 347 Mass. 586 (1964)
OSHA	Occupational Safety and Health Administration
Project	Salem Cables Project
Proposed Cables	The Project's new underground transmission lines
PNF	Project Notification Form
PSC	Public Service Corporation
PVC	polyvinyl chloride
RAO	Response Action Outcome

ROW	right-of-way
Russell	Russell Biomass, LLC, 17 DOMSB, EFSB 07-4/D.P.U. 07-35/ 07-36 (2009)
S Cable	Existing S-145 cable
Save the Bay	Save the Bay v. Department of Public Utilities, 366 Mass. 667 (1975)
SCFF	self-contained fluid filled
Section 72 Petition	NEP petition pursuant to G.L. c. 164, § 72
SF_6	sulfur hexafluoride
Siting Board	Massachusetts Energy Facilities Siting Board
Siting Board Petition	NEP petition pursuant to G.L. c. 164 § 69 J
Study Area	Massachusetts, Rhode Island, and Connecticut
T Cable	Existing T-146 cable
Tennessee/Agawam	Tennessee Gas Pipeline Company, D.T.E. 01-57 (2002)
Town of Truro	Town of Truro v. Department of Public Utilities, 365 Mass. 407 (1974)
TMP	Traffic Management Plan
ULSD	Ultra-low-sulfur diesel
USEPA	United States Environmental Protection Agency
Westborough	New England Power Company d/b/a National Grid, D.P.U. 12-2 (2012)
WHO	World Health Organization
Worcester	New England Power Company d/b/a National Grid, EFSB 09-1 /D.P.U. 09-52/ 09-53 (2011)
Working Group	a group of City officials, business leaders, and residents
XLPE	cross-linked polyethylene
ZBA	Salem Zoning Board of Appeals
Zoning Petition	NEP petition pursuant to G.L. c. 40A § 3

Pursuant to G.L. c. 164, § 69J, the Massachusetts Energy Facilities Siting Board ("Siting Board" or "Board") hereby approves, subject to the conditions set forth below, the Petition of New England Power Company d/b/a National Grid ("NEP," "Company" or "Petitioner") to construct, operate and maintain two underground 115 kilovolt ("kV") transmission cables connecting NEP's Salem Harbor Substation and Canal Substation in the City of Salem. Pursuant to G.L. c. 14, § 72, the Siting Board hereby approves, subject to the conditions set forth below, the Petition of NEP for a determination that the proposed 115 kV transmission lines are necessary, serve the public convenience, and are 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 for individual and comprehensive exemptions from the Zoning Ordinance of the City of Salem in connection with the proposed transmission facilities, as described herein.

I. INTRODUCTION

A. Summary of the Proposed Transmission Project

The proposed project, known as the Salem Cables Replacement Project ("Project"), would replace the two underground 115 kV existing transmission cables that connect NEP's Salem Harbor Substation to its Canal Street Substation in Salem, Massachusetts ("Existing Cables"). The Existing Cables, designated as the S-145 (the "S Cable") and the T-146 (the "T Cable") underground cables, were installed in 1971 and 1951, respectively (Exh. NEP-1, at 1-1). The Project would replace the Existing Cables with two underground 115 kV transmission lines (the "Proposed Cables") because, as described below in Section II.C.1, the Existing Cables are experiencing recurring fluid releases, increasing difficulties regarding maintenance and repair, and are approaching the end of their useful lives (Exh. NEP-1, at 1-3). The Company would locate the Proposed Cables in a new 1.63-mile underground duct bank along different streets from those used by the Existing Cables. The Project also includes related modifications to the Company's existing Salem Harbor and Canal Street Substations (id. at 1-1). Figure 1, below, shows the location of the Project. The estimated cost of the Project, based on a

conceptual grade estimate (i.e., -25 percent to +50 percent), is $62.43 million, with a projected in-service date of spring 2016 (id. at 5-51 to 5-52).[1,2]

Figure 1. The Salem Cables Replacement Project with Primary and Noticed Alternative Routes

Exhs. NEP-1, at Figure 1-2; EFSB-CM-14

The installation of the Proposed Cables would have four phases: manhole installation, duct bank installation, cable installation, and final pavement restoration. The Existing Cables would be removed once the Proposed Cables are energized. As further described in Section II.C.2, below, NEP is proposing sufficient capacity for the Project to serve forecasted regional loads and secondarily to serve the interconnection requirements of the proposed

1 The estimated cost of the Project in 2013 dollars includes: $33.40 million for cable installation; $12.27 million for substation improvements; $5.95 million for S and T Cable removal; and $10.81 million for project administration and development (Exh. NEP-1, at 5-52).

2 The Siting Board strongly encourages NEP and other companies in the future to submit cost estimates that incorporate a narrower range than -25 percent to +50 percent. An accurate estimate with a narrower range would provide greater certainty about the true cost of a project.

Footprint Power generating facility ("Footprint Generating Facility") at the Salem Harbor Substation (id. at 1-1).

B. Procedural History

On September 20, 2013, NEP filed three petitions with the Siting Board and the Massachusetts Department of Public Utilities ("Department") relating to the Project. In the first petition, the Company requests approval of the Project, pursuant to G.L. c. 164, § 69J ("Siting Board Petition"). A second petition seeks approval of the Project pursuant to G.L. c. 164, § 72 ("Section 72 Petition"), and was docketed as D.P.U. 13-151. The third petition, docketed as D.P.U. 13-152, seeks individual and comprehensive exemptions from the zoning bylaws of the City of Salem pursuant to G.L. c. 40A, § 3 ("Zoning Petition").

Pursuant to the Company's motion, on September 25, 2013 the Chair of the Department issued a Consolidation Order, referring the Section 72 and Zoning Petitions for review to the Siting Board pursuant to G.L. c. 164, § 69H(2). The consolidated proceeding was docketed as EFSB 13-2/D.P.U. 13-151/13-152. The Siting Board conducted a single adjudicatory proceeding and developed a single evidentiary record for the consolidated petitions ("Petitions").

The Siting Board held two public hearings to receive comments on the Project. On November 19, 2013, the Presiding Officer granted intervenor status to the City of Salem ("City"), Footprint Power Salem Harbor Development LP ("Footprint"), Arthur C. Sargent III (a Salem Councillor-at-Large), Hawthorne Hotel, Finz Seafood & Grill, Waters & Brown, Inc., and Salem residents Mary E. Madore and Kristine Doll ("Ruling"). The Ruling granted limited participant status to Tim Clarke, Salem Chamber of Commerce, and New Hampshire Transmission LLC.

The Petitioner presented the testimony of the following nine witnesses in support of the Petitions: George DeLoureiro, John Martin, Joseph Carey, Eamon Kerrigan, Joshua Holden, Lane Puls, Marissa Pizzi, Esq., Marc Bergeron, and Dr. William Bailey. The City presented David Knowlton as its witness.

The Siting Board held four days of evidentiary hearings, beginning on April 22, 2014 and ending on May 2, 2014. The Company, Ms. Madore, and Ms. Doll filed briefs on May 23, 2014.

In lieu of a brief, the City filed a Memorandum of Agreement ("MOA") dated May 22, 2014 between the City and the Company.[3] A description of the MOA follows below.

The Siting Board staff prepared an Issues Memorandum, dated August 6, 2014; on August 14, 2014, the Siting Board held a public meeting to review the Issues Memorandum and directed the staff to prepare a tentative decision approving the Company's Petitions with conditions.

C. Description of the MOA

The MOA covers a range of coordination issues related to the construction of the Project, including communication protocols, schedule considerations, acceptable construction practices, a traffic management plan, mitigation measures for environmental impacts, and procedures for handling potential damage claims. The MOA also includes the following terms:

- NEP will repave all streets affected by the project with curb-to-curb paving. Due to scheduling considerations, NEP will place $640,000 in escrow for the City to use for repaving certain roads within the Project area along the existing S Cable route instead of NEP repaving those roads itself;
- Construction work hours are limited to 7:00 a.m. to 3:30 p.m. weekdays, excluding weekends and holidays, with some identified exceptions;
- NEP will pay the City's reasonable expenses for engineering consultants for work directly related to the Project, not to exceed $130,000;
- NEP will reimburse the City for the cost of updating the tree survey along the Proposed Route ($3,500); require the contractor to pay for signage directing pedestrians and vehicular traffic to alternate routes and parking during construction (up to $5,000); and reimburse the City (up to $15,000) for retaining a Communications Manager from the non-profit agency Destination Salem to liaise among NEP, the City, and the business community during the Project; and

[3] The MOA can be found in the record at RR-EFSB-8(S)(1). Cites to that record request are shown as "MOA at . . ." herein.

- NEP's Stakeholder Relations Representative will participate in twice-monthly meetings with a group of City officials, business leaders, and residents (the "Working Group") to address issues that arise during Project construction and provide a description of construction activities for the upcoming two weeks.

The MOA, in its entirety, is attached to this Decision for informational purposes as Exhibit 1.

D. 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 69 kilovolts or more and which is one mile or more in length on a new transmission corridor." The proposed 115 kV transmission lines are clearly a "facility" with respect to Section 69J. 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 II, 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 III, 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 IV, 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 developed by the Commonwealth (see Section VII, below).

II. NEED ANALYSIS OF THE PROPOSED PROJECT

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 least possible cost. To accomplish this, the Board must, among other matters, review the "need for" the transmission 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 transmission facility.[4] 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. New England Power Company d/b/a National Grid, EFSB 12-1/D.P.U. 12-46/12-47, at 5 (2014) ("IRP"); New England Power Company d/b/a National Grid and Western Massachusetts Electric Company, 18 DOMSB 323, EFSB 10-1/D.P.U. 10-107/10-108, at 5 (2012) ("Hampden County"); Boston Edison Company d/b/a NSTAR Electric, 14 DOMSB 233, EFSB 04-1/D.P.U. 04-5/04-6, at 7-8 (2005) ("NSTAR/Stoughton").

Accordingly, to determine whether system improvements are needed, the Siting Board: (1) examines the reasonableness of the petitioner's system reliability planning criteria; (2) determines whether the petitioner uses reviewable and appropriate methods for assessing

[4] The Siting Board conducts its review of proposed transmission facilities 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 Chapter 164 of the Acts of 1997 (the Restructuring Act) and the subsequent Notice of Inquiry and Rulemaking, D.T.E. 98-84/ EFSB 98-5 (2003), Massachusetts electric companies, including NEP, 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.

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. IRP at 5; Hampden County at 5; NSTAR/Stoughton at 7-8.

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 information and reasonable statistical projection methods that include an adequate consideration of conservation and load management. See G.L. c. 164, § 69J. To ensure that this standard has been met, the Siting Board requires that forecasts be reviewable, appropriate and reliable. 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 to which it applies. A forecast is considered reliable if its data, assumptions and judgments provide a measure of confidence in what is most likely to occur. See, e.g., IRP at 5-6; Hampden County at 6; NSTAR/Stoughton at 8.

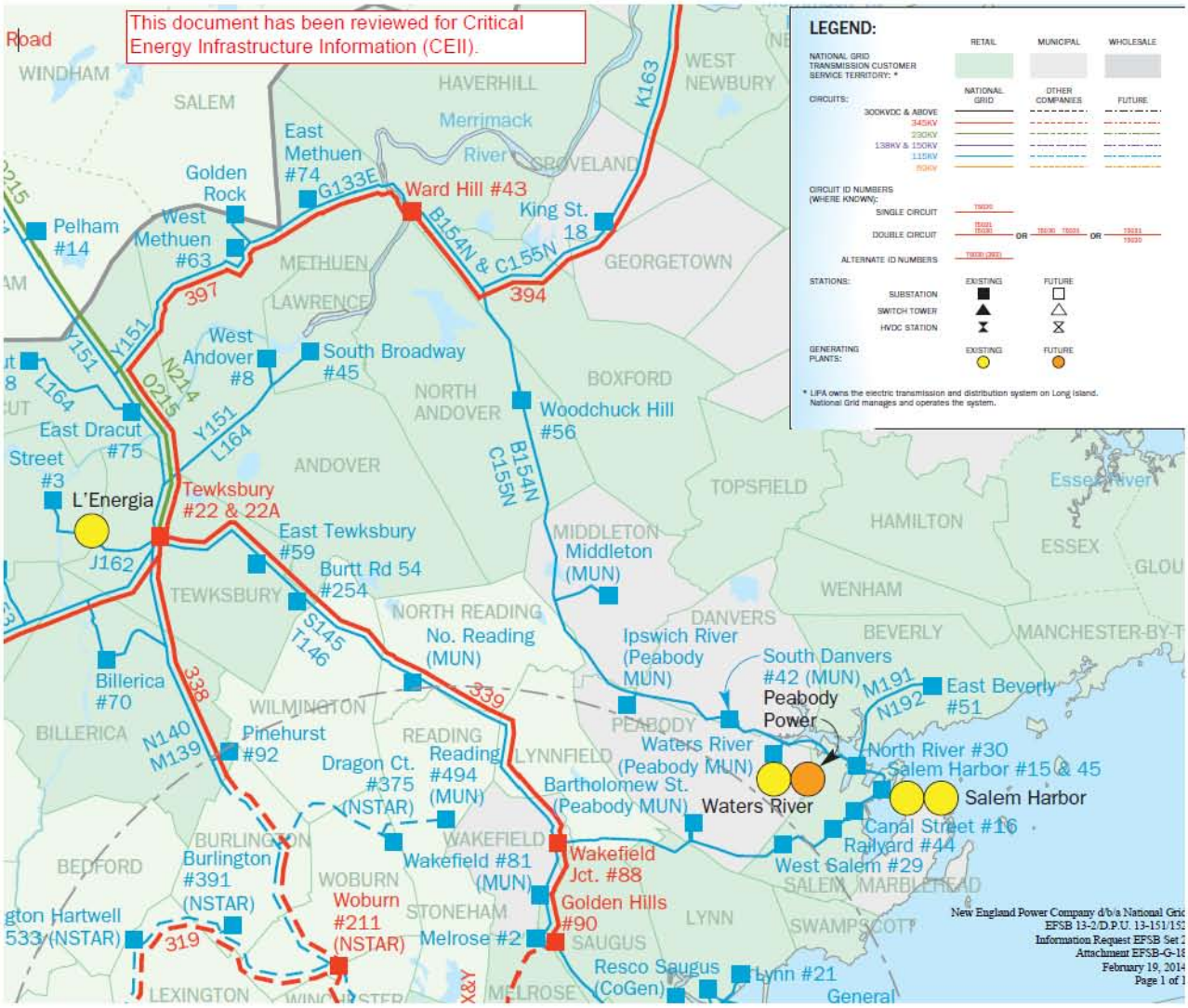
B. Description of the Existing System

The S-145E and T-146E lines are part of a 115 kV transmission loop serving the North Shore area between the substations at Wakefield Junction in Wakefield and Ward Hill in Haverhill, each of which has 345 kV-to-115 kV transformers ("North Shore Loop") (Tr. 1, at 24-25). The S-145E and T-146E transmission lines run from the Salem Harbor Substation to Wakefield Junction, also serving the Railyard Substation in Salem and the West Salem Substations along the way (Exh. NEP-1, at 2-2). From the Canal Street Substation to Wakefield Junction, the S-145E and T-146E lines are overhead conductors (id. at 2-2). NEP's B-154 and C-155 transmission lines comprise the remainder of the North Shore Loop (id. at Figure 2-2).

The functions of the North Shore Loop historically have been to move power between Ward Hill and Wakefield Junction, to connect generation at the Salem Harbor site to the rest of the grid, and to serve load on the North Shore (Tr. 1, at 25-27). With no generation operating at the Salem Harbor site, the North Shore Loop primarily moves power between the 345 kV

sources at the Wakefield Junction and Ward Hill Substations, while also serving customers along the way (Exh. EFSB-N-7).

Figure 2. Map of the 115 kV Transmission Loop from Wakefield Junction to Ward Hill



Source: Exh. EFSB-G-18(1)

As described above in Section I, and as shown in Figure 2, the subject of this case is the portion of NEP's S-145E and T-146E transmission lines that extends approximately 1.5 miles underground between the Salem Harbor Substation and the Canal Street Substation (jointly "Existing Cables" and separately "S Cable" and "T Cable") (Exh. NEP-1, at 2-2). The Existing Cables are self-contained fluid-filled ("SCFF") cable systems with pressurized dielectric fluid for insulation (id. at 2-3). The S Cable is buried beneath public roadways in Salem without a duct

bank ("direct-buried") (id. at 2-3 to 2-4). The T Cable is installed in a duct bank and manhole system (id. at 1-1 and 2-3).

The Salem Harbor Substation is adjacent to the recently retired Salem Harbor Station generating facility, which had a net generating capacity of 740 MW when all four of its units were in operation (Exhs. NEP-1, at 2-3; EFSB-N-1).[5, 6] The site of this retired generating facility is currently owned by Footprint, which intends to build a new 692 MW natural gas-fired, combined-cycle, quick start generating facility at the Footprint Generating Facility with a proposed on-line date of June 2016 (Exh. NEP-1, at 2-3, 2-11).[7] The Salem Harbor Substation connects generation at this site to the transmission grid, and serves local distribution load (Exh. EFSB-N-4). The Canal Street Substation does not serve local distribution; its sole function is to serve as a transition station from underground cables to overhead conductors (Exh. EFSB-G-16).

C. Description of the Company's Demonstration of Need

1. Need to Replace the Asset

The Company stated that the age and condition of the Existing Cables require their immediate replacement in order to maintain the reliability of the transmission system in this area to avoid future environmental incidents, and to minimize the cost of maintenance and repair of

5 Units 1 and 2 of the recently retired Salem Harbor Station were removed from service in December 2011. Units 3 and 4 were removed from service as of June 2014.

6 In the Petition, the Company stated that it was in the process of reconductoring certain other 115 kV transmission lines in the area besides the Existing Cables to ensure its ability to maintain reliable transmission service in the Merrimack Valley and North Shore areas following the retirement of the generating facility at the Salem Harbor site (Exh. NEP-1, at 2-3).

7 On October 7, 2014, Footprint sought FERC approval of a one-year deferral of its Capacity Supply Obligation because of delays in the permitting process arising from appeals that prevented it from obtaining financing and beginning construction of the facility. The appeal was resolved in favor of Footprint in September 2014. As a result, Footprint's in-service date could be delayed by approximately one year beyond June 1, 2016. See Footprint Power Salem Harbor Development LP, FERC Docket No. ER 15-60-000.

these important facilities (Exh. NEP-1, at 2-11). The Company stated that the S and T Cables, over 40 and 60 years old, respectively, are prone to leakage of dielectric fluid – particularly if corrosion, contractor damage, or other external mechanical forces have compromised the cables (id. at 2-3).[8] The Company stated that potential impacts from dielectric fluid release vary in extent depending on the volume released and the relative location of groundwater and sensitive receptors (Exh. EFSB-HW-2). The Company noted that impacts could range from small, localized releases, which would not have significant detrimental impacts, to larger releases, which could potentially impact the public water supply or cause ecological impacts on flora and fauna (id.).

The S Cable is direct-buried in the roadways of Salem, covered by a concrete cap to provide mechanical protection (Exh. NEP-1, at 2-4). The circuit consists of three single-phase cables each of which has a channel filled with dielectric fluid surrounded by copper conductors and paper insulation impregnated with dielectric fluid (id. at 2-4 to 2-5). The paper insulation is surrounded by an aluminum sheath that is designed to seal the cable and then a high-density polyethylene jacket for corrosion control (id. at 2-4). Since its installation in 1971, the S Cable has experienced at least 24 leaks that resulted in dielectric fluid releases (id. at 2-5). Over half of these leaks (13) have occurred since 2003, during which time the Company has spent more than $1.3 million on locating, repairing, and remediating the leaks on the S Cable (id.).

The Company stated that some of these leaks are the result of the thermal and mechanical characteristics of the cables from carrying electrical load and will inevitably continue over time (id. at 2-6). Other leaks have occurred when the S Cable's polyethylene outer jacket has deteriorated and exposed its aluminum sheath to the soil, which leads to corrosion of the aluminum (id.). The Company predicted that given the S Cable's age and operating history, it is likely that the jacket failure and sheath corrosion will continue to occur on the S Cable (id.).

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[8] While the Existing Cables are in operation, any releases to the environment are subject to evaluation and remediation provisions of the Massachusetts Contingency Plan specified at 310 CMR 40.00 et seq., in accordance with G.L. c. 21E, § 6, which requires reporting leaks to the Massachusetts Department of Environmental Protection ("MassDEP") and conducting clean-up activities in the area where the release occurred (Exh. NEP-1, at 3-1).

The T Cable is installed in a duct bank with two cables per phase (id. at 1-4, 2-8). Like the S Cable, the T Cable has a hollow core to provide a channel for the dielectric fluid surrounded by copper conductors and paper insulation impregnated with dielectric fluid (id. at 2-8 to 2-9). However, the T Cable is sealed in a lead sheath instead of an aluminum sheath and it does not have a polyethylene jacket (id.). The Company stated that the T Cable has required some repairs over its 60-year history, mostly as a result of cracks in the stop joint's epoxy cone insulators that isolate the two hydraulic sections of the cable (id. at 2-9; Tr. 1, at 33). The Company stated that the T Cable is also subject to deterioration as it ages due to the thermal and mechanical behavior of the cables and the corrosion of the cable's lead sheath, which can expose the cables to moisture and cause electrical failure (Exh. NEP-1, at 2-10).

To detect leaks, the Company has alarms installed on both the S Cable and T Cable that alert the Company's Control Center if cable oil pressure is dropping rapidly (Exh. EFSB-G-5). Additionally, the Company monitors and records the pressure reading for the S and T Cables during weekly inspections at the Salem Harbor and Canal Street Substations; these weekly readings are used to detect possible fluid releases before the pressure has dropped to the alarm threshold (id.). Once a leak has been detected somewhere between the two substations, the Company has three methods for locating the leak: (1) freezing the cable at one location at a time and measuring pressure drop to either side; (2) introducing a perfluorocarbon tracer to the dielectric fluid and monitoring for the tracer in the environment; and (3) testing for electrical faults in the aluminum jacket (id.). Detecting leaks may require excavation at multiple locations in the public roads, which may cause traffic delays, parking disruptions, noise, as well as a risk of inadvertent damage to the cables (Exh. NEP-1, at 2-8). The Company stated that repairing and remediating the leaks also require taking the affected cable out of service (id.).

Additionally, many replacement parts associated with the Existing Cables, such as fluid alarms and fluid reservoirs, are no longer manufactured and are difficult to obtain (id. at 2-4). Similarly, there is a limited number of experienced craftspeople proficient in the repair of SCFF cables, especially the S Cable; there are currently only two companies in the United States capable of performing repairs on the S Cable (id.).

NEP stated that its transmission asset management group determines when to replace an asset based on its operating history, reliability, availability, environmental impacts, and the cost

and ability to maintain the asset in the future (Exh. EFSB-N-27; Tr. 1, at 20-21). In 2005, following a series of dielectric leaks in 2002 through 2004, the Company commissioned KEMA Associates to conduct an overall assessment of the remaining useful life of the S Cable (Exh. EFSB-N-2). The KEMA Associates study concluded that the Company should consider options for the replacement of the S Cable based on its condition (Exhs. EFSB-N-2; EFSB-N-31). The Company determined that the T Cable also should be replaced based on its age and condition (Exh. EFSB-N-2).

The Company argues that removing the Existing Cables without replacing them would not meet applicable reliability standards as the Existing Cables are an integral part of NEP's 115 kV transmission system (Exh. NEP-1, at 3-4). If the Existing Cables were not replaced, only the existing B-154S/C-155S overhead transmission lines would serve Salem Harbor Substation (on double-circuit structures) (Exh. EFSB-N-4). As a result, 18,500 customers in the Salem area (approximately 70 MW of load) would be at risk of a blackout in an N-1 contingency involving a loss of these double-circuit structures (id.). [9]

The Company noted that, if the Existing Cables were removed and not replaced, the proposed Footprint Generating Facility would face significant operational limitations on delivering capacity and energy to the grid (Exh. EFSB-N-4). Without either the Existing or Proposed Cables, the Salem Harbor Substation (where Footprint would interconnect) would only be able to accept a maximum of 500 to 550 MW of output from the Footprint Generating Facility, assuming unconstrained conditions; significantly lower output limits could occur given constrained system conditions (id.). The Company also noted that the independent system operator, ISO-New England ("ISO-NE"), would likely require the Footprint Generating Facility to operate continuously with at least some minimum output level to mitigate the risk of voltage collapse or overload in the Salem area (id.). The Company concluded that absent the Proposed Cables, it would be very difficult for ISO-NE to operate the transmission system in the Salem area in a reliable manner consistent with applicable reliability standards (Exh. NEP-1, at 3-5).

[9] An N-1 contingency is a circumstance in which there is an unexpected fault or loss of a single electric element. An N-1-1 contingency consists of the loss of such an element, followed by non-simultaneous loss of an additional element.

2. Capacity for the Replacement Asset

The Company conducted an analysis of transmission capacity needs in the region with and without the proposed Footprint Generating Facility and determined that under both scenarios there is a need to increase the capacity of the Existing Cables in order to ensure the long-term reliability of the regional transmission system (id. at 2-11). Both of these scenarios were analyzed under the applicable ISO-NE and NEP planning criteria and guidelines (id. at 2-11 to 2-12).

a. Load Forecasts with Footprint Interconnection

The proposed Footprint Generating Facility would interconnect at the Salem Harbor Substation (Exh. NEP-1, at 2-11). On October 10, 2013, the Siting Board approved Footprint's petition to construct and on February 25, 2014, the Siting Board granted a certificate of environmental impact and public interest to the proposed generating facility. Footprint Power Salem Harbor Development LP, EFSB 12-2 (2013) ("Footprint"); Footprint Power Salem Harbor Development LP, EFSB 13-1 (2014) ("Footprint Certificate"). The Company maintains that because the capacity rating of the Existing Cables is inadequate to meet the needs to interconnect the proposed Footprint Generating Facility (as described below), the Company needs to replace the Existing Cables with a solution that has higher capacity (Exh. NEP-1, at 2-17).[10]

The Company conducted a transmission planning study with eight load flow scenarios and determined that under the worst-case generation dispatch tested with no transmission contingencies (i.e., N-0 conditions), the required normal rating for each Existing Cable would be 233 megavolt-amperes ("MVA"), which exceeds the capacity of the existing T Cable (id. at 2-14). For the worst-case N-1 contingency, the Company stated that loading would exceed the long-term emergency rating ("LTE") of both of the Existing Cables in all eight power flow cases

[10] The Existing Cables did not have sufficient capacity to serve the full output of Salem Harbor Station and could have overloaded even in some scenarios with all lines in service (Exh. EFSB-N-1; RR-EFSB-1). In May 2008, the Company first filed an application with ISO-NE for replacement of the Existing Cables, based on their condition; that original replacement proposal had a greater capacity than either the Proposed Cables or the Existing Cables (Exhs. NEP-1, at 2-3; EFSB-N-1; EFSB-N-30). However, the 2008 application was later revised in response to announced changes in generation at the Salem Harbor site (Exh. EFSB-N-30).

analyzed (id. at 2-14 to 2-15).[11] The maximum loading for the dispatch scenarios tested under N-1 contingency conditions was 375 MVA (id. at 2-15). In the worst case N-1-1 contingency tested, the loading on the cable left in service would be 647 MVA (id. at 2-16).

Achieving a 647 MVA LTE rating would necessitate two separate duct banks on two separate routes and would cost an estimated $71.76 million compared to the proposed Project's estimated $62.43 million cost (Exh. EFSB-N-17). NEP stated that Footprint would likely have been responsible for the cost increment of this alternative (id.). Footprint chose instead to be prepared to ramp down its units under certain contingencies and load conditions, so that the replacement to the Existing Cables could be built with an LTE of 400 MVA (Exh. NEP-1, at 2-16).[12]

b. Load Forecast Without Footprint

The Company conducted contingency analysis for N-0, N-1, and N-1-1 scenarios with the same eight load flow cases as it used for the analysis with the Footprint Generating Facility operating and determined that a 400 MVA LTE rating would be adequate to meet the needs of the Salem area through the 2026 planning horizon without the proposed Footprint Generating Facility (id. at 2-18 to 2-19). The Company estimated that in the absence of the Footprint Generating Facility, the 400 MVA LTE rating would be sufficient through the year 2062, but emphasized that the results from extrapolating 30 years beyond the planning horizon are highly unreliable based on the many factors that could change over time (Exh. EFSB-N-5).

The Company noted that were it constructing replacement cables solely for the long-term system requirements, without the objective of interconnecting the Footprint Generating Facility, it would have designed the Project with a capacity of at least 350 MVA (Exh. EFSB-N-5). The Company observed that the cost differential between 350 MVA and 400 MVA would probably

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11 The LTE rating is the twelve-hour capability of the element during the summer loading period, while the element's normal ratings is the continuous operating limit for that element (Exh. EFSB-N-19).

12 The proposed Footprint Generating Facility would be a quick-start facility, able to produce approximately 300 MW of output within ten minutes of startup and reach its full capacity within one hour. Footprint Decision at 1.

be less than one million dollars (Tr. 1, at 19). Therefore, the added benefits of the higher capacity 400 MVA Proposed Cables in accommodating additional years of system load growth, as well as the their ability to interconnect the Footprint Generating Facility at higher capacity levels, are realized at a relatively low incremental cost.[13] The Company stated that another benefit of increasing transmission capacity in this location would be that the Existing Cables presently have the lowest capacity of any segment of the North Shore Loop and are thus a limiting factor on the capacity of the loop (Exh. EFSB-G-12; Tr. 1, at 31-32). According to the Company, improvement to the capacity and reliability of the loop would provide more flexibility for the integration of distributed generation, such as renewable generation in the North Shore area (id.).

The Company also evaluated need for the Proposed Cables given impacts relating to climate change. The Company noted that even if soil temperatures were to increase by three degrees Celsius, the Proposed Cables would still achieve the desired 400 MVA rating (Exh. EFSB-G-14). In addition, if loads on the system were to increase faster than expected because of increased summer temperatures, the Company noted that an increased percentage of Footprint's output would serve local loads in the Salem area (served from the Salem Harbor Substation) and, therefore, would actually reduce loading on the Proposed Cables (id.). Without Footprint operating, the Company estimated that since the 400 MVA LTE rating would be sufficient through 2062, the Project has a substantial margin of capacity to meet increased loads (id.). The Company therefore contends that the 400 MVA LTE rating would be sufficient to

[13] The Company noted that while it used a ten- to 15-year planning horizon to evaluate need, once it has determined that a project is needed, the Company typically designs the project with sufficient capacity to serve load well beyond the end of the planning horizon (Exh. EFSB-N-5). The Company's Transmission Planning Guide recommends providing for a 20 percent margin over the maximum flow required for the planning horizon (id.). The Company indicated that without the Footprint Generating Facility, the replacement cables would need an LTE rating of 276 MVA in 2026 and 290 MVA in 2031 (id.). Therefore, the Company stated that the "application of a 20 percent margin to the 2031 value would result in an LTE rating of 350 MVA" (id.).

reliably serve load in the Salem area with or without the proposed Footprint Generating Facility for the foreseeable future, inclusive of potential climate change effects (Exh. NEP-1, at 2-19).

D. Positions of the Parties

None of the parties disputed the need to replace the Existing Cables or commented on the Company's assessment of the necessary capacity for the replacement.

E. Analysis and Findings on Need

For most transmission line cases that the Siting Board reviews, the petitioners rely on quantitative reliability standards to establish the need for the project. In this case, the Company established that the Existing Cables need to be replaced based on an assessment of their condition and then used quantitative reliability standards to determine the necessary capacity of the replacement.

The Siting Board finds that the Company's process to determine the need to replace Existing Cables is reviewable and used appropriate methods for assessing system reliability over time. The history of the leaks from the S Cable, the age and condition of the Existing Cables, and the difficulty of finding qualified repair workers or replacement parts for the Existing Cables justify the replacement of the Existing Cables. Replacing the Existing Cables and removing them from service will achieve the environmental objective of stopping leaks of dielectric fluid. Replacing the Existing Cables will also improve reliability by minimizing unplanned outages. Finally, replacing the Existing Cables will also improve economic efficiency by avoiding the cost of remediating future leaks. Therefore, the Siting Board concludes that the Company has sufficiently demonstrated the need to replace the Existing Cables to address environmental, reliability, and cost concerns, associated with their potential for leaks and difficulty of repair.

The record shows the Existing Cables do not exist solely to interconnect generation at the Salem Harbor site; the Existing Cables are also an integral part of the North Shore Loop that moves power between the Ward Hill and Wakefield Junction Substations and serve local distribution load. The Existing Cables also serve to connect generation at the Salem Harbor site to the regional grid; accordingly, the Company properly considered the needs of Footprint Generating Facility as one of the factors in determining the capacity for the replacement project

for the Existing Cables. As the Company noted during hearings, the incremental cost of increasing the rating of the Proposed Cables to 400 MVA from 350 MVA to fully interconnect the Footprint Generating Facility is not significant – especially relative to the system benefits.

Accordingly, the Siting Board finds that the Existing Cables in Salem need to be replaced for environmental, reliability, and costs considerations, related to the Existing Cables' propensity to leak oil and difficulty to repair. Further, the Siting Board concludes that a capacity of at least 350 MVA is needed to accommodate potential load growth. A target capacity of 400 MVA would address both the potential for load growth as well as reliably interconnect the Footprint Generating Facility. Additionally, the Siting Board notes that any additional cost for such capacity is relatively small. Therefore, the Siting Board finds that a capacity of 400 MVA would be appropriate for the solution to replace the Existing Cables.[14]

III. ALTERNATIVE APPROACHES TO MEETING THE 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: (1) other methods of transmitting or storing energy; (2) other sources of electrical power; or (3) a reduction of requirements through load management.[15] 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

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[14] In the Company's discussion of the standard of review applicable in this case, the Company noted that when jurisdictional transmission facilities are proposed to interconnect to a new or expanded generating facility, the Siting Board evaluates the need for the transmission interconnection based on the standard of review for need set forth in Cape Wind at 29 (Company Brief at 13). However, it is unnecessary to review the need for the Project using this standard because we find a need for the Project for environmental, reliability, and costs considerations.

[15] G.L. c. 164, § 69J also requires an applicant to present "other site locations." This requirement is discussed in Section V.A, below.

project is superior to alternative project approaches. IRP at 25-26; NSTAR Electric Company, EFSB 10-2/D.P.U. 10-131/10-132, at 29 (2012) ("Lower SEMA"); NSTAR/Stoughton at 21.

B. Identification of Alternative Approaches for Analysis

The Company stated that it developed a review process that identified multiple potential alternatives and then first screened these alternatives for their ability to meet the identified resource need and for overall feasibility and constructability (Exh. NEP-1, at 3-4). NEP eliminated any alternative that clearly did not meet the identified need and/or it deemed infeasible to construct (id.). Next the Company screened the remaining project alternatives in more detail for potential reliability considerations, environmental impacts (including permitting requirements), and cost analysis, and selected a project approach based on these comparisons (id.).

The Company highlighted several unique circumstances that limit the number of feasible alternatives (id. at 3-1). First, the Company stated that due to transmission system constraints, it would not be possible to take either of the Existing Cables out of service for an extended period of time, so it must construct the replacement solution while the Existing Cables remain in service (id.). Second, the Company argued that it must remove both the S Cable and the T Cable from the ground once they are retired due to environmental regulations and all project alternatives must therefore include the removal of both of the Existing Cables (id.). Third, the Company asserted that because additional capacity is needed to reliably interconnect the proposed Footprint Generating Facility, the evaluation of project alternatives must therefore include consideration of whether an alternative can be implemented in time for the plant's in-service date (id.).[16] However, the Company also stated that service to electric customers can be maintained even if the Footprint Generating Facility is completed before the Proposed Cables, because the Existing Cables will continue to operate until the two new circuits are placed in service (Exh. EFSB-PA-2). The Company added that Footprint Generating Facility, however, would be limited to operate at an output level within the ratings of the circuits in place at the time (id.).

[16] NEP stated that as a prerequisite to Footprint's participation in the February 2013 Forward Capacity Auction at full capacity, ISO-NE requested certification from NEP that the two new cables would be in service by 2016 (Exh. EFSB-PA-2).

The Company evaluated the following alternative approaches to meet the identified need: (1) a non-transmission alternative; (2) transmission solutions of varying voltages; (3) an overhead transmission alternative; (4) an underground in-street duct bank alternative; (5) an alternative through Salem Harbor ("Harbor"); and (6) an alternative using the railroad ROW.[17] These alternatives are described below.

1. Non-transmission Alternatives

The Company stated that while non-transmission alternatives such as energy efficiency ("EE") and distributed generation ("DG") have very useful applications, by their nature they cannot serve the function of the Existing Cables in the regional transmission network or interconnect a new generator to the electric grid (Exh. NEP-1, at 3-2). As such, EE and DG would not substitute for a transmission asset in resolving the reliability issues in this case (id.). Therefore, the Company eliminated non-transmission alternatives from consideration as a project alternative (id.).

2. Transmission Voltage Selection

NEP stated that 115 kV is the only transmission voltage in the Salem area, and replacement of the Existing Cables with any other voltage would require voltage transformation at both ends of the new cable (i.e., at the Salem Harbor and Canal Street Substations), necessitating expansion of both substation yards (Exh. EFSB-PA-1). Also, if 69 kV replacement cables were used, multiple cables per phase and separate duct banks would be needed because each cable would have less capacity (id.). Furthermore, the Company stated that, within its planning horizon, there is no identified need for the increased capacity that 345 kV cables would provide (id.). Therefore, the Company argues that a 115 kV transmission solution should be used (id.).

[17] A no-build alternative would not meet the resource need identified in Section II, and therefore is not considered here.

3. Overhead Transmission Alternative

The Company studied the construction of overhead transmission circuits on routes extending through Salem and routes around Salem (Exh. NEP-1, at 3-13). NEP conducted a conceptual analysis of routes through Salem to determine the feasibility of installing two 115 kV overhead transmission circuits between the Salem Harbor and Canal Street Substations (id.). Due to clearance requirements, an overhead route for two 115 kV circuits would require a new 50- to 150-foot-wide right-of-way ("ROW") (id.). To achieve this ROW width, the Company would need to acquire and demolish many existing buildings in the City, which would permanently impact numerous residents and businesses and cause significant social, economic, and visual impacts to the City and its historic districts (id.). Therefore, NEP stated that overhead transmission lines through Salem would be highly impractical and did not merit further consideration (id.).

The Company also evaluated routing two overhead transmission circuits around the periphery of Salem (id.). According to the Company, reliability constraints would necessitate constructing two separate lines of transmission structures because each circuit serves as back-up for loss of the other (Exhs. NEP-1, at 3-14; EFSB-PA-30). While the Company indicated that no existing ROW directly connects the Salem Harbor and Canal Street Substations, the Company was able to identify feasible routes connecting the Salem Harbor Substation to the West Salem Substation, which would serve the same regional transmission function as the Existing Cables (Exh. NEP-1, at 3-14).[18]

NEP evaluated an approximately 6.9-mile route for an overhead route avoiding the center of Salem that combines existing overhead transmission corridors, existing railroad corridors, and a total of 1.4 miles of new easement away from existing ROWs (id.). From Salem Harbor

[18] For a project alternative connecting the Salem Harbor Substation to the West Salem Substation, NEP stated that the existing overhead segments of the S-145 and T-146 transmission lines between the West Salem and Railyard Substations would then supply the distribution load that is served from the Railyard Substation (Exh. NEP-1, at 3-14). Under this scenario, the Company stated that the Canal Street Substation would no longer be needed and it would be decommissioned and removed (id.). Currently, the Canal Street Substation's only function is to serve as a transition station between underground cables coming from the Salem Harbor Substation and overhead lines going to the Railyard Substation (Exhs. NEP-1, at 3-14; EFSB-G-16).

Substation, the two new overhead transmission circuits would first follow the existing 200-foot-wide ROW of the B-154S and C-155S transmission lines for 3.5 miles to the Waters River Substation in Peabody, expanding the existing ROW by 50 feet (id.). NEP described how it could fit the two new circuits into the existing ROW by either: (1) acquiring new easements to expand the ROW by 50 feet; or (2) putting the new segment of the T-146E line on a double circuit structure with a relocated B-154S line, and putting the new S-145E line and a relocated C-155S line on separate single circuit structures (Exhs. NEP-1, at 3-15; EFSB-PA-30).

From the Waters River Substation, the two new overhead circuits would continue along an existing railroad corridor for approximately 2.0 miles, along a local road for approximately 1.4 miles, and then across the Peabody Golf Course to the West Salem Substation (Exh. NEP-1, at 3-15). The Company stated that it would need to demolish at least 60 residences, ten industrial buildings, and eight commercial buildings along the railroad ROW (id.). The Company stated this project alternative would require Article 97 land dispositions from the Legislature and stated that that such disposition is difficult to obtain when a feasible alternative exists (id. at 3-17, 3-18).[19] Additionally, the Company would not be able to obtain secure property rights along the railroad ROW (id. at 3-15).

4. City Streets Underground Alternative

The Company evaluated an underground transmission alternative that would place both replacement circuits within a single new duct bank and manhole system through the public streets of Salem between the Salem Harbor and Canal Street Substations (i.e., the proposed Project) (Exh. NEP-1, at 3-5).[20] The Company stated that, in order to keep the Existing Cables

[19] All open space areas covered by Article 97 of the Articles of Amendment to the Constitution of the Commonwealth of Massachusetts require a two-thirds vote of each branch of the legislature before they can be disposed of or used for other purposes.

[20] The Company also analyzed installing the two replacement circuits in two separate, new duct bank and manhole systems along different routes, including the possibility of placing one of the replacement circuits within the existing T Cable duct bank (Exh. NEP-1, at 3-5, 3-12). However, the Company determined that it would not be feasible to reuse the existing T Cable's duct bank for this Project (id. at 3-12). Without the option to reuse the existing T Cable duct bank, the Company concluded that the

in service during construction of the replacement project, it would have to build the new duct bank along a different route from the Existing Cables, due to road widths and existing utility density (id. at 3-6). The Company stated that this alternative is technically feasible (id. at 3-8).

5. Harbor Route

NEP evaluated three technologies for installing the new circuits across the Harbor. The three technologies were: (1) overhead transmission lines across the Harbor; (2) the use of jet plow technology to install the new circuits under the Harbor; and (3) the use of horizontal directional drilling ("HDD") technology to install the two new circuits under the Harbor (id. at 3-23).

a. Overhead Transmission Across Salem Harbor

The Company asserted that construction of transmission structures within the Harbor is the only practical means to provide adequate clearance of transmission lines over vessels (Exh. NEP-1, at 3-23). However, the transmission structures themselves would then interfere with navigation through the Harbor, would require extensive environmental permitting, and could significantly impact existing marine resources (id.). The Company stated that it would still need to acquire new onshore overhead ROW easements in order to connect from the Harbor to the Canal Street and Salem Harbor Substations (id.). The Company provided maps that indicate that there is fairly dense residential development between the Canal Street Substation and the Harbor that would preclude these overhead transmission connections unless a substantial number of homes were removed (id. at Figure 5-1). The Company argues that based on these substantial obstacles, this alternative is not practical and should be eliminated from further analysis (Company Brief at 48).

shorter construction duration of the single duct bank alternative would minimize impacts to the City, as compared to the two-duct bank alternative (id. at 3-39).

b. Jet Plow Alternative

Another option to cross the Harbor would be to install the two new circuits under the Harbor using jet plow technology along an approximately 1.4-mile corridor (Exh. NEP-1, at 3-23). The Company described how, in a jet plow installation, an installation barge would pull an approximately 15-foot-wide plow along the sea floor (id. at 3-24). High-pressure water would be injected into the seabed sediment to create a liquefied trench approximately five feet wide in which the plow would lay the electric cables (id.). The Company stated that each circuit would contain six solid dielectric cables, for a total of twelve cables with a horizontal separation of 20 feet between each cable, resulting in a corridor width of approximately 260 feet (including a 20-foot buffer beyond the outermost cables) (id. at 3-23).

At each landfall location, the cable would be installed using a short-range HDD between an upland manhole location and a temporary cofferdam, located a short distance offshore (id. at 3-24). At the Salem Harbor Substation, a 0.3-mile underground route would be necessary to connect the substation to the Harbor (id.). The Company stated that because of ampere capacity requirements for underwater sections, the jet plow alternative would require two cables per phase (i.e., six cables per circuit) compared to one cable per phase for an all in-street option (Exh. EFSB-PA-20). The lines would continue on land in the same six cables per circuit configuration (id.). This would likely require two separate duct banks along two separate in-street routes from the Harbor to Canal Street Substation due to the existing levels of utility congestion and the narrowness of the Salem streets, resulting in a total of approximately 1.0 to 1.5 miles of construction through mixed residential neighborhoods with small businesses and community buildings (Exhs. NEP-1, at 3-24 and 3-26; EFSB-PA-20). The Company stated that this alternative would be technically feasible (Exh. NEP-1, at 3-30).

c. HDD Harbor Alternative

The HDD Harbor alterative would involve the installation of two circuits along an approximately 2.0-mile corridor under the Harbor using HDD technology (Exh. NEP-1,

at 3-31).[21] The Company stated that it would use high-pressure fluid-filled ("HPFF") cables to accommodate the long pull length (id. at 3-31). To achieve the required ratings with HPFF cable technology, the Company would need to use three cables per phase for a total of 18 cables, installed in six cable pipes (id.).

The Company stated that an HDD installation would involve drilling beneath the Harbor floor to install the 18 cables in six steel pipes, spaced between ten and 35 feet apart (id. at 3-31, 3-32). The Company stated that due to the length of the crossing and the lack of space on either side of the Harbor in which to assemble the pipes, at least one temporary mid-Harbor platform would be needed for 14 months or more during construction (id. at 3-32, 3-33). As a result of the shallow burial depth of the cables around the mid-Harbor platform location, there would be an area approximately 200 feet by 500 feet (2.3 acres) in the Harbor that would have permanent navigation restrictions (id. at 3-32).

Due to limited subsurface space at the Salem Harbor Substation, the two circuits would need to be launched from separate points, and the Company would require two separate land-based routes totaling approximately 0.5 miles (id. at 3-31 to 3-32). To connect to the Canal Street substation, this alternative would require the installation of the two circuits along separate underground routes for a total of approximately 1.0 to 1.5 miles through residential neighborhoods with small businesses and community buildings (id. at 3-31 and 3-34). The Company proposed to use the Palmer Cove ball fields as an HDD staging area, which would occupy the fields for up to five months (id. at 3-33). The Company stated that the HDD alternative through the Harbor would be technically feasible (id. at 3-38).

6. Railroad ROW Alternative

An existing Massachusetts Bay Transportation Authority ("MBTA") railroad corridor for the Newburyport/Rockport line passes though Salem (id. at 3-21). In its initial Petition, the Company conducted a conceptual analysis of the potential use of this corridor to avoid the impacts of in-street construction and argued that it should be dismissed from consideration

[21] NEP commissioned Burns & McDonnell and its sub-consultant Haley & Aldrich to complete a detailed investigation into the feasibility, risks, and estimated costs for installing the new cables under the Harbor using HDD technology (Exh. NEP-1, at 3-30).

because: (1) there did not appear to be room within the railroad corridor for manhole installation; (2) work hour restrictions would make construction and repair very difficult; and (3) the Company could not secure permanent property rights along this corridor (id. at 3-22).

Based on input from the public, the Siting Board requested that the Company conduct supplemental analysis of the feasibility of using the railroad corridor to avoid in-street construction through downtown Salem (Exh. EFSB-PA-12). To address the Siting Board's request, the Company performed additional field work, conducted additional desktop analysis, met with the MBTA, and developed configuration concepts and preliminary cost estimates (Exh. EFSB-PA-12(S)). The Company also engaged its consultant, Burns & McDonnell, to contract with Haley & Aldrich to conduct a preliminary study of using HDD under the Salem railroad tunnel ("MBTA Tunnel") (id.).

The Company assessed the feasibility of the railroad ROW alternative in three segments: (1) options to traverse the area between the Salem Harbor Substation and the railroad ROW ("Segment 1"); (2) options to traverse the area along or adjacent to the railroad ROW east of the north end of the MBTA Tunnel at Bridge Street ("Segment 2"); and (3) options to traverse the area between the north end of the MBTA Tunnel and either the Canal Street Substation or the Railyard Substation ("Segment 3") (id. at 2-1). See Figure 3 below for the options that the Company considered for each segment.

Figure 3. Map of the Options for the Railroad ROW Alternative by Segment

Source: Exh. EFSB-PA-12(S)(1) at Figure 1

For Segment 1, the Company stated that it would be possible to use the existing B-154S/C-155S transmission corridor, as described above (id.). Alternatively, the Company could install the new circuits underground, either in City streets or through City-owned land and the Tracy Multi-Use Path (id. at 2-3). While the Company stated that all of these options were

technically feasible, it argued that the route that consisted of City-owned land and the Tracy Multi-Use Path would be the most preferable and advanced this option for further consideration (id. at 2-4, 2-13).

For Segment 2, the Company first considered the option of installing the new circuits underground within the railroad ROW (id. at 2-5). The Company had significant concerns with this option, namely that: (1) work would be restricted to between the hours of 1:00 a.m. and 5:00 a.m., which would extend the schedule and increase costs; (2) the railroad would only grant a revocable license to the Company, so it might have to relocate the facilities at any time at the Company's expense; and (3) coordination with the MBTA would complicate maintenance and repairs (id.). The Company stated that while there may be marginally enough room to meet the MBTA's written setback requirements, the MBTA indicated that it was unlikely to find this option acceptable (id. at 2-5 to 2-6). The MBTA gave the following reasons: (1) potential track settlement would necessitate a greater setback in this area; (2) the track in this area runs adjacent to a significant amount of rock, and its removal could disrupt the track; and (3) the 115 kV cables could induce false signals or cause other issues with the MBTA signal cables installed adjacent to the tracks (id. at 2-6). Based on the difficulties of this option and the MBTA's likely rejection of it, the Company argued that the option of constructing the cables underground within the railroad ROW for Segment 2 should not be considered further (id.).

Next, the Company evaluated constructing the new circuits overhead within the railroad ROW for Segment 2. The Company indicated that there is not enough physical space between the railroad tracks and the adjacent road or riverbank to reliably site an overhead transmission line (id. at 2-7). The Company noted that to comply with the MBTA setback requirements, the Company would need to site some transmission structures in the river, on the seawall, or on the retaining wall along the riverbank, which would expose the transmission structures to accelerated weathering and erosion at the foundation and raise reliability risks associated with emergency restoration (Exhs. EFSB-PA-12(S)(1) at 2-7; EFSB-PA-43). Additionally, constructing transmission structures on the seawall would most likely require rebuilding the seawall, which the Company stated may not be feasible given that disturbing the existing structure could compromise the integrity of the soil supporting the adjacent railroad tracks (Exh. EFSB-PA-43). For these reasons, the Company concluded that constructing overhead transmission lines in the

railroad ROW for Segment 2 should be eliminated from consideration (Exh. EFSB-PA-12(S)(1) at 2-7).

As an alternative to construction within the railroad ROW for Segment 2, the Company considered constructing the new circuits in the adjacent Bypass Road and Bridge Street or the bike path on the south side of the roads (id. at 2-7 to 2-8). The Company stated that there is not sufficient room to develop an overhead transmission route in this area that meets minimum safety clearance requirements, but that it would be feasible to install the new underground circuits in these locations (id. at 2-8).

For Segment 3, the Company first investigated whether it could attach the replacement circuits to the ceiling of the MBTA Tunnel (id. at 2-9). The MBTA indicated that this option would be unacceptable due to safety concerns related to having two energized 115 kV cables installed within an active railroad tunnel (id.).

The Company next evaluated whether the cables could be installed in a trench next to the tracks within the MBTA Tunnel (id.). The MBTA stated that the tunnel does not have enough room to install a trench and meet the MBTA's written minimum setback requirements. The Company therefore concluded that this option would not be feasible (id. at 2-9 to 2-10).

The Company also investigated the possibility of going under the MBTA Tunnel via HDD (id. at 2-10). The Company determined that an HDD option to connect to the Railyard Substation would most likely be feasible using either: (1) cables insulated with cross-linked polyethylene ("XLPE") spaced ten feet apart within separate steel conduits; or (2) four steel pipes, spaced ten feet apart, each containing three HPFF cables (Exhs. NEP-1, at Appendix 3-3 Section 2.1; EFSB-PA-12(S)(1) at 2-10; EFSB-PA-47). The Company indicated that HPFF cables would be the most likely construction material because the use of XLPE is not standard practice for HDD, and HPFF cables are superior in terms of allowable pull length, total number and/or size of bore holes required, and sheath bonding requirements (Exhs. NEP-1, at Appendix 3-3 Section 2.1; EFSB-PA-12(S)(1) at 2-14).

While NEP acknowledged that using HDD for Segment 3 would reduce community impacts such as traffic congestion, parking disruption, and noise, the Company also noted the serious drawbacks to using HDD in this case (Exh. EFSB-PA-12(S)(1) at 2-13). For example, the Company stated that there is a risk that the conduit could fail due to multiple tight bends,

borehole collapse, or intrusion of drill mud at unplanned locations (id. at 2-10). Beyond the inherent downside to any of these events, NEP noted that there is a further risk that these construction contingencies could undermine the integrity of the MBTA Tunnel and put the safety of the public at risk (id. at 2-13). Additionally, the Company stated that because work hours in this location would be limited to 1:00 a.m. to 5:00 a.m., it would most likely not be able to accomplish the pullback of the HDD in one day without shutting down the railroad operation (Tr. 1, at 52-56). The Company testified that it is undesirable to stop during pullback because stopping increases the chances of the pipe getting stuck (id. at 53). The Company also testified that because of the narrowness of the alignment under the MBTA Tunnel, if one of the pipes became stuck there might not be adequate room to drill a replacement boring for that conduit (id. at 52-53). For these reasons, the Company recommended that if a railroad route were selected, the new circuits should be installed underground within Washington Street and Canal Street for Segment 3 (Exh. EFSB-PA-12(S)(1), at 2-14).

Finally, the Company evaluated the use of the Washington Street and Canal Street ROWs for installing the circuits in Segment 3 adjacent to and above the MBTA Tunnel (id. at 2-11 to 2-12). The Company stated that extensive acquisition and demolition of private property would be required to develop an overhead transmission corridor along these roads, and therefore the Company concluded that this option should be rejected (id. at 2-12). However, the Company stated that it may be feasible to install the new circuits underground within Washington Street and Canal Street to connect to the Canal Street Substation, because there is most likely room on the east side of Washington Street to install the new circuits so that they are not directly over the MBTA Tunnel (id. at 2-11).

In summary, for the railroad ROW alternative, NEP proposed a route that would leave the Salem Harbor Substation, traverse City-owned property and the Tracy Multi-Use Path underground, and then continue underground along Bypass Road and Bridge Street or the adjacent bike path to Washington Street and then to Canal Street, terminating at the Canal Street Substation. The Company asserts that this alternative would be inferior to the proposed Project (id. at 35).

7. Screening Analysis of Project Alternatives

As described above, the Company identified a number of potential alternative approaches to meeting the identified need. The Siting Board notes that EE and DG are important resources for reducing greenhouse gas emissions and may also serve to reduce or postpone the need for infrastructure such as transmission lines in certain applications. However, the Siting Board agrees with the Company that, in this case, EE and DG cannot serve the function of the Existing Cables in the regional transmission network or enable the interconnection of the Footprint Generating Facility to the electric grid. Based on the non-transmission alternatives' inability to meet the identified need, the Siting Board finds that these alternatives do not merit further consideration.

With regard to voltage selection for the remaining transmission alternatives, the Siting Board finds that a 115 kV transmission solution best serves the identified need while minimizing cost and environmental impacts. Because an overhead transmission line would require the acquisition and demolition of numerous properties, the Siting Board does not favor this option when there are other less disruptive alternatives.[22] Based on an initial feasibility analysis, the Siting Board concurs with the Company's view that the single duct bank underground alternative would be technically feasible and merits further consideration.

Among the three cross-Harbor alternatives, the overhead transmission lines across Salem Harbor can be eliminated from consideration because the onshore portion would either require the acquisition and demolition of numerous properties or the construction of a new transition station that would bring the overhead lines underground at the edge of the Harbor, providing the function that the Canal Street Substation performs. On the other hand, the jet plow and HDD technologies are feasible options for the Harbor alternative and merit further consideration.

For the railroad ROW alternative, it would not be feasible to construct the new circuits either underground or overhead along the segment of the ROW for Segment 2 based on the

[22] The Company asserted that an additional reason to reject the overhead transmission alternative as well as the jet plow and HDD alternatives is the time-sensitive nature of the Project (Exh. NEP-1, at 3-17, 3-28, 3-36). As described above in Section II.B, service to electric customers would not be interrupted if the replacement solution is not in place by Footprint's in-service date. Therefore, we do not necessarily exclude these alternatives at this screening level.

MBTA's objections. For Segment 3, it would not be feasible to put the new circuits in the MBTA Tunnel due to safety considerations, nor would it be practical to use HDD under the MBTA Tunnel due to the very limited available work hours and the particular risks of drilling failure in this location. The Company's proposal for the railroad alternative involves in-street construction on Bridge Street, Washington Street, and Canal Street and would essentially be another form of the single duct bank alternative.

Therefore, in the following sections, the Siting Board further evaluates the single duct bank, jet plow, and HDD alternatives, by comparing the reliability, environmental impacts, and cost of these alternatives.

C. Reliability

The Company evaluated the reliability of the single duct bank, jet plow, and HDD alternatives. The Company stated that the single duct bank alternatives would meet all required transmission planning criteria, and that any necessary maintenance or repair work would use the manholes, be relatively straightforward, and involve minimal environmental impacts (Exh. NEP-1, at 3-8). The Company noted that either of the Harbor alternatives could present future reliability challenges if the cables were damaged or failed (Exh. NEP-1, at 3-29 and 3-37). The Company stated that submarine cables failures take longer to repair than underground cables (id. at 3-29). Additionally, the Company stated the use of HPFF cables for the HDD alternative could result in dielectric fluid leaks to the Harbor and the availability of replacement cables may be at risk because there is only one manufacturer of HPFF cables in the United States (id. at 3-37).

Further, the Company expected that both Harbor alternatives would face permitting challenges since many of the permits required contain statutory standards that require an applicant to prove that there is no practicable alternative to the proposed action (id. at 3-27, 3-28, and 3-34). For example, the Company argued that these alternatives would not meet the statutory test of approval under Chapter 91 for a non-water dependent project located within a Designated Port Area (id. at 3-28, 3-36). Therefore, the Company stated that it may be unable to obtain the necessary permits for the Harbor alternatives, and estimated that even if it could, the permitting process for these alternatives would take 18 to 24 months (id.).

D. Environmental Impacts

The Company evaluated the environmental impacts of the single duct bank, jet plow, and HDD alternatives. The Company stated that the underground single duct bank alternative would avoid direct impacts to natural resources such as vegetated wetlands, rare species habitats, aquifers, or marine resources and, further, does not require Massachusetts Environmental Policy Act ("MEPA") review (Exh. NEP-1, at 3-7). The Company stated that the single duct bank alternative would impact the residences, small businesses, commercial retail centers, and community buildings in downtown Salem, including a large number of historic properties and popular tourist attractions (id. at 3-6). The Company stated that because this alternative would be entirely within City streets, environmental impacts would primarily consist of temporary construction impacts, such as traffic disruption, dust, and noise (id.).

Both of the Harbor alternatives would impact marine resources, including a variety of fish and invertebrate species that rely on Salem Harbor as essential forage habitat (id. at 3-26). Based on correspondence with the Massachusetts Division of Marine Fisheries, the Company stated that the jet plow alternative would most likely require time-of-year restrictions, particularly for winter flounder between mid-February and mid-June (Exh. EFSB-PA-18).

The Harbor routes would avoid impacts to downtown Salem, but would still require in-street construction through residential neighborhoods in the City (Exh. NEP-1, at 3-26, 3-34). Additionally, the Harbor alternatives would impact navigation and use of Salem Harbor, one of the region's largest natural harbors (id. at 3-25 and 3-33). The Company said that the jet plow and HDD alternatives could permanently displace moorings for recreational boaters (id.). The jet plow alternative could also conflict with the proposed Salem Wharf Project off Blaney Street, which would house a new port terminal building, a boardwalk, and dock space (id. at 3-25).

E. Cost

The Company evaluated the cost of the single duct bank, jet plow, and HDD alternatives. All estimates are summarized in Table 1 below and have a target accuracy of -25 percent to +50 percent (Exh. NEP-1, at 3-8, 3-30, 3-37). The Company stated that the estimated project cost of the single duct bank alternative is approximately $62.43 million (id. at 3-8). The

estimated cost of the jet plow alternative is $169.79 million, while the estimated cost of the HDD alternative is $162.08 million (id. at 3-30 and 3-37).[23]

Table 1. Cost of Project Alternatives

Option	**Cost***
Single Underground Duct Bank	$62 million
Harbor Jet Plow	$170 million
Harbor HDD	$162 million

Sources: Exh. NEP-1, at 3-8, 3-30, 3-37

* All of these costs include substation upgrades, removal of the Existing Cables, and project administration and development.

F. Position of the Parties

The Company argues that the single duct bank alternative is superior to all the other alternatives (Exhs. NEP-1, at 3-39; EFSB-PA-12(S)(1) at 3-5). With the execution of the MOA, the City is supportive of the Project, as proposed by the Company (MOA at 2).

Intervenor Mary Madore argues the HDD alternative through the Harbor is a viable alternative and questions the cost estimate provided by the Company for this alternative (Madore Comments on IM). Individual intervenor Tim Clarke (who is affiliated with the business Waters & Brown, which also intervened separately) argues that the railroad ROW route would be considerably less disruptive to Salem than the single duct bank alternative and should be further vetted (Clarke Comments on IM).

G. Analysis and Findings

The record shows that cables under the Harbor would be more difficult to maintain and repair than cables in streets. Difficulties obtaining Chapter 91 approval for the Harbor

[23] NEP presented several widely varying cost estimates of the Harbor alternatives to the public (Exh. EFSB-PA-31). The Company first stated at a April 2012 public meeting at the Forrester Street neighborhood that the cost of installing a single circuit under Salem Harbor using HDD was $43.1 million compared to a $27.8 million cost for a land-based alternative (id.). In a July 2013 report, the Company estimated the cost of installing the cables using HDD would be approximately $110 million (id.). The Company stated that these two early estimates did not include all costs, such as substation construction, project administration, and engineering, and that the Company made these estimates before the project scope had been finalized (id.).

alternatives could substantially delay or even derail the Harbor alternatives, increasing the length of time that the Company is forced to use the Existing Cables, which have reliability concerns as described above in Section II.C.1. Accordingly, the Siting Board finds that the single duct bank is preferable to the other alternatives with respect to reliability.

The record shows that that the single duct bank, jet plow, and HDD alternatives would all have significant environmental impacts. The Harbor alternatives would avoid impacts on Salem's downtown and would impact a slightly shorter total length of the City's streets, but would have construction and permanent impacts to the Harbor. The Siting Board finds that while the types of impacts would vary among the alternatives, overall the environmental impacts among the three alternatives would be comparable.

The record shows that the single underground duct bank is estimated to cost approximately $100 million less than the Harbor alternatives. The Siting Board finds that the single duct bank alternative is preferable to the Harbor alternatives with respect to cost.

Although the Siting Board found that the single duct bank and the Harbor alternatives are comparable with respect to environmental impacts, the Harbor alternatives are significantly more costly than the single duct bank alternative. The Harbor alternatives are also inferior to the single duct bank alternative in terms of reliability, due to the potential difficulty of accessing the underwater cables. Additionally, the Company may be unable to obtain Chapter 91 licenses for the Harbor, given the existence of other practicable alternatives. Therefore, the Siting Board finds that the single duct bank alternative is preferable to the other identified project alternatives with respect to providing a reliable energy supply for the Commonwealth with minimum impact on the environment at the lowest possible cost.

IV. ROUTE SELECTION

A. 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. IRP at 41-42; Hampden County at 35; NSTAR/Stoughton at 32-33.

B. The Company's Route Selection Process

Based on its conclusion that two 115 kV cables installed in a single duct bank within the City streets between the Salem Harbor and Canal Street Substations would be the best alternative to meet the identified need, the Company undertook a process to identify potential routes for the replacement cables (Exh. NEP-1, at 4-1). The Company demarcated a Project Study Area that encompasses routing opportunities that could provide a relatively direct connection between the two substations over a reasonable distance (id. at 4-2). Next the Company met with numerous City officials, representatives of Footprint and Spectra Energy, and members of the public, and obtained mapping of existing utility infrastructure (id. at 4-2 to 4-3). The Company eliminated from consideration any street where the existing utility density is too high to install a new duct bank, and eliminated other streets based on input from City personnel (id. at 4-3).[24] After the Company eliminated these streets based on feasibility, it then eliminated several other streets from consideration, as they were no longer logical components of any non-circuitous route between the Salem Harbor and Canal Street Substations (id. at 4-4).

The route segments that were not screened out based on feasibility concerns were combined into "candidate routes" and assessed in more detail by applying a set of environmental

[24] In this initial screening, the Company eliminated Washington Street because of the MBTA Tunnel and several underground utilities beneath it, and eliminated Canal Street based on the presence of the existing S Cable and multiple large-diameter sewer, gas, water, and telecommunications facilities (Exh. NEP-1, at 4-4). Based on the Siting Board's request for the Company to reexamine the railroad ROW alternative, the Company reopened its investigation of installing the cables in Washington and Canal Streets (Exh. EFSB-PA-12(S)(1)). The Company concluded, however, that it may not be feasible to construct a duct bank on Canal Street based on the existing utility density; in addition, the City engineer asked the Company not to use Washington Street if it could be avoided (Tr. 2, at 276-277, 290-291).

criteria and evaluating conceptual cost estimates (id. at 4-1). To evaluate the relative environmental impacts of these nine routes, the Company developed twelve criteria, based on input from City officials and the public in several different meetings including public open houses, appearances at regularly scheduled meetings of various civic and neighborhood groups, and meetings with representatives from City government (id. at 4-10). The Company selected the following twelve criteria for evaluation: (1) residential land uses; (2) commercial or industrial land uses; (3) sensitive land uses; (4) recreational land uses; (5) historic resources; (6) potential for traffic congestion; (7) public/private transportation facilities; (8) potential to encounter subsurface contamination during construction; (9) number of public shade trees; (10) the length of the route; (11) existing road width; and (12) existing utility density (id. at 4-10 to 4-11). The Company scored each candidate route from one to three for each criterion based on its impacts relative to other candidate routes, with a three being the worst score, so that a higher score signified greater impacts (id. at 4-11).

The Company then weighted the criteria to reflect the relative importance of the criteria (Exh. NEP-1, at 4-16). The Company stated that it did not test different weighting schemes, but developed a single scheme based on input from the City and the public, as well as its own experience (id. at 4-16 to 4-17; Tr. 2, at 288). The criteria of residential land uses, commercial/industrial land uses, and potential for traffic congestion were each assigned a triple weight (Exh. NEP-1, at 4-17). Sensitive land uses, existing road width, and existing utility density were each assigned a double weight (id.). The Company assigned the remaining criteria a weight of one (id.). The Company then developed a cost per mile based on the general conditions found in the project area and applied this cost per mile to each of the candidate routes (id. at 4-23).[25] The weighted score and projected cost of each of the candidate routes are shown below in Table 2.

[25] The Company stated the cost for each candidate route represented only those costs associated with the construction of the underground cable systems (Exh. NEP-1, at 4-25). Total Project costs including substation upgrades and the removal of the Existing Cables are discussed below in Section V.

Table 2. Weighted Scores and Costs of Candidate Routes

Candidate Route	Description	Weighted Environmental Impact Score	Environmental Score Ranking	Estimated Cost (millions)	Cost Ranking	Length (miles)
A	Boardman-Congress	32	2	$34.03	2	1.66
B	Boardman-Lafayette	48	6	$36.99	6	1.80
C	Forrester-Congress	30	1	$33.40	1	1.63
D	Forrester-Lafayette	44	5	$36.15	5	1.76
E	Andrew-Congress	38	3	$35.30	3	1.72
F	Andrew-Charter-Lafayette	54	7	$38.32	8	1.86
G	Briggs-Congress	40	4	$35.93	4	1.75
H	Briggs-Lafayette	56	8	$38.89	9	1.89
I	Andrew-Derby-Lafayette	56	8	$37.62	7	1.83

Sources: Exh. NEP-1, at 4-21, 4-24

The Company stated that there would not be meaningful differences in operating characteristics among the candidate routes and that underground cables along any of the routes would meet the identified need in a reliable manner; therefore, reliability was not a determining factor in the Company's route selection process (id. at 4-24). As a result, the Company based its route selection on relative environmental impacts (as measured by the Company's weighted criteria) and estimated cost, although the costs of all Candidate Routes were relatively similar (id. at 4-23 to 4-24). The Company selected Candidate Route C as its Primary Route because it had both the best environmental impact score and the lowest estimated cost (id. at 4-24).

C. Geographic Diversity for Notice Alternative

To identify a Noticed Alternative, the Company sought a candidate route that offered geographic diversity (Exh. NEP-1, at 4-25). The Company eliminated Candidate Routes A, B,

D, E, and G from consideration since they are similar to the Primary Route in using Forrester, Boardman, and Congress Streets (id.). The remaining routes were F, H, and I, which are generally located on different streets from the Primary Route, although all routes make use of Hawthorne Boulevard between Washington Square South and Charter Street (id.). Of those routes, the Company dismissed Candidate Route H because it had the worst cost ranking and was tied with Candidate Route I for the worst environmental score (id.). Candidate Route I was the least expensive of these three options, but it was tied for the worst environmental score; the Company also argued that Candidate Route I was undesirable because it would impact a portion of Derby Street, which would already be impacted by the removal of the Existing Cables (id.). The Company then selected Candidate Route F to be the Noticed Alternative Route, concluding it was the best route among the three routes that are geographically distinct from the Primary Route (id.).

D. Positions of the Parties

The City concurs with the Company's assessment that the Proposed Route is the best route for the single duct bank alternative (Tr. 3, at 407). The City specifically supports the Company's elimination of Washington Street and Canal Street as potential routes, citing the utility density and ongoing projects at Canal Street (id.). No other parties commented on the Company's route selection process for the single duct bank alternative.

E. Analysis and Findings on Route Selection

In past decisions, the Siting Board has found various criteria to be appropriate for identifying and evaluating route options for transmission lines and related facilities. These criteria include natural resource issues, land use issues, community impact issues, cost and reliability. IRP at 42; Hampden County at 38; NSTAR/Stoughton at 43-44. 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. IRP at 45; Hampden County at 37; Boston Edison Company, 19 DOMSC 1, EFSC 89-12A, at 34-38 (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. IRP at 45; Hampden County at 38; NSTAR/Stoughton at 43-45.

The Company's Noticed Alternative Route for the Project reflects some measure of geographic diversity. The Company appropriately identified a study area that would encompass all viable siting options, given the limitations imposed by an interconnection between the Salem Harbor and Canal Street Substations. Although various segments of the Candidate Routes analyzed were overlapping or within blocks of each other, given the urban setting and relatively short distance between the substations, each route has varying degrees of environmental impacts. The Siting Board finds that the Company established two routes (the Primary and the Noticed Alternative Route) for the Project with some measure of geographic diversity.

In conclusion, the Company has: (1) 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 (2) 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 and that its proposed facilities are sited in locations that minimize cost and environmental impacts.

V. ANALYSIS OF PRIMARY AND NOTICED ALTERNATIVE ROUTES

A. 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. IRP at 46-47; Hampden County at 39; NSTAR/Stoughton at 32-33.

Accordingly, in the sections below, the Siting Board examines the environmental impacts, reliability and cost of the proposed facilities along the Primary and Noticed Alternative Routes to determine: (1) whether environmental impacts would be minimized; and (2) whether an appropriate balance would be achieved among conflicting environmental impacts as well as among environmental impacts, cost and reliability. In this examination, the Siting Board compares the Primary Route and the Noticed Alternative Route 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.

B. Description of the Primary and Noticed Alternative Routes

1. Primary Route

The Company stated that its Primary Route for the Proposed Cables is approximately 1.63 miles long and would be located underground in City streets in a new duct bank and manhole system, connecting the Salem Harbor Substation to the Canal Street Substation (Exh. NEP-1, at 1-9, 5-2). The Primary Route would exit the Salem Harbor Substation and proceed in a westerly direction along Fort Avenue and Webb Street, traveling past the Bentley Elementary School and through a mix of residences and small businesses (id. at 5-2). From Webb Street, the Primary Route would turn southwest into a residential neighborhood on Essex Street and Forrester Street (id.). The Primary Route would next pass the south side of the Salem Common on Washington Square South and then turn south onto Hawthorne Boulevard and continue south on Congress Street, passing a mix of commercial, tourist, residential, and institutional uses (id. at 5-2 to 5-3). The Primary Route would then turn west onto Leavitt Street and continue onto Fairfield Street, before turning north onto Cabot Street, west on Cypress Street, and then north across a vacant NEP-owned parcel to connect to the Canal Street Substation (id. at 5-3). Leavitt, Fairfield, Cabot, and Cypress Streets all pass through primarily residential neighborhoods (id.).

The Company stated that the Primary Route would include six manhole locations, spaced approximately 1,500 to 2,000 feet apart based on the length of cable that can be pulled through the conduits (Exhs. NEP-1, at 5-5; EFSB-CM-14). The manhole locations are shown above in Figure 1, in Section I.A.

2. Noticed Alternative Route

Like the Primary Route, the Noticed Alternative Route would traverse City streets in a duct bank and manhole system to connect the Salem Harbor Substation to the Canal Street Substation (Exh. NEP-1, at 5-3). The Noticed Alternative would be approximately 1.86 miles long (id.). It would exit the Salem Harbor Substation and proceed in a westerly direction along Fort Avenue and Webb Street traveling past the Bentley Elementary School and through a mix of residences and businesses (id.). The Noticed Alternative Route would then turn southwest on Andrew Street, a residential street (id.). The Noticed Alternative Route would run along the north side of Salem Common on Washington Square North and then turn south along Washington Square West and Hawthorne Boulevard and then turn west on Charter Street, passing a mix of commercial, tourist, residential, and institutional uses on these streets (id.). At Lafayette Street, the Noticed Alternative Route would turn south, passing through a mixed commercial and residential area before transitioning to a more residential area (id.). Finally, the Noticed Alternative Route would turn west onto Gardner Street and north onto Canal Street to connect to the Canal Street Substation, passing through a residential neighborhood (id.). The Company concluded that the Noticed Alternative is less advantageous than the Preferred Route, but stated that it would be constructible and would provide a distinct alternative to most segments of the Primary Route (id.).

3. Substation Upgrades

NEP stated that regardless of whether the Primary or Noticed Alternative Route were constructed, the same improvements would be necessary at the Salem Harbor and Canal Street Substations (Exh. NEP-1, at 5-41). At the Salem Harbor Substation, the Company stated that it would remove electrical equipment associated with the Existing Cables, including cable termination structures, disconnect switches, and dielectric fluid reservoirs (id. at 5-42). To accommodate the Proposed Cables, the Company would install new cable riser termination structures in the area of the substation currently used as the parking lot, to allow for removal of the existing structures without an electric outage (id.). The Company stated that it would also install electrical equipment similar to that associated with the Existing Cables, but without

dielectric fluid reservoirs (id.). Additionally, the Company would install new relay, control, and communication equipment inside the existing control house (id.).

NEP stated that at the Canal Street Substation, the Company would remove all existing electrical equipment, support structures, and foundations with the exception of the existing steel lattice transmission structures, which NEP would repaint (id. at 5-45). The Company would install new electrical equipment, support structures, and foundations similar to the components that would be removed, but without dielectric fluid reservoirs (id.). Additionally, the Company would install a new control building (id.). The Company stated that it would build a new control house because the addition of a new fiber optic cable and new microprocessor relays would require a battery system as well as a climate controlled environment and protection from the elements (Exh. EFSB-N-26). At the Canal Street Substation, the Company would grade the site to allow for the installation of the new equipment and replace the existing retaining wall and the perimeter fence, as well as include new landscaping elements (Exh. NEP-1, at 5-45).

4. Removal of the Existing Cables

The Company argues that the Project must include the removal of the Existing Cables based on MassDEP regulations (Exh. NEP-1, at 1-4). NEP stated that once the Proposed Cables are installed and ready for service, the Existing Cables would be de-energized and taken out of service (id. at 5-48, 5-50). NEP stated that once the existing oil-filled cables have been removed from service, they would no longer be pressurized and monitored, and the Company would have no ability to detect any new leaks (Exh. EFSB-HW-3). As a result, the Company indicated that once removed from service, the Existing Cables would be regulated by the MassDEP as a Threat of Release subject to the Massachusetts Contingency Plan ("MCP") 310 CMR 40 (id.; Tr. 2, at 248).[26] The Company indicated that under the MCP, once the Existing Cables were removed from service, a two-hour notification requirement would be triggered and an "Immediate Response Action" would be required (Exh. EFSB-HW-3).[27]

[26] The reportable quantity for dielectric fluid under the MCP is 25 gallons (Tr. 2, at 250-251).

[27] Immediate Response Actions are assessment and/or remedial actions that must be undertaken in an expeditious manner to address sudden releases, Imminent Hazards and

The Existing Cables traverse the City's streets underground from the Salem Harbor Substation to the Canal Street Substation (Exh. NEP-1, at 5-50). From Salem Harbor Substation, the Existing Cables follow Derby Street to the west through a mix of residential, commercial, and tourist uses (id.). The T Cable turns south on Lafayette Street and then west into the Canal Street Substation on Cedar Street, transitioning from mixed use to mostly residential (id.). From Derby Street, the S Cable turns south on Canal Street, transitioning from mixed use into primarily commercial and industrial uses (id.). See Figure 1 in Section I.A for a map of the route of the Existing Cables.

After NEP removes the Existing Cables from service, the Company would flush them with water and then purge them with nitrogen or another gas to remove as much of the dielectric fluid as feasible (Tr. 2, at 249-250). The Company estimated that approximately 430 gallons of dielectric fluid would remain in each phase after the flushing, compared to the current amount of approximately 1,000 gallons of dielectric fluid per phase (id.). Once the Company flushes dielectric fluid from the cable core, the Company could begin to remove the Existing Cables (Exh. NEP-1, at 5-48, 5-50). Removal of the direct-buried S Cable would require excavating a trench along the route of the cable (id. at 5-48). The Company estimated that it would take approximately two months to excavate the direct-buried S Cable (Tr. 2, at 253). Because the T Cable is installed in a duct bank, the Company anticipated it would be able to pull the T Cable out through the manholes without excavation (Exh. NEP-1, at 5-50).

At the Salem Harbor Substation and Canal Street Substation, fluid reservoirs, cable terminations, and other auxiliary equipment would be drained and removed for proper disposal (id. at 5-49, 5-51).

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other time-critical release or site conditions. Immediate Response Actions must be taken whenever and wherever timely actions are required to assess, eliminate, abate or mitigate adverse or unacceptable release, threat of release and/or site conditions, as set forth in 310 CMR 40.0412. 310 CMR 40.0405.

C. Discussion of the Project with the Primary Route

1. Construction and Restoration Methods

NEP would install the Proposed Cables in four phases: (1) manhole installation; (2) trench excavation, duct bank installation, and initial pavement patching; (3) cable installation; and (4) final pavement restoration (Exh. NEP-1, at 1-9, 1-10, 5-4, 5-5). The Company would conduct these four phases in sequence at each location along the route, although the Company anticipates that several phases of construction could be ongoing simultaneously in different sections of the routes (id. at 5-5). Removal of the Existing Cables is addressed in Section VI, below.

a. Manhole Installation

Two precast concrete manholes (one manhole for each circuit) would be placed adjacent to each other approximately every 1,500 to 2,000 feet along the route (Exh. NEP-1, at 5-5). Manholes facilitate cable installation and splicing and allow access for maintenance and future repairs (id.). Each pair of manholes would take approximately ten to twelve days to install (id.). Based on space requirements for cable pulling and splicing, each manhole would be approximately eight feet wide by 21 feet long and nine feet high, and typically would be installed as a lower half and an upper half (Exhs. NEP-1, at 5-5; EFSB-CM-2; Tr. 1, at 63). Each half would be precast off-site and transported via flatbed truck and then installed in the ground with a crane (Tr. 1, at 63). The only visible aspects at ground level would be the manhole covers (Exh. NEP-1, at 5-5).

NEP stated that all excavated soil from the manhole installation would be loaded directly into trucks and transported to an off-site stockpile area (Exh. NEP-1, at 5-5; Tr. 1, at 63). Machinery involved in the manhole installation would include an excavator or backhoe for excavation, dump trucks moving in and out of the area to carry away the soils, and then a crane to lower the manhole sections into the hole (Tr. 3, at 496-497). As needed, suitable soils would be used to backfill the excavation (Exh. NEP-1, at 5-5). Any excess soil would be tested and disposed of off-site (id.).

b. Trench Excavation and Duct Bank Installation

Each of the two proposed circuits would consist of three cables installed in individual polyvinyl chloride ("PVC") conduits (Exh. NEP-1, at 5-4). The trench for the duct bank would be approximately four feet wide by five to eight feet deep (id.). The duct bank would contain a total of ten PVC conduits: six six-inch diameter PVC conduits for the cables and four smaller PVC conduits for grounding cables, communication cables, and potentially a temperature monitoring cable (id.). The PVC conduits would be encased in a common concrete envelope. Additionally, the Company stated that it would install a de-energized loop of conducting wire alongside the duct bank at approaches to the manholes (id.), as described below in Section V.C.2.i.

NEP stated that the underground duct banks for the Project would be installed using open-cut trenching (id. at 5-6).[28] For each segment of the route, the width of the trench would be marked on the street, the Company would contact Dig-Safe, Dig-Safe would mark the location of existing utilities, and the Company would cut the pavement with a saw (id.). Saw cutting is a relatively fast operation (several hundred feet may be cut in one day); therefore, to avoid proceeding too far ahead of the next crew, pavement cutting would not be done every day (id.; Exh. EFSB-CM-4). Following saw cutting, the existing pavement would be broken up with pneumatic hammers and both pavement and excavated soil would be loaded by backhoe into awaiting dump trucks (Exhs. NEP-1, at 5-6; EFSB-CM-4). The Company would handle pavement separately from the soil because the pavement would be recycled at an asphalt batching plant (Exh. NEP-1, at 5-6).

The trench would then be excavated to the required depth by backhoe (id. at 5-7). In some locations, soils would be dewatered in place to preclude instability of the excavation (Exh. EFSB-CM-12). In some locations, part of the excavation would be done by hand to avoid disturbing existing utility lines or service connections (Exh. NEP-1, at 5-7; Tr. 4, at 584). Work

[28] The only portion of the Primary Route that would not utilize open-cut trenching is along the Congress Street Bridge where the conduits and cables would cross the South River in an available utility bay beneath the southbound side of the bridge (Exh. NEP-1, at 5-10; Tr. 1, at 68-69).

may be slower at street intersections because these locations tend to have the greatest concentration of underground utilities (Exh. NEP-1, at 5-7). Typically, an advance crew would excavate street intersections so that obstructions could be precisely identified and the conduit locations can be determined before the main work crew reaches the intersection (id.). As with the manhole excavations, "clean trench" method would be used in which soil is loaded directly into a dump truck for off-site recycling, disposal, or reuse – i.e., soil would not be stockpiled along the side of the trench (id.; Tr. 1, at 63).

The trench would be sheeted and shored as required by soil conditions (Exh. NEP-1, at 5-7). Once a portion of the trench is excavated, the PVC conduits would be assembled and lowered into the trench (id. at 5-7, 5-8). The area around the conduits would be filled with thermal concrete; the trench backfilled with clean excavated material, thermal concrete, and/or sand with low thermal resistivity; and any excess soil tested and disposed of (id. at 5-7). Finally, temporary pavement would be laid; the Company anticipated the temporary pavement would remain in place from six to 15 months to allow the trench to settle over at least one winter season (id. at 5-8; EFSB-CM-5).

The duct bank trench would cross several streets. While some smaller side streets might need to be closed temporarily, NEP stated that it expects to be able to maintain partial access to other streets by a phased construction in which the first phase would consist of excavating and constructing across approximately one-half of the roadway, thereby keeping the other half open for traffic with a police detail as needed, and the second phase would consist of construction across the second half of the roadway, with the first half completed and re-opened to traffic (Exhs. EFSB-CM-4; EFSB-PA-37).

NEP anticipated that a typical business or residence would see activities related to trench excavation, duct bank installation, and pavement patching in the front of its house/business or general vicinity for two to three weeks (Exh. NEP-1, at 5-8). Total work durations at manhole locations would be longer, as noted above. The pace of construction may be slower in areas of higher existing utility density, where the Company encounters unanticipated obstructions, where it increases the trench depth, or in areas of higher traffic volumes (id.). Depending upon the number of these conditions work crews encounter, the Company expects duct bank construction durations could increase up to approximately five weeks (id.). Overall, in-street work involving

the installation of manholes, installation of the duct bank and temporary pavement restoration is expected to take approximately twelve months (see Section 5.4.2) (id.).

NEP stated that it would make every reasonable effort to maintain access to adjacent residences and businesses during trenching and duct bank construction (id. at 5-9). At various points in the trenching and duct bank construction process, it would be necessary to have an open trench that might temporarily impede access, but once the crews are finished for the day, the trench would be steel-plated to re-establish access to nearby homes and commercial buildings (Exh. NEP-1, at 5-9; Tr. 3, at 536). At the end of each work day, any remaining open trenches would be covered with securely anchored steel plates of sufficient thickness to withstand traffic loading, and the site would be left in broom-swept condition (Exh. NEP-1, at 5-9; MOA at 5).

c. Cable Installation and Testing

Following the installation of the manholes and duct bank, the cable would be pulled through the conduit (Exh. NEP-1, at 5-9). Sections of each cable would be installed between consecutive manholes (id.). NEP projected that cable pulling would take twelve days at each pair of manholes (Exh. EFSB-CM-3; Tr. 3, at 497-498). This process would be repeated until all of the cable sections were installed (Exh. NEP-1, at 5-9).

Adjacent cable sections would be spliced together inside the manhole vaults (id.). The splicing operation would require a splicing van containing equipment and material; an air conditioning unit to control moisture in the manhole; and a portable generator to provide power for the splicing van and air conditioning unit (id.). The Company stated that splicing high-voltage solid dielectric transmission cable typically requires 40 to 60 hours to complete the splicing of all three cables at each manhole, but that the splicing activities would take place over several days such that splicing work at a pair of manholes would extend over twelve days (Exhs. EFSB-CM-3; NEP-1, at 5-9). Once the complete cable system is installed, it would be field-tested from the substations. At the completion of successful testing, the line would be energized (Exh. NEP-1, at 5-10).

d. Final Pavement Restoration

Street restoration typically occurs in two steps. Following duct bank installation, the Company would temporarily patch the pavement, and subsequently, repair or replace the pavement as required to provide final pavement restoration (id. at 5-5). The Company would provide a leveling course at driveways as needed to meet the new road surface elevation (id. at 5-10). Sidewalk restorations would also comply with all requirements of the Salem Department of Public Works ("DPW"), the Massachusetts Department of Transportation ("MassDOT"), and the Street Restoration Standards established by the Department Order in D.T.E. 98-22,[29] including installation of curb cuts at crosswalks wherever sidewalks are replaced (Exh. NEP-1, at 5-10; MOA at 3).

Overall, the Company estimated that work at the each manhole location would take a total of 43 construction days, whereas duct bank installation between manhole locations would take between ten and 25 construction days (Exh. EFSB-CM-3).

2. Impacts

a. Land Use and Historic Resources

i. Company Description

Land uses along the Primary Route are a dense mix of residential, commercial/industrial and recreational uses (Exh. NEP-1, at 5-14). The Primary Route passes eleven sensitive receptors, defined as land uses that may be more susceptible to Project impacts (other than residences); potentially affected sensitive receptors include three funeral homes, a church, a daycare center, government offices, and civic institutions (id. at 5-15, 5-16; RR-EFSB-19). The Primary Route also passes the grounds of the Bentley Elementary School on Fort Avenue (Exh. EFSB-LU-2). The athletic fields and a basketball court abut the route, and the school

[29] The full citation for the proceeding in which the Department adopted the Street Restoration Standards is Investigation by the Department of Telecommunications and Energy upon its own motion, pursuant to G.L. chapters 164, 165 and 166A commencing a review of standards employed by public utility operators when restoring municipal street surfaces after performing excavations, D.T.E. 98-22 (1999). The Order was issued on August 26, 1999.

building itself is approximately 420 feet from the edge of the Primary Route along Fort Avenue (id.). The Primary Route also passes near the Salem Academy Charter School; the school would be 325 feet away from the Project at the closest point (RR-EFSB-18).

The Company has not yet determined where it would locate the staging and laydown area for the Project, stating that this determination would be the responsibility of its contractor, subject to NEP approval (Exh. EFSB-CM-15). However, the Company anticipates that a possible staging and laydown area for the Project would be adjacent to the Salem Harbor Substation (id.). Construction workers would park their personal vehicles at a staging area and drive to the work site in construction vehicles (Exh. EFSB-T-1).

NEP stated that there would be no permanent impacts to land uses from the installation of the Proposed Cables, as they would be installed entirely underground within City streets, but the adjacent land uses would be temporarily affected by construction impacts (Exh. NEP-1, at 5-15). The Company stated that it would minimize construction impacts on adjacent land uses by minimizing traffic impacts, implementing duct control/air quality measures, employing erosion and sediment controls, and using noise control measures (as discussed in Sections V.C.2.e to V.C.2.h, below).

As part of its community outreach, NEP committed to participate in semi-monthly meetings with the Working Group to coordinate construction impacts (MOA at 2). Additionally, the Company committed to develop a Project website at least two months prior to the start of construction and to publicize and maintain a hotline in Spanish and English for emergencies after hours (MOA at 1-2).

NEP stated that the Salem Harbor Substation is situated on the Salem Harbor Station site and therefore is completely surrounded by industrial land uses associated with power generation, and that the Project would not affect these land uses (Exh. NEP-1, at 5-42). Land uses adjacent to the existing Canal Street Substation include commercial and industrial uses to the north and west, and residential neighborhoods to the east and south (id. at 5-45). The Company asserted that because there would be no significant expansion of this substation, there would be no long-term impacts to surroundings land uses (id.). The Company's proposed mitigation measures to minimize construction impacts on land uses adjacent to the substation from traffic, dust/air pollution, and noise are discussed below in sections V.C.2.e to V.C.2.h.

The Company stated that for underground transmission projects in urban settings, it typically requires its contractors to complete pre-construction and post-construction video surveys of structures and other features along the proposed routes, including the internal and external conditions of structures, if the landowner gives permission (Exhs. NEP-1, at 5-16; EFSB-G-11). The Company will notify by mail any abutters within 300 feet of the Primary Route of the opportunity to have their property surveyed (Exh. EFSB-G-11). The video surveys would be used if future damage claims are submitted as a result of the Project (id.).

The Company stated that it would designate a Company Project representative who would direct a potential claimant to the Company's contractor when the potential claimant wishes to submit a damage claim. The Company's contractor would be responsible for administering a damage claim process and would be required to have appropriate insurance coverage (Tr. 2, at 302-305). In the MOA, the Company and the City agreed to have NEP's contractor manage the damage claims process with the condition that the contractor must provide weekly notice of damage claims to the Company's Project representative. In turn, the Company's Project representative would provide the City's engineer with a weekly summary of the damage claims. The MOA states, "NEP's agreement to acquire claims processing information and provide it to the City is not an agreement or acceptance by NEP to be responsible for compensating for claims resulting from the negligence, gross negligence, reckless misconduct or intentional acts of the [c]ontractor" (MOA at 3).

In light of the proximity of the proposed construction to many historic homes, staff asked questions about the process that would occur in the event that construction activities damage property (e.g., the foundation of a private home). The Company's witness stated that its proposed damage claim process (i.e., reliance on the contractor) is consistent with the Company's longstanding practice (Tr. 2, at 302-304).

Salem's unique history and many historic and cultural attractions make it a major tourist destination (Exh. NEP-1, at 5-17). The Primary Route would pass visitor destinations such as the Hawthorne Hotel, the Crowninshield-Bentley House, and the Salem Waterfront Hotel (id.). To minimize impacts to the City's tourism industry, the Company committed to reimburse the City $15,000 to retain Destination Salem, a non-profit agency that markets, promotes, and manages tourism in Salem (MOA at 1). For this Project, Destination Salem would employ a

communications manager to liaise among NEP, the City, and the business community (id.). The Primary Route passes multiple historic buildings, National Historic Districts (the Derby Waterfront, Salem Common, and Essex Institute National Historic Districts), Local Historic Districts, and inventoried, but as of yet undesignated historic areas (Exh. NEP-1, at 5-32).

The Primary Route also passes in front of three archaeological sites (id. at 5-33). NEP stated that it would work with the Massachusetts Historical Commission ("MHC") and the Salem Historical Commission to ensure that there are no adverse effects from the Project to historic and archaeological resources (id. at 5-34). To comply with G.L. c. 9, § 27C (Chapter 254 Review), NEP submitted a Project Notification Form ("PNF") to the MHC (Exh. EFSB-LU-4). On December 6, 2013, the MHC responded to the PNF (id.). MHC requested a program of archaeological monitoring between Congress Street and Lafayette Street to identify any unmarked human burials because bone spoons that appeared to have been buried in a grave were previously found at that site (Exhs. EFSB-LU-3; EFSB-LU-4(S)). MHC requested that a qualified professional archaeologist with experience in urban archaeology and New England Native American unmarked grave identification submit a State Archeologist's Permit to MHC to halt construction and contact MHC immediately in the event that an unmarked human burial is discovered (Exhs. EFSB-LU-3; EFSB-LU-4-S). The Company stated that it had reached out to a qualified contractor to serve as the archaeologist during construction (Tr. 2, at 296).

ii. Positions of the Parties

With the measures agreed to in the MOA, the City supports the Project as proposed (MOA at 2). The City testified that its experience with the damage claims process in two recent MassDOT projects was deficient because residents found it difficult to obtain any reconsideration of the contractor's determination concerning damage claims (Tr. 3, at 386-387). However, in the City's comments on the Issues Memorandum, the City maintains that through the process of negotiating the MOA with NEP, the City is now confident as to the process for resolving claims as outlined in the MOA (City Comments on IM at 2). Therefore, the City requests the Siting Board to allow the MOA to govern the claims reporting process and allow NEP's contractors to process all damage claims (id. at 2-3).

Ms. Madore argues that the Working Group created to advise the Project has inadequate resident participation, stating that the City councilors are the only residents of the City in the Working Group (Madore Brief at 1). Ms. Doll suggests that specialized construction techniques should be used to protect the many historic properties that abut the Project route (Doll Comments on IM). Both Ms. Madore and Ms. Doll state that they are concerned about the damage claims process and their ability as homeowners to resolve damage claims with a contractor rather than with NEP. They voice concern about the potential lack of responsiveness and accountability of contractors based on difficulties that occurred with other projects (Madore Comments on IM at 1; Doll Comments on IM).

The Chamber of Commerce also argues that NEP should process the damage claims and be responsible for claims for all work done (Chamber of Commerce Comments on IM).

iii. Analysis and Findings

Because the Project primarily involves underground construction, there would be no permanent land use impacts. However, there would be significant land use and historic resource impacts during the construction of the Project due to the dense, mixed-used nature of the Project route. The Company's proposed mitigation measures for erosion and sedimentation, noise, traffic, and air impacts (discussed below) would help to mitigate the construction impacts to the dense, mixed-use land-uses that would abut the Project.

The Company has not yet established a staging and laydown area. Because the activities at the staging and laydown area have the potential for significant land use impacts, the Siting Board directs the Company to provide a staging and laydown plan for review by the Board prior to the commencement of construction.

The Working Group is an important community outreach measure that would give residents, businesses, and City officials a forum to express concerns and to improve coordination. The Siting Board supports this initiative and anticipates that the Company's active participation in the Working Group would help generally to mitigate particular land use impacts as they arise.

Given the historic nature of many of the buildings abutting the Project route, the video surveys are an important measure to ensure that construction does not damage any of these

buildings, and that compensation is provided as appropriate for any valid damage claims. The Siting Board recognizes the potential for confusion among claimants where, as in this case, NEP is obtaining Siting Board approval to construct the Project, and is the public "face" of the Project, but is hiring a contractor(s) to perform the construction. It is also a legitimate consideration that the level of customer service a contractor provides may not meet the expectations of NEP's customers. In this case, however, there is no record evidence to indicate that NEP's contractor(s) have historically failed to properly address reasonable claims of liability caused by construction-related activities. Accordingly, we will not disturb or impose further conditions on the Company's proposed damage claim process, to which NEP and the City have agreed.

In response to a question about liability, NEP asserted that, as a general rule, it would not be legally liable for damage that arises from the tortious acts of its contractors (RR-EFSB-22). Because NEP's possible liability for the tortious conduct of its contractors would be dependent on the specific factual circumstances surrounding each claim, statements to Salem residents that "in general" NEP would not be liable for the torts committed by its contractors could be confusing or even misleading in some circumstances.[30] The Siting Board directs the Company and its contractors to avoid making any unprompted representations to the public in the damage claims process for this Project: (1) on the websites of the Company and its contractors; and (2) in any materials circulated describing the process for making claims for damages. So that the Siting Board can understand how effectively the proposed damage claims process works, the Board directs the Company to provide quarterly summaries, beginning on April 6, 2015, of the functioning of the damage claims process, which could consist of a compilation of the weekly reports that the Company has committed to submit to the City.

In addition, the Siting Board directs the Company to fully comply with the MHC's requested program of archaeological monitoring, as described in Section V.C.2.a.i, above.

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30 We note that the Supreme Judicial Court has adopted a common law principle that a utility can be found to be liable for the harmful acts of its independent contractor when its contractor is performing the work of the utility. See, generally, Barry v. Keeler, 322 Mass. 114, at 126-127 (1947).

Given implementation of the mitigation measures proposed by the Company and the conditions described above, the Siting Board finds that land use and historic resource impacts of the Project using the Primary Route would be minimized.

b. Other Infrastructure

i. Company Description

The Project has the potential to impact other infrastructure in the City, including streets, sidewalks, public shade trees, gas mains, and sewer and drain pipes. In the MOA, NEP agreed to pay for reasonable expenses up to $130,000 for the City to hire engineering consultants to observe construction activities, in part to ensure that the Project does not adversely affect City infrastructure (MOA at 1). The Company's commitment to participate in semi-monthly meetings with the Working Group would also help coordinate around issues that arise during construction (id. at 2).

The Project would entail extensive excavation of the City's streets for manhole and duct bank installation and the removal of the Existing Cables (Exh. NEP-1, at 5-5, 5-6, and 5-48). Project work would disrupt the sidewalk in some areas, and the sidewalks would also need to be excavated (Tr. 1, at 78-79; RR-EFSB-4(S)(1)). The impacted sidewalks would be a mix of concrete, asphalt, and brick sidewalks (RR-EFSB-4(S)(1)). The Company stated that it does not anticipate any excavation on private property (Tr. 1, at 80).

As part of the MOA, NEP agreed to provide curb-to-curb repaving of all streets excavated for the Project, including excavation for removal of the Existing Cables, and to repaint centerlines, crosswalks, and any other markings (MOA at 3). The Company also agreed to replace all sidewalks affected by the Project with the same type of surface material (id.). The Company stated that, to the extent possible, it would reuse existing pavers for the restoration of brick sidewalks, and in the event that it cannot reuse existing pavers, NEP would work with the City and abutters to select appropriate new paver material (Exh. EFSB-V-2). Additionally, the Company committed to install curb cuts at crosswalks (MOA at 3).

The Company stated that there are 123 public shade trees along the Primary Route (Exh. NEP-1, at 5-18). NEP stated that it expected it would need to remove at least three or more of these public shade trees, and that the Project would affect a total of 16 public shade trees

(Tr. 1, at 81-82).[31] To mitigate the impacts to public shade trees, NEP agreed to replace any trees that were removed as part of the Project in accordance with Salem's tree replacement policies and to guarantee any newly planted trees for two years after planting (MOA at 4).[32]

The Company agreed to consult with the City's tree warden before cutting the roots of any tree (MOA at 4). Additionally, the Company outlined a number of measures it would take to protect trees affected by the project, such as erecting a temporary fence around individual tree pits and dressing cut tree roots with a tree rooting hormone compound (Exh. NEP-1, at 5-20). Further, the Company agreed to guarantee the survival of all trees affected by the Project for at least one year post root cutting and to replace the trees in accordance with the City's policy if the tree warden orders such replacement (MOA at 4).

The Company stated that because the Primary Route would be entirely within City streets, the predominant impact would be on existing underground utilities (Exh. NEP-1, at 3-6). Among these underground utilities, National Grid's affiliate owns the gas mains (Tr. 1, at 117). The City requested that, before commencement of the Project, on streets affected by the Project, National Grid replace all the natural gas lines that were already slated for replacement under National Grid's five-year plan in order to prevent another excavation of the streets in the near future (id. at 118).[33] The Company stated that this work would typically involve the replacement

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31 The three trees the Company has slated to remove are all under 30 feet tall and less than six inches in diameter as of 2010 (RR-EFSB-5(S)). One of the three is located in front of a residence on Fairfield Street; the other two are located on the Congress Street Bridge (RR-EFSB-5(S)(1)). The Company indicated that the need to remove more than three identified trees would depend on the extent to which its excavations impact roots of others among the 16 trees that would be affected (Tr. 1, at 81-82).

32 The City's tree replacement policy requires that if a live shade tree is removed, the City must be compensated for the number of inches in the tree's diameter (measured 4.5 feet above the ground), either with new trees or equivalent payment (Exhs. EFSB-V-4(1) at 1; COS-13). For example, if the Company removes a twelve-inch diameter red maple tree, it could replace the tree with a new three-inch diameter red maple tree in addition to either three three-inch trees to be selected and delivered based on the City's tree warden direction or, alternatively, provide the funds for three additional three-inch trees (Exh. COS-13).

33 NEP elaborated that where the new duct bank would have been directly adjacent to a cast-iron main it would have asked National Grid to do this replacement work anyway, so

of cast-iron gas mains with plastic mains (id. at 116). The replacement of the gas mains would occur before the Project work and would occur on almost every street affected by the Project (id. at 117-118, 120). The Company stated that work would occur before the Project instead of concurrently with the Project in order to avoid severe traffic disruptions (id. at 119). The Company elaborated that for streets where the gas main is on the opposite side from the location of the Proposed Cables, replacing the gas mains before the construction of this Project would avoid the need to completely close the street (id. at 119-120).

This Project also has the potential to impact the City's water and sewer mains (Tr. 3, at 395-396). The City stated that some of its water and sewer lines are almost 100 years old and could be vulnerable to damage from construction (id.). As part of the MOA, NEP committed to inspect each of the 44 locations where the Project crosses the City's sewer and drain mains by closed circuit television with the City's engineer before Project construction and to inspect the crossings again after Project construction (MOA at 5). While the City would repair damage that was identified during the original inspection, the Company committed to pay for the repair of any damage caused by the construction (id.). In addition to the post-construction inspection, the Company stated it would expect that any damage, such as a backup or blockage to the City's sewer and drain infrastructure, would become apparent between the temporary paving and the final repaving, so that there would be an opportunity to address the damage prior to the final repaving (Tr. 1, at 128). The City's Engineer agreed that any damage to City infrastructure would most likely become apparent before the final repaving given that the Company has agreed to wait through the stresses of a winter season before doing the final repaving (Exh. EFSB-CM-5; Tr. 3, at 405).

NEP stated that it would need to relocate some utility infrastructure to accommodate the new duct bank for the Proposed Cables, which would result in minor interruptions of service to businesses or residents along the Primary Route that could last several hours (Exhs. EFSB-CM-8; EFSB-CM-11). The Company committed to working closely with the City

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that the Project would not damage the old cast-iron mains (Tr. 1, at 118-119). On the other hand, where the new duct bank would be on the other side of the street from the existing gas mains, National Grid would replace the gas mains before the Project, solely to avoid additional excavation of repaved streets in the near future (id.).

and other utilities to identify potential impacts and mitigate service disruptions to the extent possible (Exh. EFSB-CM-8).

ii. Positions of the Parties

Mr. Clarke and Ms. Madore both express concerns about coordination of this Project with other utilities (Clarke Comments on IM; Madore Brief). Ms. Madore specifically emphasizes her concern about the age of the existing infrastructure and the potential for damage to water, sewer, and gas mains (Madore Brief).

With the measures agreed to in the MOA, the City supports the Project as proposed (MOA at 2). Specifically, the City supports the Company replacing the existing gas mains on streets affected by the Project before the Project commences in order to minimize traffic impacts (Tr. 3, at 384-385).

iii. Analysis and Findings

Given the nature of the Project and the age and density of the existing utility infrastructure in the City's streets, there is significant potential for the Project to impact the City streets and the existing utilities within them. The Company's commitment in the MOA to pay for the City to hire a consulting engineer to monitor construction would help minimize the potential for the Project to damage infrastructure.

Additionally, the Company's commitment to repave all streets impacted by the Project from curb to curb and to repave all sidewalks with materials similar to existing materials would reduce the Project's long-term impacts on the City's infrastructure. In this situation, due to the dense and historic character of downtown Salem and its surrounding neighborhoods, curb-to-curb repaving is appropriate to mitigate the Project's impacts.

The Company has outlined a detailed plan to protect public shade trees where possible and to replace any public shade trees it removes in accordance with the City's policy. These measures would minimize impacts to public shade trees.

NEP's coordination with its parent company, National Grid, to replace all gas mains that were slated for replacement within five years on Project-affected streets would minimize the need for future excavation and maximize the benefit of curb-to-curb repaving. Therefore,

although the gas main replacement will increase the near-term disruption in the City, the anticipated practice will minimize the long-term disruption to the City.

NEP committed to inspect all water and sewer mains prior to construction and again after construction and to wait at least six months between construction and final repaving. Additionally, the Company committed to pay for any Project-related damage to water and sewer infrastructure caused by the Project. These commitments will minimize the impacts on the City's water and sewer infrastructure.

The Siting Board finds that, with the Company's described implementation of the mitigation measures, the impacts on other infrastructure along the Primary Route would be minimized.

c. Visual Impacts

i. Company Description

NEP asserted that, because it would install the Proposed Cables underground within City streets, the Proposed Cables would not create any permanent visual impacts (Exh. NEP-1, at 5-38). For the Salem Harbor Substation, the Company stated that the proposed upgrades would include replacement of some existing equipment and expansion into the existing parking lot (id. at 5-42). The Company argued that these changes would have minimal visual impacts, given the visual integration of the substation into the adjacent and much larger generating facility (id.).

NEP stated that work at the Canal Street Substation would include removal of existing equipment, installation of new equipment, and construction of a new control house (id. at 5-46). The Company stated that it would not expand the footprint of the substation and that the dominant visual features of the site, which are two existing termination structures for transmission lines extending to the west, would remain unchanged (id.). As part of the Project, NEP would replace the perimeter fence at the Canal Street Substation, which it stated would require the removal of several trees along the Cedar Street fence line and slope and vegetation that has grown on the Cypress Street fence (Exhs. NEP-1, at 5-46; EFSB-V-6). The Company also stated that some of the existing trees on the slope adjacent to Cedar Street have become too

tall relative to the height of the transmission structures and need to be removed for that reason (Tr. 2, at 333).

As part of the Company's proposed landscaping at the Canal Street Substation, the Company stated that it would restore the vacant lot to approximately the original grade and install grass and other plantings (Exh. EFSB-LU-6). Additionally, the Company would construct a new retaining wall in this lot to support approximately five feet of backfill on the abutter's property that has, over time, accumulated against the Company's fence (id.). NEP stated that it is responsible for the upkeep of the vacant lot next to the Canal Street Substation (Tr. 2, at 331). Within the substation yard, the Company would replace the existing timber retaining wall with a gabion retaining wall (Tr. 1, at 61). The Company stated that it selected gabion, metal mesh structures filled with large stones, because gabion could be installed more quickly than a concrete retaining wall, reducing the construction duration at the Canal Street Substation (id. at 61-62). As a condition of the Special Permit issued by the Salem Zoning Board of Appeals ("ZBA"), the Company committed to new landscaping along Canal Street and along the boundary of the substation with the abutters on Cypress Street (RR-EFSB-23(S)). The Company's updated landscaping plan includes a row of trees along Canal Street and a row of trees behind the abutters on Cypress Street, as well as trees and shrubs on the slope adjacent to Cedar Street (RR-EFSB-23(S)(1)). The new landscaping would include eight trees at the perimeter of the east side of the Canal Street Substation but there would be a gap in the new trees adjacent to an abutting residence; the Company stated that the steep slope in that area prevents the planting of additional trees (id.; RR-EFSB-24).

As part of the project, NEP would replace the existing lighting at the Canal Street Substation with new lighting (Exh. EFSB-V-8). The lighting would normally be off and would only be used to illuminate equipment in the event of nighttime emergency work; it would be controlled by a switch just inside the entrance gate (id.). The lights would be located on stand-alone poles and equipment support structures at a height of approximately 25 feet and directed downward (id.). The Company would install low wattage door entrance lights on the control building to allow safe nighttime entry (id.). The Company stated that it would add lights to the new structure at the Salem Harbor Substation, but otherwise the lighting at the substation would remain the same (id.).

ii. Positions of the Parties

With the measures agreed to in the MOA, the City supports the Project as proposed (MOA at 2). The City specifically requests that if the Siting Board grants NEP zoning exemptions, all the conditions of the ZBA's Special Permit for the Canal Street Substation control house, including the additional landscaping at the Canal Street Substation, be preserved by the Board (City Brief).

iii. Analysis and Findings

The Project would have no permanent visual impacts along the Primary Route. The Company's landscaping plan for the Canal Street Substation would provide better visual screening of the substation from Canal Street than the existing conditions. The row of shrubs behind the abutter on Cypress Street should also provide adequate screening for that abutter. Along the east side of the site adjacent to Cedar Street, however, some residences may have increased views of the substation due to tree removal, even with the new tree plantings. The current landscaping plan appears to appropriately balance the goal of screening abutters with the physical constraints of the site; however, during the course of the Project the Company should seek additional opportunities to screen the abutters along Cedar Street as feasible considering the slope of the site. Regardless of the Siting Board's decision on zoning exemptions, NEP is responsible for installing all the landscaping shown on the most recent landscaping plan submitted to the Siting Board, as it is part of the Company's description of the Project to the Board. The Company's proposed lighting at the substations would be minimally disruptive to the abutters while still allowing for the safe operation of the substations.

Given implementation of the mitigation measures proposed by NEP, the Siting Board finds that visual impacts from the Project would be minimized.

d. Water

i. Company Description

The land on both sides of the Congress Street Bridge is filled tideland subject to Chapter 91 jurisdiction (RR-EFSB-20). As a result, the Project requires a Notice of Minor

Project Modification, which the Company first submitted to MassDEP on March 7, 2011 (RR-EFSB-21). The Company submitted a revised version on September 12, 2013 (id.). MassDEP granted the first Minor Modification Request and did not formally respond to the second request (id.). Pursuant to 310 CMR 9.22(3), an applicant may proceed with a minor modification if no objection from MassDEP is received within 30 days of submission of a notice (id.). The Company stated that its contractor may decide to use a temporary floating platform in the South River for the installation of the Proposed Cables under the Congress Street Bridge, but committed that its contractor would coordinate any in-water work with all relevant regulatory agencies (Tr. 4, at 604-605).

The Company stated that it expects that excavation along the Primary Route would encounter groundwater (Exh. EFSB-W-1). To manage excess groundwater the Company stated that it would use one of several different best management practices, determined by site-specific conditions and/or any pertinent permit conditions (id.). Potential practices include pumping water from the trench and conveying it though either a settling basin or filter pad and letting the treated water infiltrate into a different portion of the excavation away from the active work area or discharging it into the municipal storm drainage system (if approved by the City) (id.). The Company stated that in the event that contaminated soils affected groundwater, the Company would dispose of the groundwater as necessary to prevent its introduction into the storm drain system (Exh. NEP-1, at 5-8).

The Company stated that the Proposed Cables and associated accessories could withstand exposure to both fresh and salt water from groundwater, surface runoff, or flooding, including continuous, full submergence (Exh. EFSB-W-3; Tr. 2, at 313). Because the Proposed Cables would be designed to withstand exposure to water, the Company stated that no design changes would be required to address potential increased flooding due to rising sea levels (Exh. EFSB-G-13). The Company further stated that the Canal Street Substation is located inland and should not be affected by the potential for increased flooding due to rising sea levels, while the limited scope of work for this Project at the Salem Harbor Substation does not offer the opportunity to redesign the whole substation to address potential future flooding (id.).

NEP committed to implement appropriate best management practices for the control of erosion and sedimentation during construction, enforced by regular Company inspections

(Exh. NEP-1, at 5-8). In any areas where stormwater is directed to a local storm drain, the Company stated that it would install filter fabric barriers to prevent sediment from entering the storm drain system (id.). The Company would remove filter fabric from the storm drain when construction is complete at each location (id.). As described above in Section V. C.1, excavated soils will be loaded directly into trucks and transported to an off-site stockpile area, which will limit the potential for soils to migrate off-site and into the municipal storm drain system (id. at 5-9). The Company stated that it would obtain a National Pollutant Discharge Elimination System ("NPDES") Construction General Permit and would maintain a storm water pollution prevention plan onsite (id.).

NEP stated that because it would install the Proposed Cables underground within City streets, the installation would not cause any permanent impacts to wetlands or waterbodies (id. at 5-38). Additionally, the Company stated that the Project would not impact stormwater drainage at either the Canal Street Substation or the Salem Harbor Substation (Exh. EFSB-W-2).

ii. Analysis and Findings

The record shows that the Project would not have any permanent impacts on water resources. NEP has notified MassDEP of its Minor Modification Request related to the Project and has committed to seek approval from all relevant entities for any in-water construction work. NEP committed to appropriately manage and dispose of any groundwater that it encounters. Additionally, the Company committed to implement best management practices to control erosion and sedimentation during construction. The Company analyzed increased flooding due to rising sea levels to an appropriate extent in the design of the Project.

Accordingly, the Siting Board finds that the Project's impacts to water resources would be minimized.

e. Traffic

i. Company Description

NEP stated that traffic impacts would be confined to the time period of construction (Exh. NEP-1, at 5-21).[34] The Company stated that the heaviest traffic volumes along the Primary Route are along Hawthorne Boulevard and continuing onto the section of Congress Street north of Harbor Street, and that at peak travel hours there is congestion on this entire corridor from Washington Square South to Leavitt Street (id. at 5-21, 5-22).[35] The Company stated that lane closures or full street closures would be most likely where the existing roadway is less than 30 feet wide, which occurs for approximately 1,100 feet of the 1.63-mile primary route (id. at 5-21). Construction workers would park their personal vehicles at a staging area and drive to the work site in construction vehicles (Exh. EFSB-T-1).

According to NEP, the primary route includes streets that are used as part of routes for motor coaches, trolleys, and public buses, and that provide access to public parking lots and a parking garage (Exh. NEP-1, at 5-21). NEP stated that the primary route does not pass by the main entrance of any school, but several school bus routes use parts of the route (Exh. EFSB-T-9). The Company would also arrange for a police detail to facilitate alternating travel wherever construction reduces road width to a single travel lane (Tr. 3, at 521). The Company stated that a technical advisory group would be formed to integrate construction activities with Footprint, Algonquin Gas Transmission Company ("Algonquin"), and other construction projects in Salem, to limit construction-related traffic volume wherever possible (Exh. NEP-1, at 5-25). In addition, the Company stated that it would work with the City of Salem to prepare and implement a traffic management plan ("TMP") to reduce the potential for inconvenience (id. at 5-21, 5-25). The TMP must address the following:

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[34] Traffic impacts and also noise impacts are affected by Project schedules. Since schedule is relevant to each of these impact categories, Project schedule is addressed in a separate section, Section V.C.g, below.

[35] From north to south along this fairly straight section of the Primary Route, the name of this effectively continuous street changes from Washington Square South to Hawthorne Boulevard to Congress Street (Exh. NEP-1 at fig. 5-3).

- Coordination with Salem school, police, and fire departments;
- Provisions for emergency vehicle access;
- Identification of lane locations and widths at work zones;
- Schedule and duration of lane closures, road closures, and/or detours;
- Warning signs, reflective barriers, barricades, flashers, and other protective devices;
- Temporary provisions needed to maintain access to homes and businesses;
- Routing and safeguarding of pedestrian, personal transporter, and bicycle traffic;
- Continuity of MBTA, school bus, trolley tour, and motor coach routes;
- Communication with adjacent businesses relative to critical product deliveries;
- Roadway level-of-service effects from temporary lane closures; and
- For the timing and duration of travel and parking restrictions, a notification system for municipal officials, local businesses, adjacent residents, and the public.

(Exhs. EFSB-1, at 5-25, 5-26; EFSB-T-5; EFSB-T-9).

NEP stated that it would mail project notification to all abutters approximately three to four weeks prior to the start of construction (Exh. EFSB-T-2). Then, approximately three to seven days prior to construction in particular streets, the Company would contact residents by phone to alert them to construction dates and hours, and to any road closures or lane restrictions; construction crews would also post signage alerting the public to upcoming road closures and/or restrictions (id.). Also, NEP stated that it has developed a website to provide up-to-date information on construction scheduling, road openings, and traffic around the Project (Exh. EFSB-T-8).

NEP stated that traffic impacts from the removal of the Existing Cables would be similar to those anticipated for the installation of the Proposed Cables and the Company committed to employ similar mitigation measures for the removal of the Existing Cables (Exh. NEP-1, at 5-50 to 5-51).

ii. Positions of the Parties

In its original testimony, which preceded development of the MOA between the City and the Company, the City requested that the Siting Board condition the Project, requiring that the

TMP identify streets that would be temporarily closed during project construction, that NEP discuss these street closures with the City in its development of the TMP, and more generally that the City approve the TMP prior to the issuance of any street opening permit (Exh. COS-3, at 3, 5). Also, the City requested that the Siting Board impose a condition that in the evening, NEP's contractor mark with cones the parking spaces needed for construction the following day; that, in the event a vehicle is parked in the work zone, the Company make reasonable efforts to locate the owner to move the car; and to work with the City to identify nearby locations where vehicles could be moved for easy retrieval and at no cost to owners (id. at 3). (NEP agreed to the last two requests (COS-NEP-9)). The City stated that it would expect to lead the coordination of the various contemporaneous construction projects (Tr. 3, at 399-401). Finally, the City requested that the Siting Board impose a condition that, following construction, the Company repave streets curb to curb, replace sidewalks, install curb cuts, and paint crosswalks and center lines (Exh. COS-3, at 3).

NEP and the City have agreed in the MOA that NEP would develop a TMP in consultation with the City, which would detail streets to be temporarily closed due to manhole installation, the anticipated timing of closures, and the amount of notice, with road closures posted on the Project website as well (MOA at 3). Furthermore, NEP has agreed to notify abutters of parking restrictions five days in advance of construction in an area and to post no-parking signs at least 48 hours prior to such construction (id. at 4). With respect to repaving, NEP and the City have also agreed to set up an escrow account for repaving certain streets, and have established as well that sidewalks would be replaced in kind, and that curb cuts would be installed at crosswalks on those sidewalks (id. at 3).

iii. Analysis and Findings

The record shows that during construction the Project would have significant impacts on traffic in Salem, and that, as described below in Section V.C.g, the Company proposes to work with the City to minimize impacts by scheduling work outside of Salem's October tourist season and, as practicable, around other events and periods of higher tourist activity. There are several other major construction projects expected in Salem in approximately the same time period. The Company has indicated that it would work to coordinate schedules with Footprint, Algonquin,

and other construction projects. In Footprint, the Siting Board required Footprint to coordinate with the City, National Grid, and Algonquin, as available, to prepare a plan for roadway and traffic mitigation system for Salem, to submit the plan to the Siting Board, and to implement the plan. Footprint at 88. The Siting Board required that the roadway and traffic mitigation system include a number of elements, including: a single repository of information relevant to construction scheduling, road openings, and traffic flow; a menu of potential mitigation options, and a decision tree or other suitable approach determining their implementation; a platform for Footprint, National Grid, Algonquin, and the Salem DPW to coordinate construction activities; and a protocol for allocation of mitigation costs. Footprint at 88.

With respect to coordinating with the other construction projects and with the City, it would be advantageous to have an approach to that coordination that is consistent with Footprint. Accordingly, the Siting Board directs NEP to: (1) contact the City, representatives of Footprint, and Algonquin and solicit their cooperation and participation in preparing the Company's TMP; (2) prepare the TMP with the cooperation of as many parties as are agreeable; (3) submit the plan to the Siting Board and all parties by January 5, 2015; and (4) implement the plan. The Company shall participate in a roadway and traffic mitigation system with the City and other participants, that shall include the following elements: (a) a single repository of information relevant to construction scheduling, road openings, and traffic flow; (b) a menu of potential mitigation options, and a decision tree or other suitable approach determining their implementation; (c) a platform for NEP, Footprint, Algonquin, and the DPW to coordinate construction activities; and (d) a protocol for allocation of mitigation costs. In addition, the Siting Board directs NEP to provide the Siting Board with quarterly reports on its traffic monitoring, coordination with other entities, and traffic mitigation activities, beginning three months after the date of this Decision and ending with the completion of Project construction.

With the implementation of the traffic management plan condition and schedule-related conditions imposed below in Section V.C.2.g, the Siting Board finds that traffic impacts from construction and operation of the Project along the Primary Route would be minimized.

f. Noise

i. Company Description

With respect to operational noise from the Project, NEP stated that there would be no change in operational noise at the Salem Harbor Substation (Exh. EFSB-NO-8; Tr. 3, at 480). At the Canal Street Substation, the Project includes addition of a control house, which would have a heating, ventilation, and air conditioning ("HVAC") unit, with a noise level that the Company likened to a window-type air conditioner (Exh. EFSB-NO-8). The Company stated that its designs had not advanced to the point of determining a location for the HVAC unit, but indicated that it would be able to install the HVAC unit on the Canal Street side of the building, to direct sound away from nearby residents (Tr. 3, at 483, 491-493). Aside from the HVAC unit for the control house at Canal Street Substation, the Company asserted that none of the new electrical equipment would generate noise (Exh. EFSB-NO-8).

Noise from construction of the Project would impact adjacent residences, businesses, and other sensitive uses (Exh. NEP-1, at 5-26). To minimize construction noise impacts, staff explored a variety of mitigation strategies beyond those the Company proposed. The Company stated that construction would generally comply with City and state noise requirements (id. at 5-28). The Company would mitigate noise by training its contractors to maintain equipment, use functioning sound mufflers, and comply with MassDEP's anti-idling requirements for equipment (id.). In addition, the Company stated that it would maintain communication with a designated stakeholder representative in order to provide abutters an opportunity to raise questions or concerns (id.).[36]

The Company has provided noise estimates in A-weighted decibels ("dBA"). For reference, a ten-dBA noise increase is perceived as a doubling in loudness to the average person, while a noise increase less than three dBA is typically regarded as imperceptible (Exh. EFSB-NO-6). Some typical environmental sound levels are provided in Table 3, below.

[36] Noise impacts and also traffic impacts are affected by Project schedules. As schedule is relevant to each of these impact categories, Project schedule is addressed in a separate section, Section V.C.2.g, below.

Table 3. Typical Environmental Sound Levels

Sound Source	**Sound Level (dBA)(L_{eq})**
Gas Lawn Mower at 3 feet	95
Diesel Truck at 50 feet	85
Shouting at 3 feet	75
Normal Speech at 3 feet	65
Quiet Urban Area (Daytime)	55

Source: Exh. EFSB-NO-6

Noise mitigation at manhole locations is of particular concern as these areas would face both longer workdays and a longer construction schedule than duct bank installation locations. NEP stated that construction at manhole locations would take a total of 43 working days for manhole installation, adjacent duct bank installation, and cable pulling and splicing (Exh. EFSB-CM-3). The Company anticipates extended work days of ten to twelve hours for the cable splicing operation (Exh. EFSB-NO-14). However, manhole installation would be louder than cable splicing; maximum noise levels from pavement saws, manhole cranes, asphalt pavers, backhoes, and dump trucks would be up to 90 dBA at 50 feet (Exh. NEP-1, at 5-27).

Noise sources from cable pulling and splicing at the manhole locations would include a generator, an air conditioner, and a splicing van (id.). The Company originally estimated that maximum noise impacts from cable pulling and splicing would be up to 84 dBA at 50 feet (id.).[37] NEP stated that the generator providing electrical power for the splicing van and air conditioning unit would be muffled to minimize noise and has been used successfully in other locations with sensitive receptors (id. at 5-9). The Company subsequently committed also to use a

[37] Since many residential buildings are closer to manhole construction locations than 50 feet, including homes as close as eleven feet, NEP projected that exterior sound levels at these buildings would be as high as 97 dBA – i.e., 13 dBA louder due to closer proximity to the sound source (Exh. EFSB-NO-11). For a prediction of maximum indoor noise levels during construction, NEP used estimates of sound reduction of 17 dBA with windows open and 25 dBA with windows closed, and predicted maximum indoor noise impacts at the closest buildings as 80 dBA and 72 dBA, for windows open and closed, respectively (id.).

WhisperWatt™ generator, or its equivalent, in order to reduce noise impacts for cable pulling and splicing (Exh. EFSB-NO-12). A WhisperWatt generator would have a maximum noise impact of 58 dBA at 50 feet (id.). With the use of a WhisperWatt generator, the loudest noise from the cable pulling and splicing would be the vehicle noise from the splicing truck, which would produce up to 75 dBA at 50 feet (RR-EFSB-29).

One potential mitigation measure for construction noise (not addressed in the MOA) would be to use portable sound barriers along the Primary Route. The Company stated that sound reduction for portable sound barriers typically ranges from eight to 15 dBA for receptors at the ground floor of an adjacent building and five to eight dBA at the second floor (RR-EFSB-41). The Company stated that the use of movable noise barriers would create two hours of additional work at the beginning and end of each shift and would require an additional construction vehicle for delivery at the start of each shift, adding significant labor costs to the Project by either extending the construction workday or lengthening the construction schedule (RR-EFSB-28; RR-EFSB-42). The Company stated that the necessary space for vehicles and equipment to maneuver around the worksite during manhole installation would mean that the portable noise barriers would need to be set back from the worksite, increasing the footprint of the Project, which could result in additional road closures or blocked sidewalks (RR-EFSB-28; RR-EFSB-42). Further, in order to maintain access to the site and private driveways, a continuous noise barrier around some worksites might not be feasible, reducing the effectiveness of the noise mitigation (RR-EFSB-42). The Company argues that the projected noise benefits of portable sound barriers are limited and that the additional construction vehicle, additional work time, and other added difficulties could add to, rather than reduce, the level of impacts experienced in the City and could complicate completing construction without affecting two on-peak seasons (NEP Comments on IM at 4-5).

Construction noise could be produced over a longer period of time at the Canal Street Substation, where the Company projected that relatively intensive work would occur over a period of four to six months (Tr. 3, at 489-490). The Company stated that extended work, including weekend work, might be required at the substations before and during transmission outages to limit the duration of the transmission outages (Exhs. EFSB-NO-5; EFSB-NO-13; Tr. 3, at 466-467). There are several residential abutters to the Canal Street Substation, with the

closest abutter located 20 feet away (Exhs. NEP-1, at 5-43; EFSB-NO-10). NEP stated that the cost of using temporary noise barriers at the Canal Street Substation would be insignificant, but that the barriers could impede construction activities due to the small size of the site (Exh. EFSB-43(S)). The Company therefore has proposed to mitigate noise from stationary construction equipment first by locating the equipment away from nearby residences (id.). Where that is not practical, the Company would then install moveable noise barriers close to the noise source(s) (id.). Additionally, the Company would use well maintained equipment with functioning mufflers and prohibit extended idling of construction equipment when the equipment is not performing a productive function (id.).

NEP stated that noise impacts from the removal of the Existing Cables would be similar to those anticipated for the installation of the Proposed Cables and the Company committed to employ similar mitigation measures for the removal of the Existing Cables (Exh. NEP-1, at 5-50 to 5-51).

ii. Positions of the Parties

The City acknowledges that the work hours agreed to between the Company and the City differ from the City's noise and construction work hour ordinances (MOA at 6). The City has committed to provide any waivers from its Noise Ordinance (and construction hours ordinance) that may be required to enable the work schedule as described below in Section V.C.2.g (MOA at 6). In comments on staff's Issues Memorandum, the City notes its concern that impacts may be greater than anticipated and requests that the Siting Board require the Company to develop a mitigation plan with the City for the selective use of portable noise barriers for work at manhole locations when maximum noise impacts are expected for significant durations and site conditions allow for the effective use of noise barriers (City Comments on IM at 2). However, the City suggests that notwithstanding the considerable day-time noise impacts of construction, any noise mitigation should be used judiciously to avoid bigger problems of decreased access to homes (August 14, 2014 EFSB Meeting Tr. at 84-85). Therefore, the City requests that the mitigation plan be flexible so that it can be altered as the Project progresses and City officials become more familiar with the advantages and disadvantages of portable noise barriers (City Comments on IM at 2).

iii. Analysis and Findings

The record shows that during construction the Project would have appreciable noise impacts on Salem, as residences are generally close to the edge of the streets in which work would occur. Locations that would have the longest duration of noise impacts would be at manhole locations, where manholes would need to be installed and cables pulled and then spliced; and at the Canal Street Substation. Among the activities at manhole locations, the record shows that all work could be completed within regular construction hours except for cable splicing, which would require ten to twelve hours of work per day. In order to minimize sound impacts during cable splicing in particular, the Siting Board requires the Company to use WhisperWatt or equivalent sound attenuated generators. The record shows that the Company is willing to use temporary noise barriers at Canal Street Substation. The Siting Board requires the Company to locate stationary noise-generating equipment at the Canal Street Substation as far from residences as is feasible, and to use temporary noise barriers for such equipment that is located close to residences.

One option for additional mitigation at manhole locations could be the selective use of portable noise barriers wherever they would be a practical solution mitigating significant noise impacts. The Board could mandate the use of noise barriers both on days when the Company expects construction equipment to produce noise levels at or near the maximum range for extended periods of time, such as prolonged jack hammering, and at locations where it would be feasible for the Company to maintain a near-continuous noise barrier around the noise source. However, the record shows that noise barriers may contribute to longer construction periods and may exacerbate access difficulties. Accordingly, the Siting Board requires the Company to develop a flexible mitigation plan, in cooperation with the City of Salem, for the selective use of portable noise barriers for work at manhole locations that would balance the benefit of reducing noise at locations where maximum noise impacts are expected for significant durations against site conditions that may not allow the effective use of noise barriers while maintaining vehicle and pedestrian access and safety. In the event that the City and the Company reach an impasse on developing the noise mitigation plan, either party can request resolution by the Siting Board. Furthermore, the Company shall provide a report to the Siting Board detailing the extent,

efficacy, and difficulties experienced in its use of noise barriers within three months following the completion of construction, including removal of the Existing Cables.

With the implementation of the above noise conditions and schedule-related conditions imposed below in Section V.C.2.g, the Siting Board finds that noise impacts from construction and operation of the Project, using the Primary Route, would be minimized.

g. Schedule

i. Company Description

NEP provided a generic schedule for the Project showing how it would distribute work across two years of construction, starting with construction of a new duct bank and manhole system and continuing with removal of the existing cables:

Construction Year 1:

- Street excavation and construction of a single new duct bank and manhole system.

Construction Year 2:

- Installation of the new cables;
- Pavement restoration along the new cable route;
- Street excavation and removal of the existing S cable;
- Backfill and pavement restoration along the route of the S cable;
- Removal of the existing T cable from the duct bank; and
- Disposal of the existing cable and accessories (Exh. NEP-1, at 3-5, 3-6).

Construction Years 1 and 2:

- Modifications to the existing substations (id. at 3-6).

The City of Salem's many historical and cultural attractions draw numerous tourists every year (id. at 5-17). The City testified that its peak tourist season runs from mid-April to November 1, with events throughout the year, such as seasonal holiday events (Exh. NEP-1, at 5-17; RR-EFSB-26).[38] The City has requested that NEP avoid work in certain areas along the

[38] As a condition to the MOA, the City has provided the Company with a schedule of local events that could be affected by the Project, such as the Black Cat Road Race and the Salem Film Festival. The Company has agreed to incorporate these schedules into its construction bid documents (RR-EFSB-44).

Project from October 1 to November 1 to avoid impacts to the Halloween tourist season (Exh. NEP-1, at 5-11). To comply with this request, the Company's most recent construction schedule includes no in-street work in October (id.; Exh. EFSB-G-15).[39, 40]

The most recent construction schedule in the record has manhole installation occurring from November 2014 through January 2015 and cable pulling and splicing occurring from November 2015 through March 2016, so all work at the manhole locations would be outside of the summer tourist season as well (Exh. EFSB-G-15). However, duct bank installation would take place from January 2015 through September 2015, which would avoid the Halloween tourist season but span the summer tourism season (id.). Under that schedule, the somewhat less intrusive cable pulling and splicing operations would then occur from November 2015 to March 2016, to be followed by final pavement restoration along the Primary Route in March to May 2016 as well as removal of the Existing Cables (id.; Exh. NEP-1, at 3-6). With respect to the specifics of scheduling duct bank installation, the Company stated that work must proceed linearly between two manhole locations, but the Company could choose the order of each segment between adjacent manhole locations (Tr. 1, at 98-99).[41]

The same schedule would have the Existing Cables de-energized in April or May 2016 (Exh. EFSB-G-15). The Company stated that the dielectric fluid in the decommissioned cables would represent a threat of release under 310 CMR 40, the MCP, putting the site into the MCP process, starting with a two-hour notification requirement from which there are no express waiver provisions (RR-EFSB-16; Tr. 2, at 247-248). De-energizing the cables in April or May 2016 would therefore cause cable removal to coincide with the City's peak tourist season (RR-EFSB-26). The Company stated that it is willing to work with MassDEP, the Siting Board,

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39 With respect to off-street work at the two substations, the Company stated that specific dates would be dictated by the available electrical outages schedule (Exh. EFSB-NO-9).

40 NEP also stated that the City ordinarily imposes a street opening moratorium from December through April, to facilitate snow removal, but that preliminary discussions indicated that the City would exempt the Company from this moratorium to allow construction in the winter months (Exhs. NEP-1, at 5-11; EFSB-G-10; Tr. 1, at 73).

41 The Company stated that its contractor might prefer to construct the entire route in a single directional sequence (Tr. 1, at 98-99).

and the City to determine whether a mutually agreeable solution could be reached, but emphasized that it must comply with the rules and regulations of the MassDEP (Company Reply Brief at 2).

NEP stated that it would coordinate construction activities with Footprint, Algonquin, and other active construction projects along the installation routes to minimize impacts to the City (Exh. NEP-1, at 5-11, 5-12). NEP stated that it will coordinate with City officials and with Footprint and Algonquin on location-specific construction schedules (id. at 5-5). The Company stated that some adjustments to the proposed schedule would be required to accommodate and coordinate with other projects such as those proposed by the City, MassDOT, Footprint, and Algonquin; some Project construction activities may be advanced or delayed to align with construction of these other projects (id. at 5-11).

With respect to weekly and daily work schedules, and following discussions with the City, NEP stated that it would be amenable to a typical schedule of 7:00 a.m. to 3:30 p.m. for work at the jobsite (Tr. 3, at 463-465).[42] The Company stated that certain construction activities would require extended work days, most notably cable splicing, for which it anticipates approximately 60 extended work days, requiring ten- to twelve-hour work days (Exhs. NEP-1, at 5-11; EFSB-NO-5). NEP would also consider the use of extended hours if requested by the City to accelerate the pace of work in specific areas (Exh. NEP-1, at 5-11). The Company anticipates that there would be no work on weekends or holidays, but would request permission from the City if weekend work was needed at either substation in order to work around outage schedules (id.; Tr. 3, at 466-467). NEP stated that it would work with the City and community to limit the impacts of any extended work schedules, noting that the City does not typically endorse night work but would consider it for this Project if it were determined that it was appropriate and would not cause hardships for certain businesses and residents (Exh. NEP-1, at 5-11).

The Company argues that its discussions with the City have led to a comprehensive mitigation agreement in the form of the MOA, and that the Company and the City are continuing

[42] The Company noted that the schedule the City requested for in-street work is somewhat different from hours allowed by the Salem noise ordinance (Tr. 3, at 486). For work at the substations, NEP stated that it would follow the City ordinance and restrict work to the hours of 8:00 a.m. to 5:00 p.m. if the City does not request other hours (id. at 487).

that cooperative effort, in order to mutually develop a more detailed construction schedule, that it expects this cooperative effort would produce more effective results than a fixed schedule would be able to do if it were established at a preliminary planning stage (August 14, 2014 EFSB Meeting Tr. at 72). Furthermore, the Company states that it is optimistic that, with the City's cooperation, it can develop a schedule for Project installation that would avoid in-road construction during summer months (id. at 72, 78). The Company argues that construction schedules are, by definition, iterative and subject to change based on conditions actually experienced in the field, and submits that the best option is to allow the Company and the City to work out a schedule in a cooperative manner to ensure that impacts to residents and associated disruptions are minimized (NEP Comments on IM at 3).

ii. Positions of the Parties

The City requests that duct bank installation occur only between January and April for the segment from Washington Square South to Hawthorne Boulevard (in the heart of Salem's historic downtown) (RR-EFSB-37). Additionally, the City requests that, to the extent possible, all work – not just duct bank installation – on Washington Square South, Hawthorne Boulevard, and Derby Street take place during November through April (outside of peak tourist season), with as much of the work as possible occurring between January and April (id.). Based on the current schedule, work that might occur on these three streets during the peak tourist season includes one segment of duct bank installation (described above) and the removal of the existing S Cable, as well as a short segment of duct bank installation on Washington Square South (approximately 150 feet) and duct bank installation through the intersection of Derby Street and Hawthorne Boulevard (Exh. EFSB-CM-14).

The City requests that the Siting Board require the Company to seek a waiver from MassDEP so that the removal of the S Cable is not performed during the months of May through October to avoid the peak tourist season (City Brief). The City also prefers that the removal of the S Cable occur between January and April (id.).

The MOA between NEP and the City limits construction hours to 7:00 a.m. to 3:30 p.m. on weekdays, except for those days when NEP is performing cable splicing and unless otherwise

approved or required by the City engineer (MOA at 6).[43] The MOA states that the City shall provide waivers from its Noise Ordinance and Construction Work Hours rules as may be required in order to comply with the 7:00 a.m. to 3:30 p.m. schedule (id.). The MOA states that NEP shall prohibit its contractor from conducting any preparatory work generating a noise disturbance prior to 7:00 a.m., such as starting construction vehicles (id.). The MOA requires NEP to submit an e-mail to the City engineer explaining the necessity and duration of the extended work hours, prior to performing work such as cable splicing that requires extended work hours (id.).

Mr. Clarke, Ms. Madore, and the Salem Chamber of Commerce all request avoidance of construction during the peak tourist season. Specifically, Mr. Clarke requests that construction in critical business areas be limited to January through March (Clarke Comments on IM). Ms. Madore argues that the Company should avoid construction during the peak tourist season and October (Madore Comments on IM). The Chamber of Commerce argues that the Siting Board should impose strict calendar restrictions on the project (Salem Chamber of Commerce Comments on IM). Additionally, Ms. Doll argues that abutters should vet daily construction start-up times, including any discussion of construction on evenings and weekends, and further argued that an 8:00 a.m. start time would be standard and more acceptable than a 7:00 a.m. start time (Doll Brief; Doll Comments on IM).

iii. Analysis and Findings

The record shows that there are a number of competing factors relative to a calendar schedule for the Project, including a need for timely completion of the Project, and a tourism season that Project construction could disrupt. The record also shows that the Company and the City have made substantial progress in working out construction schedules that are acceptable to both parties, with adherence to an October construction moratorium as the only firm limitation. Schedule details would need to be adjusted as the Project progresses, so detailed instructions in

[43] David Knowlton, City engineer, indicated that the City wants construction of manholes and conduits confined to the period 7:00 a.m. to 3:30 p.m., but that splicing would be relatively quiet and localized so could be allowed to extend beyond those hours (Tr. 3, at 425-426).

advance may not be realistic. Accordingly, the Siting Board requires the Company to avoid all construction in the month of October, except as authorized by the City – specifically, at the Salem Harbor Substation and Canal Street Substation, and, during the first two weeks in October, in certain City streets that would not affect tourist activity. The Siting Board also requires the Company to continue its work on developing a detailed construction schedule in cooperation with the City of Salem. In the event that the City and the Company reach an impasse on developing the construction schedule, either party may request resolution by the Siting Board. Furthermore, NEP shall provide a quarterly report to the Siting Board detailing the progress of construction schedule preparation in cooperation with the City, with the first report due on January 5, 2015.

With respect to scheduling the removal of the existing S Cable, the Siting Board recognizes that the removal of the Existing Cables would have significant traffic, noise, and air impacts on the City, especially if the cables were removed during the peak tourist season. While delaying the removal of the Existing Cables could lessen the impacts of the cable removal on Salem's peak tourist season, it would also extend the period during which additional undetected leakage might occur. The evidence in this case suggests that the Company would need to remove the existing S cable starting immediately after de-energizing the cables. Nevertheless, the Siting Board requires the Company together with a representative of the City to consult with MassDEP on the potential threat of release of oil or hazardous materials posed by unpressurized unmonitored dielectric fluid in the S Cable and the potential for the Company to do some or all of the removal of the S Cable at a time that avoids Salem's peak tourist season.

h. Air

i. Company Descriptions

NEP stated that construction activities may generate dust and also air emissions from equipment engines (Exh. NEP-1, at 5-30). The Company stated that it would require its contractors to use dust control measures to mitigate potential fugitive dust emissions (id. at 5-31, 5-43, 5-47). The Company stated its contractor would have water trucks available nearby, and would spray water onto source areas whenever the contractor observed airborne dust (Exh. EFSB-A-1). As described above in Section V. C.1, excavated soils would be loaded

directly into trucks and transported to an off-site stockpile area, which reduces the potential for dust (Exh. NEP-1, at 5-7). The Company stated that brooms and hand tools would be used for localized clean-ups at construction sites and street sweepers would be employed for larger areas (Exh. EFSB-A-1). Additionally, the Company stated that equipment used to cut concrete or asphalt would be fitted with dust suppression water distribution systems that the contractor would use during all cutting activity (id.).

To mitigate air emissions from construction equipment, NEP committed to retrofit any diesel-powered, non-road construction equipment rated 50 horsepower or above, whose engine is not certified to USEPA Tier 4 standards, and that will be used for 30 days or more over the course of the Project with USEPA-verified (or equivalent) emission control devices (e.g., oxidation catalysts or other comparable technologies) (Exh. NEP-1, at 5-31). The Company also stated that it would exclusively use ultra-low-sulfur diesel fuel for all construction equipment it uses for the Project, and that it would comply with state law and MassDEP regulations that limit vehicle idling to no more than five minutes except in certain circumstances, such as when vehicles need to run their engines to operate accessories (id.). NEP stated that air impacts from the removal of the Existing Cables would be similar to those anticipated for the installation of the Proposed Cables and the Company committed to employ similar mitigation measures for the removal of the Existing Cables (id. at 5-50 to 5-51).

The only long-term potential air impacts that NEP anticipated as a result of this Project would be sulfur hexafluoride gas ("SF_6") emissions from the four new circuit breakers that NEP would install at the Salem Harbor Substation to replace four existing oil-filled circuit breakers there (id. at 5-43).[44] The Company estimated that the four new circuit breakers would require

[44] The Massachusetts Clean Energy and Climate Plan for 2020 identifies SF_6 as a non-toxic but highly potent greenhouse gas ("GHG") and estimates one pound to have the same global warming impact as eleven tons of carbon dioxide ("CO_2"). See G.L. c. 21N. Reducing SF_6 emissions is an important policy goal of the Clean Energy and Climate Plan. The Siting Board's mandate requires it to ensure the consistency of new energy facilities with the Commonwealth's current health, environmental protection, and resource and development policies. In accordance with this mandate, the Siting Board reviews the Company's proposed use of SF_6 to ensure reduction of SF_6 emissions to the maximum extent possible.

340 pounds of SF_6 (Exh. EFSB-A-5).[45] The Company stated that the equipment manufacturer would guarantee that the new equipment would have an SF_6 emissions rate of less than 0.5 percent per year and would factory-test the equipment prior to delivery (Exh. NEP-1, at 5-44; RR-EFSB-31).[46] The Company would have a low-SF_6-pressure alarm and, as a redundant method of leak detection, NEP would also record the SF_6 pressure in the circuit breakers as part of its regular monthly or bi-monthly substation equipment inspections (Exh. NEP-1, at 5-44). The Company stated that it has implemented measures to quantify and reduce its system-wide SF_6 emissions, by repairing or replacing its worst-performing equipment and providing training programs to substation maintenance personnel on the proper handling of SF_6 (id.).

ii. Analysis and Findings

NEP committed to dust control measures during Project construction including spraying water, stockpiling soils offsite, and maintaining clean worksites. The Company also stated that it would limit vehicle idling and use ULSD fuel to reduce air emissions. As NEP has agreed, the Siting Board directs the Company to ensure 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

45 Both NEP and Footprint would install additional SF_6-containing equipment at the Salem Harbor Substation as a result of the construction of the proposed Footprint Generating Facility (Exhs. EFSB-A-5; EFSB-SHR-1). NEP would install two additional circuit breakers with 170 pounds of SF_6 and Footprint would install a new switchyard with two SF_6-insulated collector bus systems and four generator breakers with 628 pounds of SF_6, so that in total the construction of the Footprint Generating Facility would require 798 pounds of SF_6 (Exhs. EFSB-A-5; EFSB-SHR-1). As a condition of the approval of the Footprint Generating Facility, the Siting Board directed Footprint "to consult with National Grid and develop a joint comprehensive SF_6 reduction plan in connection with the anticipated National Grid upgrades to the Salem Harbor Substation." Footprint at 30. NEP testified that it has provided Footprint all of its documents and procedures for SF_6 mitigation and monitoring and made its subject matter experts available to Footprint as necessary (Tr. 4, at 566).

46 The Company stated that this equipment would comply with MassDEP's new regulation 310 CMR 7.72, *Reducing Sulfur Hexafluoride Emission from Gas-Insulated Switchgear*, which limits all new equipment to a 1.0 percent annual leak rate (Exh. NEP-1, at 5-44, n.19).

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.

NEP selected SF_6-containing equipment with relatively low leakage rates that complies with MassDEP regulations. Additionally, the Company committed to monitor the SF_6-containing equipment with low-pressure alarms and regular inspections. The Siting Board directs the Company to inform the Board if it adds SF_6 to any equipment or replaces any equipment due to SF_6 loss at the Salem Harbor Substation within five years of the completion and initial operation of the Project, after which time the Company will consult with the Siting Board to determine whether the Siting Board deems it appropriate to require continued reporting. So that the Siting Board can stay informed of NEP's overall progress to reduce SF_6 emissions, the Board directs the Company to submit to the Siting Board a copy of its annual SF_6 reports to MassDEP.

The Siting Board recognizes that it is also important to minimize SF_6 emissions from SF_6-containing equipment Footprint owns at the Salem Harbor Substation. Accordingly, the Siting Board directs NEP to assist Footprint in fulfilling its condition for a joint SF_6 reduction plan by continuing to provide Footprint with all of the Company's updated documents and procedures for SF_6 mitigation and monitoring at the Salem Harbor Substation and by continuing to make the Company's subject matter experts available to Footprint as necessary.

With the proposed measures to minimize dust and air emissions from construction equipment and the Company's selection of low-leakage SF_6-containing equipment, as well as the conditions outlined above, the Siting Board finds that potential air impacts from construction and operation of the Project would be minimized.

i. Hazardous and Solid Waste

NEP stated that construction mitigation measures would include removal of any subsurface contamination the Company encounters during earthwork and solid waste disposal (Exh. NEP-1, at 5-12). With respect to existing contamination, the Company stated that it determined that seven active sites under the Massachusetts Contingency Plan ("MCP") program

exist along the Primary Route (id. at 5-29). The Company stated that, as appropriate, it would contract with a Licensed Site Professional ("LSP") to manage contaminated soils (id.).

At locations where NEP has been identified as the Responsible or Potentially Responsible Party for a known historical release, and for which a Temporary or Permanent Solution has been filed along with a Class A, B, or C Response Action Outcome ("RAO"), the Company may perform a post-RAO Release Abatement Measure pursuant to 310 CMR 40.0440 and 310 CMR 40.1067 (id.). In other areas, the Company would address contaminated soils under MCP provisions for a Utility Release Abatement Measure under MCP regulations (id.).

NEP stated that it would take asphalt and concrete generated during the Project to an asphalt, brick, and concrete recycling facility (Exh. EFSB-HW-11). The Company would ship waste from shipping of equipment and supplies for reuse or recycling to the extent possible (id.). The Company would recycle copper, aluminum, and lead, and it would also sort used substation equipment for re-use or sale to outside vendors (id.; Tr. 3, at 461).

Disposal of dielectric fluid from the Existing Cables is discussed in Section V.B.4. As noted above, the Company has stated that the dielectric fluid in the decommissioned cables would represent a *threat of release* under the MCP, requiring an *immediate response action* (Exhs. EFSB-HW-3; EFSB-HW-4). Once the Company has flushed oil from the Existing Cables, it would transport the oil and water for disposal at a licensed receiving facility (Exhs. NEP-1, at 5-48 to 5-30; EFSB-HW-7).

The record shows that the Company would minimize the amount of waste material it creates in the construction process, would dispose of the fluid from the Existing Cables at a licensed facility, and would follow MassDEP procedures if it encountered existing contamination when excavating for the Proposed Cables and to remove the existing S Cable. Accordingly, the Siting Board finds that hazardous and solid waste impacts from construction and operation of the Project, incorporating the Primary Route, would be minimized.

j. Safety

i. Company Description

NEP committed to design, build, and maintain the Project facilities in a manner that would protect the health and safety of the public (Exh. NEP-1, at 5-12). The Company stated

that it would adhere to all federal, state, and local regulations, as well as industry standards and guidelines established to protect the public, such as the Massachusetts Code for the Installation and Maintenance of Electric Transmission Lines (220 CMR 125.00), the National Electrical Safety Code, and design codes and guides established by the Department, the Institute of Electrical and Electronic Engineers, the American Society of Civil Engineers, the American Concrete Institute, and the American National Standards Institute (id.). Once the Project is constructed, the Company would inspect all manholes on a five-year cycle to look for defects (Exh. EFSB-S-6). To ensure security at the substation, both the Salem Harbor and Canal Street Substations would be surrounded by a perimeter fence, and the Salem Harbor Substation would have security cameras and restricted access by badge to the control building (Exh. EFSB-S-7).

NEP stated that there are no fire stations or police stations along the Primary Route from which emergency service vehicles are actively dispatched (Exh. EFSB-LU-1). Salem Fire Station No. 6 is located on Fort Avenue, along the Primary Route, but it is currently used as office space for the Salem Fire Prevention Bureau (id.). The existing S Cable is located in front of an active fire station at the intersection of Lafayette Street and New Derby Street (id.). The Company committed to coordinating emergency access with the Salem Fire Department at this location so that emergency services would not be disrupted (id.). The Company stated that its TMP would describe how all emergency vehicles would have the necessary access, and that mitigation measures could include temporarily stationing a fire engine or other emergency response vehicles in strategic locations (Exh. EFSB-S-4).

The Company committed to using a police detail as students arrive and depart from the Salem Academy Charter School to ensure that the students can safely cross the street to their school from the MBTA bus stop (RR-EFSB-18; Tr. 3, at 521-522). The Company stated that it would also consider the need for a police detail at the Bentley School, in consultation with the Working Group (Tr. 3, at 522)

NEP stated that it would contact Dig Safe before construction, and Dig Safe notification would be sent to all member utilities and any non-participating entities would be notified of the upcoming work (Exh. EFSB-S-1). During construction, the Company would sheet and shore the trench as required by soil conditions and Occupational Safety and Health Administration ("OSHA") safety rules, to prevent trench collapses and allow traffic to pass next to the trench

safely (Exhs. NEP-1, at 5-7; EFSB-S-2). During non-work hours, the Company would cover the trench with steel plates secured in place with an asphalt berm to prevent movement of the plate or unauthorized access to the trench (Exh. EFSB-S-3). The TMP would detail required warning signs, drums, and flashing lights to be used in the work zone during non-working hours (id.).

ii. Analysis and Findings

NEP committed to follow all relevant safety laws and regulations during construction and to have ongoing inspections of the Proposed Cables after construction. The Company stated that it would work with the City to coordinate emergency vehicle access to all parts of the City during construction. Additionally, the Company would use police details where necessary to ensure the safety of commuting students. The Company would maintain a safe worksite by calling Dig Safe before all construction, following relevant OSHA requirements, and covering and signing the worksite during non-work hours.

Based on the Company's proposed mitigation measures, the Siting Board finds that potential safety impacts from the Project's construction would be minimized.

k. Magnetic Fields

i. Background

Electrical current in the Proposed Cables will create magnetic fields since magnetic fields are created whenever current flows in a conductor (Exh. NEP-1, at 5-34). Some epidemiological studies suggest a statistical correlation between exposure to magnetic fields and childhood leukemia. Footprint at 99; Pioneer Valley Energy Center, LLC, 17 DOMSB 294, EFSB 08-1, at 42 (2009); Sithe Mystic Development, LLC, 9 DOMSB 101, EFSB 98-8, at 86-87 (1999). However, according to a 2007 World Health Organization ("WHO") report, "the evidence for a causal relationship is limited, therefore exposure limits based upon epidemiological evidence are not recommended, but some precautionary measures are warranted" (Exh. NEP-1, appendix 5-3, at vii). In past decisions, the Board has recognized public concern about electric and magnetic fields ("EMF") and has encouraged the use of low cost measures that would minimize magnetic fields along transmission ROWs. GSRP, 18 DOMSB 7, EFSB 08-2/ D.P.U. 08-105/ 08-106,

at 87 (2010); Cambridge Electric Light Company, 12 DOMSB 305, EFSB 00-3/D.T.E 00-103, at 38 (2001); IDC Bellingham, LLC, 9 DOMSB 225, EFSB 97-5, at 104 (1999).

According to the Company's consultant on magnetic fields, when the WHO concluded in 2007 that consistent epidemiological evidence suggests that chronic low-intensity magnetic field exposure is associated with an increased risk of childhood leukemia, it was a conclusion that WHO based on small numbers of cases and controls in the epidemiological literature (Tr. 2, at 181; see Exh. NEP-1, app.5-3, at 17). The Company indicated that more recently published studies have been based on larger data sets, and studies using different methods to estimate past exposures (Exh. NEP-1, app.5-3, at 22-28; Tr. 2, at 182).

The Company's consultant reported on the more recent evaluations of the potential for a connection between exposure to magnetic fields and childhood leukemia. One of these studies was a 2012 pooled analysis of data involving over 3,000 cases from Canada, Denmark, Germany, Japan, the United Kingdom, and the United States that did not show any statistically significant elevation in the hazard ratio for childhood acute lymphoblastic leukemia for exposure categories above one milligauss ("mG") (Exh. NEP-1, app.5-3, at 25). The Company's consultant stated that the new studies do not alter the WHO conclusion that epidemiologic evidence on magnetic fields and childhood leukemia is "limited" as defined by the International Agency for Research on Cancer ("IARC") (id. at 27).[47] Nonetheless, the Company's consultant concluded that recent studies show that if there is an association between elevated magnetic field levels and childhood leukemia, the association is "weak" (id. at 27).[48]

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[47] In relation to epidemiological studies, IARC describes "limited evidence" as follows: "A positive association has been observed between the exposure and cancer for which a causal interpretation is considered to be credible, but chance, bias or confounding could not be ruled out with 'reasonable confidence'" (Exh. NEP-1, app.5-3, at 16).

[48] Once connected, the Proposed Cables would also create electric fields since electric fields are created whenever voltage is present on conductors (Exh. NEP-1, at 5-34). However, electric fields are shielded by earth, so the Proposed Cables would not create above-ground electric fields (id.). Therefore, this section reviews only the magnetic fields that the Project would induce.

ii. Project Magnetic Field Impacts and Mitigation

NEP stated that its plan to place the S and T Cables together in a single duct bank would minimize magnetic fields with a phase arrangement optimized to maximize mutual cancellation of magnetic fields (Tr. 2, at 205). Over most of the route, the circuits would be in a configuration of three phases of one circuit placed in a horizontal arrangement over the other circuit (three over three), which results in lower magnetic field levels than a vertical arrangement at most locations (except directly over the duct bank) (Exh. NEP-1, appendix 5-2, at 3-4). In some locations the Company would use a vertical arrangement of the cables (two wide by three deep), resulting in higher magnetic fields to the sides but lower levels directly above the duct bank (id.). The burial depth of cables varies depending on the location of existing underground utilities, and would vary from 2 ½ to ten feet (id., appendix 5-2, at 3). For the shallowest locations, the magnetic field three feet above pavement at the centerline would be 55 mG for a horizontal configuration and 43 mG for a vertical configuration (id., appendix 5-2 at 10-13). At locations 15 feet laterally from the duct bank centerline, the magnetic field would be nine to ten mG for the horizontal configuration and 16 to 18 mG for the vertical configuration (id.). At all locations where the duct bank is buried over six feet deep, maximum magnetic fields would be less than 20 mG (id.).

However, as the Proposed Cables approach the paired manhole vaults, the two circuits would split into separate duct banks and would have less mutual cancellation, resulting in higher magnetic field levels at these locations (id., appendix 5-2, at 15). The area directly above the manhole vaults would have lower magnetic fields than the area above the manhole approaches because the manhole vaults contain reinforcing steel and a copper ground ring (Tr. 2, at 204). As originally designed (i.e., with no additional mitigation), magnetic fields directly above the duct bank near the manhole would be 143 mG at summer normal maximum loading conditions, which is higher than magnetic field levels projected in past underground transmission line cases the Siting Board has approved (id. at 5-35 and appendix 5-2, at 16). The 143 mG figure represents the location where cables would enter a manhole vault at the shallowest depth proposed, 3.8 feet (id., appendix 5-2, at 15-18).

The Company evaluated means of potential mitigation that would reduce magnetic fields at the approaches to manholes. One form of mitigation for the Proposed Cables would be to

install wire loop shielding alongside the manhole approaches on both sides of the conduits, and not attached to the cables. This design would induce an opposing current in the wire loop by current in the Proposed Cables, thereby cancelling out some of the original magnetic field ("uncompensated passive loops") (id., appendix 5-2, at 19). The Company testified that any type of passive loop mitigation would be relatively novel; one Company witness was unaware of any such application within the United States and a second witness was aware of one project in the United States that had installed this mitigation but had not yet published results (Tr. 2, at 211-213).

Another form of mitigation would be similar to the uncompensated passive loops the Company proposed, but would add capacitors to the loops to increase current in the loops and thereby enhance the cancellation effect ("capacitive-compensated passive loops") (NEP-1, appendix 5-2, at 15; RR-EFSB-13). NEP stated that capacitive-compensated passive loops would require two electrical boxes per manhole and that the capacitors would need to be inspected at least every year to confirm that they were still in operation, for which inspection the Company would need to switch off the Proposed Cables (RR-EFSB-13). This would add ongoing operational and maintenance costs to the installation costs provided below (id.).

A third option would be to install the manhole vaults several feet deeper. While source of the magnetic fields would then be further from receptors at the surface, burying the manholes deeper would also increase the distance that the Proposed Cables would be divided into two separate duct banks by about 50 feet in each direction – which would decrease the mutual-cancellation from having the two circuits in close proximity to each other (Tr. 2, at 216; RR-EFSB-13).

Table 4, below, identifies resultant magnetic field levels and installation costs for the uncompensated passive loop and alternative forms of magnetic field mitigation as evaluated by NEP. The modeled magnetic field values assume a loading of 250 MVA for each cable, representing a summer normal maximum loading condition with full generation operating at the proposed Footprint generating facility (Exh. NEP-1, at 5-35).[49] NEP has proposed to install the

[49] NEP modeled the uncompensated passive loops as copper cables formed into a rectangular loop shape with dimensions of 50 feet along the Proposed Cables and six feet

uncompensated passive loop as magnetic field mitigation (Exh. EFSB-E-6; Company Brief at 82).

Table 4. Efficacy and Cost of Magnetic Field Mitigation at Manhole Approaches

Mitigation Strategy	Magnetic Field (mG) based on Distance from duct bank centerline			Cost to Install Mitigation
	-25 feet	0 feet	25 feet	
No mitigation	30	143	27	$0
Uncompensated Passive Loop	26	71	24	$100,000
Capacitive-Compensated Passive Loop	25	53	23	$336,000
Additional Vault Depth (4 feet) with No Passive Loop	24	56	21	$611,000

Sources: Exh. NEP-1, at Appendix 5-2 at 18; RR-EFSB-13.

The Proposed Cables would also separate from each other as they enter the Canal Street Substation. In order to minimize magnetic fields at neighboring locations, NEP proposed to locate the S and T Cables such that they would remain in the same duct bank into the Company's property at the Canal Street Substation, and has selected a route for the separated cables that avoids passing close to residences (RR-EFSB-14-S-2; RR-EFSB-47; RR-EFSB-49).

iii. Positions of the Parties

Ms. Madore voices concern about cancer correlating with magnetic fields even as low as three mG and argues in favor of taking whatever actions are possible to minimize magnetic fields (Madore Comments on IM). Ms. Doll is concerned about magnetic fields contributing to childhood leukemia and argues that the magnetic field impacts of the project are unacceptable (Doll Comments on IM).

vertical, installed nine inches to the outside of the Proposed Cables (Exh. NEP-1, appendix 5-2, at 20-22; Tr. 2, at 203).

iv. Analysis and Findings

A number of historical studies appear to show a statistical association between residential distances from transmission lines and human health effects. The WHO has stated that the evidence for a causal relationship between magnetic field exposure and childhood leukemia is limited; WHO therefore does not recommend exposure limits based on the epidemiological evidence, but does recommend taking some precautionary measures. Consistent with the WHO recommendations, the Siting Board continues to look for low cost measures that would minimize exposures to magnetic fields from transmission lines. In this case, NEP has identified a novel approach to minimizing exposures by installing underground loops of wire adjacent to locations where the two proposed circuits have reduced mutual magnetic field cancellation. Specifically, the uncompensated passive loops the Company proposed for manhole approach locations would cost an estimated total of $100,000 and reduce centerline magnetic field levels at summer normal maximum loadings from 143 mG to 71 mG. The Siting Board endorses this measure as relatively low-cost mitigation providing a relatively large reduction in exposure levels. This approach is new, and information on its performance would be useful to the Siting Board. Accordingly, the Siting Board requires the Company to install uncompensated passive loops at manhole approaches and to file a report with the Siting Board on the efficacy of this mitigation following one year of Project operation. The report should identify whether the measurements are consistent with information previously provided by the Company, and if they are not, identify what measures can be made to further reduce the magnetic fields. The Company should also provide a report within 30 days of the issuance of this Decision describing what measures the Company can take during construction to add additional mitigation in the future without having to re-excavate the roadway. With the implementation of the passive loop measures proposed by the Company and the above reporting condition, the Siting Board finds that magnetic field impacts of the Project would be minimized.

D. Discussion of the Project with the Noticed Alternative Route

The Primary and Noticed Alternative Routes would use similar construction methodologies and would pass through similar built environments (Exh. NEP-1, at 5-40). The Primary Route is approximately 1.63 miles long, while the Noticed Alternative route is

approximately 1.86 miles long (id. at 5-2 to 5-3). The Noticed Alternative would pass in front of 238 more residential units, seven more commercial/industrial buildings, and four more sensitive receptors than the Primary Route (id. at 5-15). NEP argues that because the Noticed Alternative Route is longer and would pass more residences and sensitive receptors, it has a greater potential for impacts from traffic, noise, and dust and emissions (id. at 5-25, 5-28, 5-30).

NEP also estimated that because the Noticed Alternative Route is slightly longer than the Primary Route it would cost more (id. at 5-41). Specifically, the Company estimated that the cost to install the Proposed Cables would be $33.40 million for the Primary Route versus $38.32 million for the Noticed Alternative (id.).[50] The Company stated that because the length, physical environment, and construction methodology of the two routes are similar, there would be no material difference between the routes in terms of reliability (id. at 5-40).

E. Findings on Primary and Alternative Routes

The Siting Board finds that the information the Company provided regarding the Project's environmental impacts is substantially accurate and complete. The Siting Board finds that there would be no unique benefit to the Noticed Alternative Route over the Primary Route, but there would be greater impacts associated with the Noticed Alternative Route. Accordingly, the Board finds that the Primary Route would be preferable to the Noticed 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.

Based on review of the record, the Siting Board finds that the Company provided sufficient information regarding to allow the Siting Board to determine whether the Project has achieved a proper balance among cost, reliability and environmental impacts. Based on the information presented in Section V.C, above, the Siting Board finds that with the implementation

[50] The Company stated that it developed a detailed cost-per-mile estimate based on extensive utility mapping and geotechnical investigation of the Primary Route and used this estimate to generate cost estimates for the Noticed Alternative Route (Exhs. EFSB-G-7; EFSB-G-19). The Company argued that because the Noticed Alternative Route would be in a similar urban environment and would require similar construction techniques and traffic management and restoration plans, the construction cost-per-mile would be approximately the same (Exh. EFSB-G-19).

of the specified mitigation and conditions, and compliance with all local, state and federal requirements, the temporary and permanent environmental impacts of the Project along the Primary Route would be minimized. 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.

VI. CONSISTENCY WITH POLICIES OF THE COMMONWEALTH

A. Consistency 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.

B. Analysis and Conclusions

1. 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. 14 of the Acts of 1997, Sections 1(a) and (h). In Section II, above, the Siting Board found that the Project would improve the reliability of electric service in Massachusetts and New England. In addition, in Section V.C.2.h, the Siting Board requires the Company to use only retrofitted off-road construction equipment to limit emissions of particulate matter 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.C.2, the Siting Board finds that the Project's magnetic field, hazardous materials, and air impacts have been minimized. Accordingly, subject to the Company's specified mitigation and the Siting Board's conditions set forth in Section X, below, the Siting Board finds that the Company's plans for construction of the Project are consistent with current health policies of the Commonwealth.

2. Environmental Protection Policies

In Section V.C.2 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 land use, historical resources, 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.

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.

3. 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. In Section IV, the Siting Board reviewed the process by which the Company sited the Project. The Project has been designed and conditioned to avoid or minimize impacts to natural and cultural resources. See Section II.C.2 for a discussion of Siting Board consideration of the effects of increased temperatures and Section V.C.2.d for a discussion of Siting Board consideration of the effects of predicted sea level rise, consistent with G.L. c. 30, § 61. Subject to the specific 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.

VII. ANALYSIS UNDER G.L. c. 40A, § 3 – ZONING EXEMPTIONS

Pursuant to G.L. c. 40A, § 3, the Company requests individual zoning exemptions from the City of Salem Zoning Ordinance (Exh. NEP-2, at 1). NEP also seeks a comprehensive

zoning exemption from the City of Salem as it relates to the construction of the Project described herein.

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 bylaw under G.L. c. 40A, § 3 must meet three criteria.[51] First, the petitioner must qualify as a public service corporation. Save the Bay, Inc. v. Department of Public Utilities, 366 Mass. 667 (1975) ("Save the Bay"). Second, 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); Tennessee Gas Pipeline Company, D.T.E. 01-57, at 3-4 (2002). Finally, the petitioner must establish that it requires exemption from the zoning ordinance or bylaw. Boston Gas Company, D.T.E. 00-24, at 3 (2001) ("Boston Gas").

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[51] G.L. c. 40A, § 3 applies to the Department. The Chair of 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.

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 at 3-4; Berkshire Power Development, Inc., D.P.U. 96-104, at 26-36 (1997) ("Berkshire Power").[52]

b. Analysis and Findings

The Company is an electric company as defined by G.L. c. 164, § 1 and, as such, qualifies as a public service corporation. 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

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[52] 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 at 30; Save the Bay at 685-686; Town of Truro v. Department of Public Utilities, 365 Mass. 407 (1974). 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 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 at 31.

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) ("NY 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; NY 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;[53] and (3) the environmental impacts or 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, 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 and Findings

With respect to the need for, or public benefits of the Project, the Siting Board found in Section II, above, that the Company needs to replace and upgrade the existing energy resources for environmental concerns, economic efficiency, and reliability. In Section III, the Siting Board analyzed a number of different project approaches other than the Company's proposed 115 kV

[53] 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); NY Central Railroad at 591.

underground transmission lines that the Company might use to meet the reliability need (such as overhead transmission lines or a non-transmission alternative) and concluded that the proposed approach is preferable to other approaches. The Siting Board also reviewed the Company's route selection process in Section IV, and determined that the Company applied a reasonable set of criteria for identifying and evaluating routes to ensure that the Company missed no clearly superior route. The Siting Board also compared the benefits of the Primary and Noticed Alternative Routes and concluded that the Primary Route is preferable to the Noticed 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 the Project impacts, in Section V the Siting Board reviewed the environmental impacts of the Project and found that, while the Project would result in some local adverse impacts, the impacts of the Project would be minimized with the implementation of certain mitigation measures and conditions.

Based on the foregoing, the Siting Board finds that the general public interest in constructing the Project outweighs identifiable adverse local impacts. Accordingly, the Siting Board finds that the 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. New England Power Company d/b/a National Grid, D.P.U. 12-02, at 6-7 (2012) ("Westborough"); NSTAR Electric Company, D.P.U. 11-80, at 4 (2012); Tennessee Gas Company, D.P.U. 92-261, at 20-21 (1993).[54]

[54] 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.

b. List of Exemptions Sought

NEP seeks individual zoning exemption from the following sections of the Salem Zoning Ordinance:

(1) Section 3.3.2, which requires a special permit for a change or substantial extension of pre-existing nonconforming use, including erecting the new control house at the Canal Street Substation; and

(2) Use Table under Section 3.1 of the Zoning Ordinance, requiring a new special permit to establish an "essential services" use, including erecting the new control house at the Canal Street Substation.

On August 28, 2013, NEP filed a petition with the ZBA seeking a Special Permit to establish a new "essential services" use pursuant to the Use Table in Section 3 of the Zoning Ordinance; and a Special Permit under Section 3.3.2 to extend a pre-existing, nonconforming use (Exh. EFSB-Z-3(1)). The ZBA issued a final decision on October 2, 2013, granting NEP's application (Exh. EFSB-Z-4(1)). The appeal period expired on October 22, 2013; no appeals were filed (Exh. EFSB-Z-2). The Company maintains that it still requires an exemption from these provisions notwithstanding the fact that the ZBA granted NEP's application for the Special Permits because the Special Permits are subject to lapse if substantial use or construction has not begun within 24 months following the filing of the Special Permit approval with the City Clerk, or October 2, 2015 (Company Brief at 102, citing Exh. EFSB-Z-2; Tr. 3, at 356).

According to NEP, it may not be able to vest its rights under the Special Permits by completing substantial use or construction of the Canal Street Substation for reasons beyond its control, such as delays resulting from an appeal of the Siting Board's decision in this proceeding (Company Brief at 102). Although the Zoning Ordinance provides for an extension of the 24-month period for "good cause," NEP maintains that the Company's ability to secure such an extension is uncertain given the discretion of the reviewing body and the ambiguity surrounding the procedural process (Tr. 3, at 356). In addition, the Company contends that any required

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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).

delays associated with obtaining such extensions "would undoubtedly" delay the construction and completion of the Project "beyond the immediately needed in-service date" of June 2016 (Company Brief at 103). The City's indicates its support for the Company's requested individual and comprehensive zoning exemptions provided that the Siting Board also requires the Company to comply with the City's original conditions to the City's Special Permit (City comments to IM at 3).[55]

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. Hampden County at 85-86; Worcester at 75-77; Russell Biomass at 60-63 (2009).[56]

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[55] The following are the conditions of the Special Permit: (1) NEP to comply with all city and state statutes, ordinances, codes and regulations; (2) all construction to be done per the plans and dimensions submitted to and approved by the Building Commissioner; (3) adherence to all requirements of the Salem Fire Department; (4) NEP must obtain building permit prior to construction; (5) a Certificate of Inspection is obtained; (6) petitioner to obtain street numbering from Assessor's Office and display them so as to be visible from the street; (7) NEP to obtain approval from any City board or commission having jurisdiction; (8) NEP to construct a retaining wall along western boundary of 8 Cypress Street without barbed wire on top of chained link fence to be installed on top of retaining wall; (9) NEP to install additional landscaping along Canal Street where feasible, and along northern boundary of 8 Cypress Street for screening; (10) location of building may vary from plans by no more than 20 feet eastward, and it shall not be moved any closer to Canal Street; and (11) barbed wire on top of chain link fence bordering north side of 8 Cypress Street to be angled in toward the site (and not angled over 8 Cypress Street) (Exh. EFSB-Z-4).

[56] 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).

As noted, NEP has already sought and obtained the necessary Special Permits for the Project. In addition, NEP met with Salem's Inspectional Services Director on several occasions to discuss the zoning requirements related to the Project, and secured the written support from the City for the individual and comprehensive exemptions sought by NEP in this case (Exh. NEP-3-1 (Atts. B(a) and B(b)). According to the terms of the MOA, the City continues to support the zoning exemptions, and requests that the Siting Board include the conditions contained in the Special Permits (City Comments at 1).

d. Analysis and Findings

The Siting Board concurs with the Company and the City that that an exemption from these provisions is required notwithstanding the fact that the ZBA granted NEP's application for the Special Permits because the Special Permits are subject to lapse if substantial use or construction has not begun within 24 months. The record shows that the Project is needed due to the continuing environmental risk of further dielectric fluid leakage, to provide continued reliability and to serve the need to interconnect Footprint with customers throughout New England. The granting of the requested individual zoning exemptions will eliminate any risk that the zoning required for the Project causes any unnecessary delay in the Project's completion. The conditions included in the City's Special Permit are reasonable. In addition, the record shows that the Company has engaged in good faith consultations with the City.

Accordingly, the Siting Board finds that NEP has demonstrated that the requested individual zoning exemptions are required pursuant to G.L. c. 40A, § 3.

5. Conclusion on Request for Individual Zoning Exemptions

The Siting Board found above 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 are required for construction of the Project, within the meaning of G.L. c. 40A, § 3. Additionally, the Siting Board found that the Company engaged in good faith consultation with the City.

Accordingly, the Siting Board grants the Company's request for the individual zoning exemptions described above, subject to the eleven conditions set forth in the City's Special Permit, dated October 2, 2013.

B. Comprehensive Zoning Exemption

1. Standard of Review

The Company has requested a comprehensive exemption from the City of Salem Zoning Ordinance. The Siting Board will grant such requests on a case-by-case basis 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. Hampden County at 93; Worcester 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 the applicability of local zoning provisions to the project and any local concerns; and (4) the affected communities do not oppose the issuance of the comprehensive exemption. Hampden County at 89; Worcester at 82; GSRP at 136-137.

2. Company Position

The Company offered three reasons why a comprehensive zoning exemption is still necessary, despite its receipt of the two Special Permits from the ZBA. First, the Company believes that a comprehensive zoning exemption would also address the risk that the Special Permit approval could lapse, as discussed above for individual zoning exemptions (Exh. EFSB-Z-2). The Company's second argument is that if the City were to amend or enact new zoning provisions, these provisions would apply to the Project since construction did not commence within six months of the permit issuance or by April 2, 2014 (Tr. 3, at 352).[57]

[57] The Company stated that the Project would be protected by another six-month immunity period from any new zoning amendments or provisions once it receives the building

Third, the Company argues that design changes – either an unanticipated design change or a change ordered by the Siting Board or some other regulator – could necessitate new zoning relief (id. at 361). For example, NEP suggested that relocating the new control house at the Canal Street Substation could necessitate further zoning relief (Exh. EFSB-Z-7).

3. Analysis and Findings

Importantly, as discussed in Section II above, the Project is needed to replace and upgrade existing energy resources for environmental concerns, economic efficiency, and reliability. In addition, the Company has engaged in substantial good faith consultations with numerous City officials regarding the Project, and the City has given its support for both individual and comprehensive zoning exemptions. The Siting Board finds that completion of the Project is time sensitive and its delay may result in substantial public harm because of the continuing environmental risk of further dielectric fluid leakage, the need to provide continued electric reliability to customers, and the need to interconnect Footprint with customers throughout New England. Accordingly, we grant a comprehensive zoning exemption, subject to the conditions set forth in the City's October 2, 2013 Special Permit. The comprehensive exemption shall apply to the construction and operation of the Project as described herein, to the extent applicable. See Planning Bd. of Braintree v. Department of Public Utilities, 420 Mass. 22, at 29 (1995).

VIII. ANALYSIS UNDER G.L. c. 164, § 72

A. Standard of Review

General Laws 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:

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permit for the new control house but, in the interim, that new zoning amendments or provisions would be applicable to the Project (Tr. 3, at 362). As of May 7, 2014, the City stated that it was not planning any new zoning amendment or provision that would impact the Project and estimated that new zoning amendments or provisions typically take no more than 90 days from being introduced to being adopted (RR-EFSB-25).

> authority to construct and use … a line for the transmission of electricity for distribution in some definite area or for supplying electricity to itself or to another electric Company or to a municipal lighting plant for distribution and sale … and shall represent that such line will or does serve the public convenience and is consistent with the public interest .... The [D]epartment, after notice and a public hearing in one or more of the towns affected, may determine that said line is necessary for the purpose alleged, and will serve the public convenience and is consistent with the public interest.[58]

The Department, in making a determination under G.L. c. 164, § 72, considers all aspects of the public interest. Boston Edison Company v. Town of Sudbury, 356 Mass. 406, 419 (1969). Among other things, Section 72 permits the Department to prescribe reasonable conditions for the protection of the public safety. Id. at 419-420.

In evaluating petitions filed under G.L. c. 164, § 72, the Department examines: (1) the need for, or public benefits of, the present or proposed use; (2) the environmental impacts or any other impacts of the present or proposed use; and (3) the present or proposed use and any alternatives identified. Westborough at 37-38; NSTAR Electric Company/New England Power Company d/b/a National Grid, D.P.U. 11-51, at 6 (2012); Boston Edison Company, D.T.E. 99-57, at 3-4 (1999). The Department then balances the interests of the general public against the local interests and determines whether the line is necessary for the purpose alleged and will serve the public convenience and is consistent with the public interest.

B. Analysis and Decision

Based on the record in this proceeding and the above analyses in Sections I through VI and with implementation of the specified mitigation measures proposed by the Company and the conditions the Siting Board sets forth in Section X below, the Siting Board finds pursuant to G.L. c. 164, § 72 that the proposed transmission line is necessary for the purpose asserted, would serve the public convenience, and is consistent with the public interest. Thus, the Siting Board approves the Section 72 Petition.

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[58] 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 Department requires.

IX. 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" ("Section 61 findings"). G.L. c. 30, § 61. Pursuant to 301 C.M.R. § 11.01(3), Section 61 findings are necessary when an Environmental Impact Report ("EIR") is submitted to the Secretary of Energy and Environmental Affairs, and that such finding should be based on the EIR. Where an EIR is not required, Section 61 findings are not necessary. 301 C.M.R. § 11.01(3). In this case, NEP obtained an advisory ruling from MEPA indicating that the Project does not require MEPA review because it would not exceed any review thresholds (Exh. NEP-1, at 3-10). Accordingly, Section 61 findings are not necessary in this case.[59]

X. DECISION

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

In Section II, above, the Siting Board finds that the existing electric transmission system is inadequate to continue to serve current and projected loads in New England based on

[59] The Siting Board notes the requirements set forth in G.L. c. 30A, § 61, effective November 5, 2008, regarding findings related to climate change impacts. Since Section 61 findings are not required in this case, the Project is not subject to the Greenhouse Gas Emissions Policy and Protocol. The Siting Board nonetheless notes that this Project will have minimal GHG emissions, as it consists of underground transmission lines and modifications to two existing substations. As such, the Project will have minimal direct emissions from a stationary source under normal operations and will have minimal indirect emissions from transportation sources limited to construction, occasional repair, or maintenance activities. The Siting Board addresses Project SF_6 emissions and temporary emissions from off-road construction vehicles in Section V.C.2.h, above.

environmental, cost, and reliability considerations, and thus additional energy resources are needed in Salem and the North Shore area of Massachusetts.

In Section III, 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.

In Section IV, 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, above, the Siting Board finds that the proposed facilities along the Primary Route would be preferable to the proposed facilities along the Noticed 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, above, the Siting Board reviewed 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.

In Section VII, 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 Project using the Primary Route, as described herein, subject to the following Conditions A through O.

In addition, the Siting Board has found pursuant to G.L. c. 40A, § 3 that construction and operation of the Company's proposed facilities are reasonably necessary for the public

convenience or welfare. Accordingly, the Siting Board approves NEP's Petition for an exemption from certain provisions of the Salem Zoning Ordinance, as enumerated in Section VII above. The Siting Board grants the Company's Petition for a comprehensive exemption from the operation of the Salem Zoning Ordinance, as described in Section VII.

In addition, the Siting Board has found pursuant to G.L. c. 164, § 72 that NEP's proposed facilities are necessary for the purpose alleged, and will serve the public convenience and are consistent with the public interest, subject to the following Conditions A through O.

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

A. The Siting Board directs the Company to provide the Siting Board with a staging and laydown plan for review by the Board prior to the commencement of construction.

B. The Siting Board directs the Company and its contractors to avoid making any unprompted representations to the public bearing on legal liability in the damage claims process for this Project: (1) on the websites of the Company and its contractors; and (2) in any materials circulated describing the process for making claims for damages. The Board directs the Company to provide quarterly summaries, beginning on April 6, 2015, of the functioning of the damage claims process, which could consist of a compilation of the weekly reports that the Company has committed to submit to the City.

C. The Siting Board directs the Company to fully comply with the MHC's requested program of archeological monitoring.

D. The Siting Board directs the Company to: (1) contact the City, representatives of Footprint, and Algonquin and solicit their cooperation and participation in preparing the Company's TMP; (2) prepare the TMP with the cooperation of as many parties as are agreeable; (3) submit the plan to the Siting Board and all parties by January 5, 2015; and (4) implement the plan. The Company shall participate in a roadway and traffic mitigation system with the City and other participants, that shall include the following elements: (a) a single repository of information relevant to construction scheduling, road openings, and traffic flow; (b) a menu of potential mitigation options, and a decision tree or other suitable approach to determining their implementation; (c) a platform for NEP, Footprint, Algonquin, and the Salem Department of Public Works to coordinate construction activities; and (d) a protocol for allocation of mitigation costs. In addition, the Siting Board directs NEP to provide the Siting Board with quarterly reports on its traffic monitoring, coordination

with other entities, and traffic mitigation activities, beginning three months after the date of this Decision and ending with the completion of Project construction.

E. The Siting Board directs the Company to use WhisperWatt or equivalent sound attenuated generators for the Project.

F. The Siting Board directs the Company to locate stationary noise-generating equipment at the Canal Street Substation as far from residences as is feasible, and to use temporary noise barriers for such equipment that is located close to residences.

G. The Siting Board directs the Company to develop a flexible noise mitigation plan in cooperation with the City of Salem for the selective use of portable noise barriers for work at manhole locations that would balance the benefit of reducing noise at locations where maximum noise impacts are expected for significant durations against site conditions that may not allow the effective use of noise barriers while maintaining vehicle and pedestrian access and safety. Furthermore, the Company shall provide a report to the Siting Board detailing the extent, efficacy, and difficulties experienced in its use of noise barriers within three months following the completion of construction, including the removal of Existing Cables.

H. The Siting Board directs the Company to avoid all construction in the month of October, except as authorized by the City – specifically, at the Salem Harbor Substation and Canal Street Substation, and, during the first two weeks in October , in certain City streets that would not affect tourist activity –and to continue its work on developing a detailed construction schedule in cooperation with the City of Salem. In the event that the City and the Company reach an impasse on developing the construction schedule, either party may request resolution by the Siting Board. Furthermore, NEP shall provide a quarterly report to the Siting Board detailing the progress of its construction schedule preparation in cooperation with the City, with the first report due on January 5, 2015.

I. The Siting Board directs the Company together with a representative of the City to consult with MassDEP on the potential threat of release of oil or hazardous materials posed by unpressurized unmonitored dielectric fluid in the S Cable and the potential for the Company to do some or all of the removal of the S Cable at a time that avoids Salem's peak tourist season.

J. The Siting Board directs that the Company ensure 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.

K. The Siting Board directs the Company to inform the Siting Board if it adds SF_6 to any equipment or replaces any equipment due to SF_6 loss at the Salem Harbor Substation within five years of the completion and initial operation of the Project, after which time the Company will consult with the Siting Board to determine whether the Siting Board deems it appropriate to require continued reporting. The Siting Board further directs the Company to submit to the Siting Board a copy of its annual SF_6 reports to MassDEP.

L. The Siting Board directs the Company to assist Footprint in fulfilling its condition for a joint SF_6 reduction plan by continuing to provide Footprint with any of the Company's updated documents and procedures for SF_6 mitigation and monitoring at the Salem Harbor Substation and by continuing to make the Company's subject matter experts available to Footprint as necessary.

M. The Siting Board directs the Company to install uncompensated passive loops at manhole approaches and to file a report with the Siting Board on the efficacy of this mitigation following one year of Project operation. The report should identify whether the measurements are consistent with information previously provided by the Company, and if they do not, identify what measures can be made to further reduce the magnetic fields. The Company should also provide a report within 30 days of the issuance of this Decision describing what measures the Company can take during construction to add additional mitigation in the future without having to re-excavate the roadway.

N. 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, 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. The Company should provide copies of all cost reports to the City of Salem.

O. The Siting Board directs the Company, within 90 days of Project completion, to submit a report to the Siting Board documenting compliance with all conditions contained in this Order, noting any outstanding conditions yet to be satisfied and the expected date and status of such resolution.

Because issues addressed in this Decision relative to this facility are subject to change over time, construction of the proposed 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. A project proponent has an absolute obligation to construct and operate its facility in conformance with all aspects of its proposal as presented to the Siting Board. Therefore, the Siting Board requires NEP, or its 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. NEP or its 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.

The Secretary of the Department shall transmit a copy of this Decision and the Section 61 findings herein to the Executive Office of Energy and Environmental Affairs and the Company shall serve a copy of this decision on the City of Salem, City of Salem Planning Board, and the City of Salem Zoning Board of Appeals within five days of its issuance. The Company shall certify to the Secretary of the Department within ten business days of issuance that such service has been made.

Stephen H. August

Stephen H. August
Presiding Officer

Dated this 14th day of November 2014

APPROVED by the Energy Facilities Siting Board at its meeting on November 13, 2014, by the members present and voting. Voting for approval of the Tentative Decision as amended: Mark Sylvia (Acting Energy Facilities Siting Board Chair for Maeve Vallely Bartlett, Secretary, Executive Office of Energy and Environmental Affairs); Ann G. Berwick, Chair, Department of Public Utilities, Jolette Westbrook, Commissioner, Department of Public Utilities, Laurel Mackay (Designee for David Cash, Commissioner, Department of Environmental Protection); Meg Lusardi (Acting Commissioner, Department of Energy Resources); George Durante (Designee for Gregory Bialecki, Secretary, Executive Office of Housing and Economic Development); Kevin Galligan, Public Member; and Dan Kuhs, Public Member.

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Mark Sylvia, 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).

ATTACHMENT 1

MEMORANDUM OF AGREEMENT BETWEEN CITY OF SALEM, MASSACHUSETTS AND NEW ENGLAND POWER, d/b/a NATIONAL GRID

MEMORANDUM OF AGREEMENT

THIS AGREEMENT is made and entered into this 22nd day of May, 2014 between the City of Salem, Massachusetts (hereinafter referred to as "Salem" or the "City"), acting through its Mayor Kimberley Driscoll, and New England Power, d/b/a National Grid (hereinafter referred to as "NEP"), acting through Marie Jordan, Senior Vice President, Authorized Representative.

WHEREAS, NEP is proposing to replace two existing underground 115 kV electric transmission cables located within Salem city streets between NEP's Salem Harbor substation and NEP's Canal switching station and to conduct related work within its substation (the "Project");

WHEREAS, on or about November 1, 2014, NEP is planning on commencing work on the Project, subject to having received all necessary rights, permits, and approvals, such work to include without limitation the installation of duct banks, manholes, and the cables; and

WHEREAS, both Salem and NEP have been discussing the mitigation of impacts from construction of the Project within Salem's streets;

NOW, THEREFORE, for mutual consideration, the receipt and sufficiency of which is hereby acknowledged, Salem and NEP hereby agree as follows:

1. To ensure the Project does not adversely affect City infrastructure and planned construction projects along the construction route, Salem intends to hire an engineering consultant to oversee construction of the Project as more specifically set forth below. Since this is an expense that Salem would not have incurred but for the Project and is intended to minimize impacts to City infrastructure, NEP agrees to pay the City of Salem's reasonable expenses for engineering consultants for work directly related to the Project. Such expenses paid by NEP shall not exceed $130,000. Both parties agree that the engineering consultant for Salem needs to be on site during many activities, including, but not limited to: excavation, cable and manhole installation, and backfilling ("civil construction"). The estimate of $130,000 is based on NEP's estimated production rate of their contractor. If the total time for civil construction extends beyond fourteen (14) months and/or the duration of specific civil construction task extend beyond what has been estimated by the City and NEP engineers, the not-to-exceed amount to be paid by NEP shall be reviewed for adequacy and modified accordingly. The resident engineer shall be hired and paid directly by the City. The City shall submit the invoices received from the Engineer to NEP for reimbursement. The resident engineer will observe construction activities, but will not have the authority to direct National Grid contractors. No monies paid for under this provision may be used to oppose the Project in any public or in any private discussions.

2. NEP will maintain a project website throughout the duration of the Project. The website shall be established no later than two months prior to Project construction. This website shall be listed on any material sent to residents and on all Project signage. The City shall provide a link on its website to the project website and shall have meaningful input into the site's content. NEP shall include a brief description of the Project in Spanish on the website and

direct Spanish speaking individuals to NEP's Stakeholder Relations Representative if they need further translation of the information appearing only in English.

3. The City shall collect schedules from its departments for the period of November, 2014 through November, 2015 and provide such to NEP no later than May 21, 2014. Those schedules will be included as part of the construction specification for incorporation by NEP's contractor in the construction schedule to the extent practicable. NEP agrees to work with the Mayor of Salem and her designee(s) to make any final adjustments to the contractor's construction schedule. NEP recognizes that the City prohibits any major construction in the streets of Salem during the month of October. The City recognizes that the construction schedule may require revisions during the Project's lifecycle. Project milestones, updated as necessary, shall be posted on the Project website.

4. The City understands that time is of the essence and agrees, to the extent that it is able, to expedite the granting of all local permits licenses and approvals that maybe required for NEP to proceed with the Project. To further that purpose, the City agrees to support NEP's petition to the Energy Facilities Siting Board for: (a) approval of the Project under G.L. c. 164, §§ 69J and 72; and (b) individual and comprehensive zoning exemptions from the zoning bylaw in the City of Salem pursuant to G.L. c. 40A, § 3.

5. NEP's Stakeholder Relations Representative shall attend meetings twice monthly with a group of City officials, business leaders and residents (the City's Working Group) during and prior to construction, commencing on June 12, 2014. When necessary, specific representatives of NEP will be available at such meetings to address specific concerns such as traffic, safety, relocating bus stops and on-street parking and environmental issues. In advance of each meeting, the Stakeholder Relations Representative shall provide the City with a two-week look ahead describing the construction activities planned for the upcoming two weeks.

6. During manhole and duct bank construction, as well as cable installation and removal, NEP shall have a construction supervisor assigned full time to the Project and available to respond to any questions and/or concerns. NEP's construction specifications will require that the contractor provide a Site Installation Project Manager who will, among other responsibilities, maintain a permanent presence at the Project site for the duration of the Project and act as the contractor's point of contact with individuals and groups, as well as the City of Salem and all its departments; representatives of local neighborhood groups; and representatives of local businesses. NEP's construction specifications also will require that the contractor provide a field office with separate desk space for NEP personnel. The Site Installation Project Manager shall be responsive to City officials 24 hours a day/seven days a week and to residents and businesses during hours of construction.

7. NEP shall publicize and maintain a hotline phone number and process for reporting emergencies after business hours. The message on the hotline shall be in English and Spanish. NEP shall respond to inquiries in Spanish as necessary.

8. To account for the event that NEP's Project, during construction, results in damage to persons, vehicles or property to Salem residents, visitors, business owners or the City itself, NEP shall require its contractor to have a detailed damage claim process, which shall be in place prior to the start of construction. Information on how to submit claims to the Contractor will be included as part of the Project website. In order to ensure that the Contractor is being responsive, NEP agrees that its contract with the selected contractor for the Project shall require the contractor to provide notice of damage claims weekly, to the Stakeholder Relations Representative. This Representative shall provide the City Engineer a weekly list of the number of claims made, the date they were made and whether the claims have been resolved. The Parties understand that such damage claims constitute private matters between the claimant and Contractor and that neither the contractor nor NEP may disclose private information to the City. NEP's agreement to acquire claims processing information and provide it to the City is not an agreement or acceptance by NEP to be responsible for compensating for claims resulting from the negligence, gross negligence, reckless misconduct or intentional acts of the Contractor.

9. NEP shall work with City officials to ensure that residents and businesses along the construction route have the opportunity to participate in pre-construction photo surveys to document the pre-construction condition of residences and businesses along the construction route. Residents and businesses shall be entitled to receive a copy of the survey taken from their property upon written request. Prior to construction, NEP shall mail a letter to all abutters (including property owner and tenant) of the approved construction route explaining the survey process. The Project website shall include information regarding the survey process.

10. NEP agrees that streets excavated in support of the installation of the cable and the removal of the S cable, as shown in Exhibit A, shall be repaved curb to curb and center lines and any other lines present prior to construction will be repainted by NEP.

11. Sidewalks removed for manhole and duct line installation or during S cable removal are to be replaced in kind as set forth in Exhibit A; curb cuts shall be installed at crosswalks on those sidewalks that are replaced as required by City Engineer.

12. Due to work the City has planned along certain roads within the Project area along the existing S cable, in lieu of repaving those certain streets and sidewalks set forth in Exhibit A, Subpart IV, these areas will be repaved by the City at NEP's cost and expense. To that effect, NEP shall place in escrow, no later than two months prior to the removal of the S cable, the sum of $640,000 in accordance with a separate escrow agreement. The escrow agreement shall set forth the process for releasing incremental payments to the City as it repaves those streets set forth in Exhibit A, Subpart IV. The escrow agreement will also set forth the amount that will get released back to NEP if the City fails to repave any portions of these streets within 1 1/2 year after NEP completes the removal of the S cable. The $640,000 represents the amount that would have been incurred by NEP for repaving as more fully itemized in Exhibit A, Subpart IV.

13. NEP shall require its cable contractor or sub-contractors to post no parking signs, approved by the City Engineer, at least 48 hours in advance where construction is planned. Abutters shall be notified 5 days in advance of any no-parking areas. In the event that a vehicle is parked in the work zone, NEP shall make reasonable efforts to identify and acquire nearby locations where vehicles could be moved for easy retrieval and at no cost to the owners.

14. NEP shall identify streets to be temporarily closed due to manhole installation and include such in a Traffic Management Plan (TMP) that NEP shall develop in consultation with Salem public safety officials. In addition, NEP shall require the anticipated timing of closures be carried out by the contractor and the amount of notice required written into the TMP. Road closures shall be posted on the Project website.

15. The TMP shall be approved by the City Engineer and Police Chief and in consultation with the Fire Chief prior to the issuance of any street opening permit. Information on road or land closing and detour shall be posted on the website in a timely manner.

16. a. In the event NEP contractor(s) remove public shade trees after consultation with the City's Tree Warden, NEP or its contractor shall replace the trees removed in accordance with Salem's tree replacement policies (every inch in caliper that is removed is replaced by planting trees in locations determined by the Tree Warden) and any newly planted trees must be guaranteed for two years after planting. It shall be a priority of the parties to ensure that any excess trees (or equivalent funds per inch of caliper) available as a result of removing trees along the construction route be used to improve the landscape buffer at the Peabody Street sub-station.

    b. Any required cutting of tree roots may only be performed after consultation with the Tree Warden. Those trees subject to root cutting shall be guaranteed by the contractor for at least one year post root cutting and shall be replaced pursuant to City Policy if ordered by the Tree Warden.

    c. In addition, the City shall secure a report from a Certified Arborist, at a cost reimbursed by NEP in an amount not to exceed $3,500, evaluating the condition of the trees along the preferred route, as presented in the Siting Board proceeding, and indicating any changes noted from the 2010 report filed with NEP's Petition.

17. The City acknowledges that on April 15, 2014 NEP provided the City with NEP's construction bid documents (specifications and plans) with applicable City construction requirements due by June 6, 2014 for incorporation into the Project construction specifications as appropriate.

18. When the existing cable is removed at the Webb and Derby Street intersection, NEP shall work with the City to determine if any modifications can be made to their remaining conduit to accommodate the removal of the 48-inch drain siphon. The siphon is a hydraulic restriction that takes away system capacity for the Forrester Street neighborhood and is a maintenance concern for the City. If modifications are possible, NEP will be responsible for

modifications to the duct bank only and not any associated work required on the City's facilities.

19. The City acknowledges that NEP has provided the City location data on structures to remain for future use.

20. NEP's contractor shall clean, inspect and review results with the City Engineer, by closed circuit television, for each of the 44 crossings identified in the January 30, 2014 "Mainline Sewer and Drain Crossings" prior to starting excavation work on any street they are located on to confirm the crossing pipes condition and capacity. The crossing pipes will be re-inspected after the cables are installed. Any defects in the pipes to be crossed identified before construction will be repaired by the City at the City's expense. Any damage caused during construction by the Company's contractor will be repaired by a City approved contractor and billed to the Company's contractor. The City will be allowed to review all inspection results and provide final approval on defects and repair procedures for any sewer and drain lines to be repaired. The City will require that brick constructed sewer lines be structurally reinforced prior to excavation to expose the brick sewer when encountered.

21. Any City of Salem infrastructure requiring relocation and/or implementation of any system by-pass shall be identified by NEP in drawings with the proposed relocation plan. NEP shall indicate if relocation is permanent or temporary during construction and if temporary, infrastructure shall be returned to original location prior to restoration. Any permanent utility relocation plan shall be approved by the City. NEP shall compensate the City for any reasonable expense it incurs to relocate infrastructure to accommodate NEP's Project.

22. NEP's contractor shall take standard care to ensure any gravity services either exposed during construction, or unseen during construction (i.e. that have been crossed above by the Project) shall be in good condition prior to final Project paving. NEP's contractor shall repair any gravity lateral services that fail within 180 days after temporary repaving.

23. Upon completion of the installation of the Cable System, NEP shall provide Salem with copies of as-built plans and all engineering and survey information produced by and for NEP relating to the installation of the Project within public and private ways of the City of Salem.

24. NEP shall require its contractor to comply with City policy, as set forth in Exhibit B, relative to blocking access to parking meters. City policy requires the contractor to obtain a permit from the City's Parking Department to cover a parking meter at a rate of $15/day.

25. As part of the TMP, NEP shall agree to require the construction contractor to include an add-on of $5,000 (not to be exceeded) for signage directing pedestrians and vehicular traffic to alternate routes and parking, to special events, construction schedules, NEP contact information, and the like. NEP shall make every effort to ensure the businesses along the route have customer access during construction. NEP shall incorporate the City's specific sign requirements and material into contract documents.

26. NEP shall require its contractor(s) to leave the construction site in broom-swept condition at the close of each construction each day. NEP shall require its contractor to establish a dust

control procedure. In the event of snow, NEP's contractor shall ensure the work area is plowed.

27. To minimize traffic impacts to businesses, residents, tours and tourists during construction of the Project and facilitate outreach and communication between NEP, the Salem business community, and tour companies who will visit Salem, NEP agrees to reimburse the City for retaining Destination Salem, a non-profit agency that markets, promotes and manages tourism in Salem, at a cost not to exceed $15,000. Destination shall employ a Communications Manager to liaise between NEP, the City of Salem, and the business community. Destination Salem's designated communications manager's responsibilities will include, but not be limited to, the following responsibilities:
    - Attending the Project update meetings to be held twice a month.
    - Communicating with NEP regarding Project schedules, streets affected, and unplanned changes to the construction schedule.
    - Relaying Project information to the City of Salem for the BuildingSalem.com web site.
    - Communicating construction updates via email, Facebook, and Twitter to businesses that abut the construction zone and are impacted by road closures and construction delays. These businesses include, but are not limited to:
        - Salem Trolley
        - Tourist Attractions
        - Tour Companies
        - Transportation Companies
        - The Boys & Girls Club
        - Shetland Properties
        - Pickering Wharf
    - Work with NEP and the City of Salem to redirect residents, visitors, and motor coaches whose anticipated parking locations are temporarily unavailable during construction of the Project; provide relevant information regarding where vehicles can be parked and passengers can safely disembark.

28. Construction work hours shall be limited to 7:00 am to 3:30 pm weekdays, excluding weekends and holidays, except for those days when cable splicing is conducted and unless otherwise approved or required by the City Engineer. The City acknowledges that its noise and construction work hour ordinances may vary and shall provide any waivers from its Noise Ordinance or Construction Work Hours as may be required in order to comply with the 7:00 am - 3:30 pm work hours schedule. NEP shall prohibit its contractor from conducting any "pre-work" that generates a noise disturbance prior to 7:00 am, such as starting construction vehicles. As noted above, there will be certain exceptions when NEP will need to extend work outside of these work hours such as during cable splicing which will take approximately a 12-hour shift per day. During those instances and prior to commencing any work requiring extended work hours, NEP shall submit in an e-mail to the City Engineer an explanation of the reasons and the duration of the extended work hours.

29. NEP shall require its contractor to place a sign, with National Grid's logo, phone, and Project website at all worksites during the Project.

30. NEP shall work with the City's Health Agent to determine what, if any, rodent controls must be implemented, such as baiting catch basins.

31. NEP shall receive approval from the City Engineer of any construction staging area on public property. Daily staging near the construction work site, which will be removed at the end of the day as set forth in paragraph 32 herein, is not subject to this provision and shall not require prior approval.

32. NEP shall require its contractor to remove any unused equipment or materials from the worksite each evening.

33. This agreement constitutes the entire agreement between NEP and the City of Salem regarding the mitigation of impacts to the City by NEP that are attributable to construction of the Project. The City agrees not to require further mitigation other than what has been agreed to herein. The parties may agree, however, that due to unforeseen circumstances such that construction start or completion is delayed by more than 180 days, to re-open negotiations and amend this agreement. Agreement to re-open negotiations shall not be unreasonably withheld and any amendments to this Agreement shall be in writing and executed by both parties.

Signed this 22nd day of May, 2014 by the parties' authorized representatives.

CITY OF SALEM

By: Kimberley Driscoll
Kimberley Driscoll, Mayor

THIS SECTION INTENTIONALLY LEFT BLANK
NEW ENGLAND POWER AUTHORIZED REPRESENTATIVE
SIGNATURE ON NEXT PAGE

NEW ENGLAND POWER COMPANY
D/B/A NATIONAL GRID

By:_____
Marie Jordan
Senior Vice President

EXHIBIT A

CURB TO CURB REPAVING:

I. Cable Installation Alignment:

1. Fort Avenue:
Public Way, extending from Footprint Power plant property southwest for 1,100 feet (36-feet wide) to Webb Street.

2. Webb Street:
Public Way, extending from Fort Avenue northwest for 300 feet (28-feet wide) to Essex Avenue.

3. Essex Street:
Public Way, extending from Webb Street southwest for 420 feet (51-feet wide) to Forrester Street.

4. Forrester Street:
Public Way, extending from Essex Street southwest for 1,160 feet (28-feet wide) to Washington Square South.

5. Washington Square South:
Public Way, extending from Forrester Street west 850 feet (30-feet wide) to Washington Square West

6. Washington Square West:
Public Way, extending from Washington Street South southeast 170 feet (37-feet wide) to Hawthorne Boulevard

7. Hawthorne Boulevard:
Public Way, extending from Washington Street West southeast 1,425 feet (50-feet wide) to Congress Street

8. Congress Street:
Public Way, extending from Hawthorne Boulevard southeast 2,100 feet (42-feet wide) to Leavitt Street

9. Leavitt Street:
Public Way, extending from Congress Street west 900 feet (26-feet wide) to Fairfield Street.

10. Fairfield Street:

Public Way, extending from Leavitt Street west 645 feet (18-feet wide) to Cabot Street. NOTE: Existing trees may necessitate addressing sidewalk reconstruction on this street in an alternate manner, as directed by the City Engineer.

11. Cabot Street:
Public Way, extending from Fairfield Street north 75 feet (40-feet wide) to Cypress Street.

12. Cypress Street:
Public Way, extending from Cabot Street west 280 feet (34-feet wide) to the Canal Street Substation property.

II. Required Gas Main Relocation/Replacement for Cable Project

1. Alignments 1, 2 and 3 above, Fort Ave, Webb and Essex Streets:
Existing gas to be relocated to other side of roadway to avoid conflict with new Cable. 1,950 feet of main to be installed, including 180-feet (28-feet wide) on Webb Street towards Bridge Street and 100 feet (30-feet wide) on Szetela Lane off Essex Street which are new installations. A total of 28 gas services to be replaced.

2. Alignment 6 above, Washington Square West:
Existing gas to be relocated to other side of roadway to avoid conflict with new Cable. 160 feet of main to be installed.

3. Alignment 7 above, Hawthorne Boulevard:
Existing gas to be relocated to other side of roadway to avoid conflict with new Cable. 1,425 feet of main to be installed, including 400-feet (28-feet wide) on Derby Street towards Liberty Street, 325 feet (28-feet wide) on Liberty towards Charter Street, plus 1,100 feet (28-feet wide) on Derby ending at Palfrey Court, including 20 feet of new main into the side streets of Union, Hebert, and Hodge Streets, Curtis Street Extended (all 20-feet wide) and 240 feet (12-feet wide) up Custom House Court and 120 feet (12-feet wide) Palfrey Court. An approximate total of 40 gas services to be replaced.

4. Alignment 8 above, Congress Street:
Existing gas to be relocated to other side of roadway to avoid conflict with new Cable, 500 feet of main to be installed from Peabody/Ward Street intersection to Leavitt Street, including 200-feet (28-feet wide) up Peabody Street, 160 feet (28-feet wide) up Ward Street, 80 feet (36-feet wide) up Harbor Street, 60-feet (25-feet wide) up Lynch Street and 240 feet (22-feet wide) up Dow Street from Congress Street. An approximate total of 40 gas services to be replaced.

5. Alignment 9 above, Leavitt Street:
Existing gas to be relocated to other side of roadway to avoid conflict with new Cable, 880 feet of main to be installed in Leavitt Street, including 360-feet (16-feet wide) up Harrison Street, 240 feet (26-feet wide) up Prince Street and 75 feet (20-feet wide) up Naumkaeg Street. An approximate total of 40 gas services to be replaced.

6. Alignments 10, 11, and 12 above, Fairfield, Cabot and Cypress Streets:
   Existing gas to be relocated to other side of roadway to avoid conflict with new Cable, 645 feet of main to be installed in Fairfield Street, 270 feet in Cabot Street, including 180 feet (40-feet wide) towards Cedar Street, and 350 feet of main on Cypress Street. A total of 36 gas services to be replaced.

III. Sidewalk Repaving/Reconstruction

Any sidewalk impacted by the Cable Project will be reconstructed to City standards and of the same materials as existing. The City will decide the limits of restoration, as some sidewalks are in poor condition and will require improvement to meet ADA requirements if disrupted, including the installation of handicap access ramps and crosswalks. The following is a list of sidewalks and limits of restoration identified based on review of construction bids documents prepared by NEP, however, as work progresses, other sidewalks may be impacted wand will require restoration as described above:

		direct impact length		complete restoration limits	
location	s/w type	length	width	length	SY
Fort Avenue	concrete	45	5	100	56
Wash. Sq. South	brick	190	10	300	333
Hawthorne Blvd.	concrete	45	6	45	30
Congress St	concrete	35	11	35	43
Congress St	concrete	70	10	70	78
Leavitt St	concrete	40	8	100	89
Fairfield St	concrete	20	5	20	11
Fairfield St	concrete	95	5	200	111
			Total		751

IV. Pavement and Sidewalk Restoration related to the S Cable Removal

The cost of pavement and sidewalk restoration related to the S cable removal is as follows:

sidewalk (s/w) and roadway restoration cost estimate

location	from	to	type	material	total
canal street **	sub station	thru Mill St	road		
washington st	Mill st intersection	new derby st	sidewalk	concrete	$31,667
new derby st	washington st	lafayette st			
			sidewalk	concrete	$42,222
			sidewalk	brick	$15,000
			road		$1,000
lafayette st intersection	new derby	derby			
			road		
			crosswalk	concrete	$33,333
derby st	lafayette	power plant			
	lafayette	daniels st	road		$205,333
	daniels st	carlton st	sidewalk	concrete	$77,778
	carlton st	power plant	road		$177,333
			crosswalks (17 total)	concrete	$52,889
				total	$636,556
				SAY	**$640,000**

EXHIBIT B

City of Salem, Massachusetts
Parking Department
1 New Liberty Street Salem, Massachusetts

PERMIT APPLICATION TO BLOCK PARKING METER

Company Name_____

Address_____

Phone_____

Vehicle Manufacture (If Applicable)_____

Plate # (If Applicable)_____

Days Required_____

Spaces Needed_____

$15.00 PER DAY PER SPACE

TOTAL DUE

_____
SIGNATURE OF REPRESENTATIVE

COMMONWEALTH OF MASSACHUSETTS
ENERGY FACILITIES SITING BOARD

In the Matter of the Petition of Cape Wind Associates, LLC and NSTAR Electric Company, Project Change	)	EFSB 02-2B/EFSB 07-8A

FINAL DECISION

M. Kathryn Sedor
Presiding Officer
November 17, 2014

On the Decision:
Barbara Shapiro

APPEARANCES: David S. Rosenzweig, Esq.
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TABLE OF CONTENTS

The Energy Facilities Siting Board hereby APPROVES, subject to the conditions set forth below, changes to the Cape Wind Associates, LLC and NSTAR Electric Company Project as further described below.

I. INTRODUCTION

A. Summary of the Previously Approved Project

On May 11, 2005, the Energy Facilities Siting Board ("Siting Board") approved the construction by Cape Wind Associates, LLC ("Cape Wind") and NSTAR Electric Company ("NSTAR") (together, the "Companies") of two new 115 kV electric transmission lines running beneath Nantucket Sound and Lewis Bay and then underground in the Towns of Yarmouth and Barnstable on Cape Cod where they would interconnect with the electric grid at the existing NSTAR Barnstable Switching Station ("Project").[1] The purpose of the Project is to interconnect Cape Wind's planned offshore wind-powered electric generating facility in Nantucket Sound ("Wind Farm") with the regional electric grid.

The Transmission Line route is approximately 18.4 miles in length. The route would begin at the proposed Wind Farm on Horseshoe Shoal in Nantucket Sound, travel approximately 12.5 miles beneath Nantucket Sound and Lewis Bay, come ashore at the southern end of New Hampshire Avenue in Yarmouth, and then continue approximately 5.9 miles underground through Yarmouth and Barnstable to the Barnstable Switching Station ("Switching Station"). In an August 8, 2014 filing ("Project Change Filing") Cape Wind and NSTAR now propose to make various changes to the Barnstable Switching Station to accommodate the interconnection of the Transmission Lines ("Project Change").

B. Summary of the Proposed Barnstable Switching Station Changes

The Companies' proposed changes to the Barnstable Switching Station consist of the addition of new equipment to the site, and enlargement of the site to accommodate the new

[1] Cape Wind Associates, LLC and Commonwealth Electric Company, d/b/a NSTAR Electric, 15 DOMSB 1, EFSB 02-2 (2005) ("Final Decision"). The Siting Board proceeding in which the Board approved the Project and issued the Final Decision is referred to in this decision as the "Original Proceeding."

equipment. The Companies state that the proposed changes reflect the interconnection specifications for the Project that are contained in the ISO-New England ("ISO-NE") System Impact Study for the Project, which ISO-NE had not completed at the time of the Original Proceeding (Exh. CW/NSTAR-1, at 2).

The Companies stated in the Original Proceeding that the new equipment to be added to the Switching Station site would include three new circuit breakers in a new bay and two shunt reactors, and that an extension of the existing ring bus on the site also would be required (Final Decision at 27-28, 126).[2] In the Project Change Filing, the Companies now state that the equipment to be added to the site would include eight bays of circuit breakers, four shunt reactors, two harmonic filters, and a control house; expansion of the existing static VAR compensator ("SVC") on the site also would occur (Exhs. CW/NSTAR-1, at 3). The Companies stated in the Original Proceeding that the only noise associated with the Project would be construction-related noise. Final Decision at 107. In the Project Change Filing, the Companies now state that the shunt reactors, the harmonic filters, and the expanded SVC all would emit noise (Exh. CW/NSTAR-1, at 5). The Companies stated in the Original Proceeding that all Switching Station construction would occur within the station's existing fence line, and thus would not require expansion of the site. Final Decision at 27-28, 31. The Companies now state that the Switching Station would need to be expanded by approximately 1.9 acres (Exh. EFSB-3).

C. Procedural History

1. Prior Proceedings

a. EFSB 02-2

The Siting Board first approved the Project in the 2005 Final Decision. The Siting Board found that the Project, using the Companies' primary route and interconnecting at the Barnstable Switching Station, was preferable to other alternatives with respect to providing a reliable energy supply for the Commonwealth, with a minimum impact on the environment at the lowest possible cost. Final Decision at 32, 132. The Final Decision required the Companies to provide notice to

[2] The Companies indicated that additional shunt reactors might be necessary. Final Decision at 126.

the Siting Board of any proposed project changes other than minor variations. Final Decision at 135.

b. EFSB 07-8

In a proceeding in 2009 ("Certificate Proceeding"), the Siting Board granted a Certificate of Environmental Impact and Public Interest for the Project, containing nine state and local permits identified by Cape Wind as necessary for Project construction. Cape Wind Associates, LLC, EFSB 07-8 (2009) ("Certificate Decision"). The Certificate Decision stated that, in accordance with G.L. c. 164, § 69K, the Certificate "shall be in the form of a composite of all individual permits, approvals or authorizations which would otherwise be necessary for the construction and operation of the facility and it acts in the place of the nine permits referenced below." Certificate Decision, Exhibit A at 1. The Certificate Decision also stated "no agency shall require any approval, consent, permit, certificate or condition for the construction, operation, or maintenance of the project. No agency shall impose or enforce any law, ordinance, by-law, rule or regulation nor take any action nor fail to take any action which could delay or prevent construction, operation, or maintenance of the project." Certificate Decision, Exhibit A at 4; G.L. c. 164, § 69K.

The Siting Board found that the Project was needed; that granting a Certificate containing approvals for the Project was compatible with considerations of environmental protection, public health and safety;[3] that the Project might not conform with certain laws and regulations, but that it was reasonable to exempt the Project from these requirements; and, that issuing a Certificate would serve the public interest and convenience. Certificate Decision at 29-30. The Certificate Decision also required Cape Wind to provide notice to the Siting Board of any proposed Project changes other than minor variations. Certificate Decision, Att. A at 4.[4]

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[3] In the Certificate Decision, the Final Decision served as the foundation for the Siting Board's findings of need, of compatibility with environmental protection and public health and safety, and that the public convenience and necessity required the construction and operation of the Project. Certificate Decision at 13-14, 21-24, and 27-28.

[4] In 2008, the Siting Board approved other changes to the Project. Cape Wind Associates, LLC and Commonwealth Electric Company d/b/a/ NSTAR Electric, 16 DOMSB 194,

2. Current Proceeding

When the Companies submitted the Project Change Filing to the Siting Board on August 8, 2014, they also served the filing on all parties in the Original Proceeding and the Certificate Proceeding, who retain their previous Intervenor or Limited Participant status in accordance with the Siting Board precedent for processing project change requests.[5] See Brockton Power Co. v. EFSB, 469 Mass. 215, 217-220 (2014) ("Brockton Power"). On September 2, 2014, Siting Board staff issued a set of written Information Requests to the Companies and a procedural order. At the request of the Town of Barnstable, staff subsequently modified the procedural order to allow for evidentiary hearings, which were conducted on September 23 and 24, 2014. In addition to the Companies, the Town of Barnstable and the Barnstable Fire District, and Mr. Roberto Arista[6] participated in the hearing. The Companies presented four witnesses; the Town of Barnstable presented one witness; and the Barnstable Fire District presented one witness. Subsequent to the evidentiary hearing, Dakota Partners, Inc. ("Dakota") filed a motion to intervene in the proceeding; the Presiding Officer granted the motion. On October 8, 2014, the Companies and Dakota each filed a brief; the Town of Barnstable and the Barnstable Fire District filed a joint brief.[7] On

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EFSB 02-2A/D.T.E. 02-53 (2008) ("2008 Project Change Decision"). The 2008 Project Change Decision is not at issue in this proceeding.

5 The record in the Original Proceeding was incorporated by reference into the record in the Certificate Proceeding. The Presiding Officer noted that the records in the Original Proceeding and the Certificate Proceeding were incorporated by reference into the record of this proceeding. EFSB 02-2B/07-8A, Procedural Order (August 20, 2014).

6 Mr. Arista is not a party to the proceeding and was not on any party's pre-hearing witness list. He appeared pro se at the evidentiary hearing, and the Presiding Officer allowed him to be sworn in and present testimony, and allowed the Town of Barnstable to sponsor aerial photographs that he identified and described. Mr. Arista testified regarding the planned Village Green housing development that would abut the Switching Station ROW, as discussed in Section II.B.1, below. Mr. Arista identified himself as the general partner in the Village Green project. In its post-hearing intervention motion, Dakota Partners, Inc. stated that it owns the parcel of land on which the Village Green project would be located, and identified Mr. Arista as a principal in Dakota Partners, Inc.

7 The parties also filed numerous evidentiary and procedural motions before, during, and after the evidentiary hearing. The motions, the responses to the motions, and the Presiding

October 29, 2014, the Companies and Dakota notified the Siting Board that they had entered into a settlement agreement, and Dakota filed a notice of withdrawal as a party to the proceeding (Exh. CW/NSTAR/Dakota-1; Notice of Withdrawal by Dakota Partners, Inc. (October, 29, 2014)).

II. ANALYSIS OF THE PROJECT CHANGE FILING

A. Standard of Review

As noted above, in both the Final Decision and the Certificate Decision, the Siting Board required Cape Wind and NSTAR to notify the Board of any changes other than minor variations to the proposal as presented to the Siting Board, so that the Board might decide whether to inquire further into such issues. Final Decision at 135, Certificate Decision, Att. A, at 4. The standard of review to determine whether further inquiry is warranted was first articulated by the Siting Board in Berkshire Power Development, Inc., 7 DOMSB 423, EFSB 95-1, at 10 (1997) ("Berkshire Compliance Decision"). In the Berkshire Compliance Decision, the Siting Board declined to make further inquiry regarding certain project changes if the change did not alter in any substantive way either the assumptions or conclusions reached in its analysis of the project's environmental impacts in the underlying proceeding (Id. at 437-439; see also 2008 Project Change Decision at 4; GenOn Kendall LLC, EFSB 99-4C (January 9, 2012).

B. Proposed Changes to the Barnstable Switching Station

As stated above, the final design of the Project's interconnection at the Barnstable Switching Station was unknown at the time of the Original Proceeding as ISO-NE had not yet issued the System Impact Study for the Project. However, the Companies stated at that time, and the Final Decision so indicated, that any upgrades or construction related to the Switching Station would occur inside the then-existing fence line, and that the only noise associated with the Project would be construction noise – not operational noise. In contrast to the earlier record, the Project Change would include additional electrical equipment located beyond the existing fence line at the Switching Station, and this equipment would also generate operational noise.

Officer's rulings on the motions are in the record of this proceeding, and can be identified in the Docket for the proceeding.

The Siting Board finds that the location and operation of the additional equipment that the Companies propose to install at the Barnstable Switching Station may have land use, visual, noise, and other impacts. Therefore, the Project Change may alter in a substantive way assumptions or conclusions by the Siting Board in its analysis of the environmental impacts of the Project in the Original Proceeding. Accordingly, the Siting Board finds that further inquiry regarding the Project Change is warranted. The Siting Board undertakes this further inquiry below.

1. Land Use and Visual

The existing Barnstable Switching Station is situated in an approximately 3.83-acre fenced area, located within a 10.99-acre NSTAR-owned parcel (Exh. EFSB-3).[8] The proposed site expansion for the new equipment would be approximately 1.9 acres, of which 0.8 acres includes pre-existing driveways and access roads (id.).[9] All of the new equipment would be located to the west and south of the existing transmission equipment (Exhs. CW/NSTAR-1, at 3; EFSB-1(3) Public). The shunt reactors, harmonic capacitors, control house, and breaker bays would be located to the west, and the expansion of NSTAR's existing SVC would be located to the southeast (Exh. EFSB-1(3) Public).

The Companies stated that the new equipment would be consistent in kind and dimension with the existing equipment, as well as below the heights of the existing towers and masts at the Switching Station (Exh. EFSB-6). The majority of the existing Switching Station equipment, consisting of buses, transformers,[10] and a shunt reactor is approximately 15-25 feet high, while towers, masts and overhead lines are approximately 55 to 60 feet high (id.). The dimensions of the

8 NSTAR has owned and operated the Barnstable Switching Station at the current location for over 40 years (Exh. CW/NSTAR-1, at 3).

9 The distances from the NSTAR parcel property boundary to the nearest uses are: (1) Trinity Christian Academy (southeast), 450 feet for the athletic fields and 550 feet to the nearest structure; (2) Brazilian Assembly of God Church (southeast), 650 feet; and (3) nearest residences, north of Route 6, 1,250 feet and 1,600 feet respectively. The Cape Cod Times is located 250 feet south of the property line (Exh. CW/NSTAR-1, Att. D at 5-4; EFSB-14).

10 The transformers function as part of the SVC unit (Tr. 1, at 66, 197).

new equipment are as follows: (1) the four shunt reactors each consist of three cylinders, approximately 30 feet high with a radius of approximately ten feet, ten inches; (2) the two harmonic filters each consist of three cylinders, approximately 19 feet high with a radius of four feet, eleven inches, and their connection to other equipment is approximately 23 feet, three inches high; (3) the SVC expansion would be approximately 40 feet long by 78 feet wide and 26 feet, three inches high (id.). The control house would be approximately 50 feet long by 24 feet wide and eleven feet high (Exh. CW/NSTAR-1, at 3).

The entire site, including the expansion area, is previously disturbed, cleared land in an industrially zoned district (Exhs. EFSB-4; EFSB-7; EFSB-1(3)Public). To the west of the expansion area are industrial and commercial uses (Exh. CW/NSTAR-1, at 5). Trees are located along the north and south property lines and these areas would not be affected by the installation of the new equipment (Exh. EFSB-7). The Companies stated that a small area of pine trees in the southwest of the site would be removed but would not affect abutting properties, as the heavily wooded buffering outside the Switching Station would remain (id.).

An NSTAR ROW runs along the east fence line of the Switching Station (Exh. EFSB-3). Prior to the summer of 2014, there was a significant area of woody vegetation on the eastern side of the ROW (Exhs. EFSB-1(3)Public; TOB-2; Tr. 1, at 107, 112). Currently, the buffered area on the majority of the ROW has been removed to facilitate the ongoing construction of Village Green, a residential apartment development that would abut the ROW (Exh. TOB-2; Tr. 1, at 110-113).[11] The developer of Village Green stated that the removal of the woody buffer was entirely under the direction of Village Green, and that the Companies played no part in the removal (Tr. 1, at 119). The developer indicated that the new development would have some landscaped screening, but not to the extent of the previous treed buffer that was removed by the developer (id. at 111-112). The Companies indicated that views from the Village Green development of most of the new

[11] The Village Green development would be constructed in two phases (Tr. 1, at 106). Phase I, currently under construction, would consist of two residential buildings, 30 units each and a community building (id. at 111, 112). Phase I is anticipated to be completed in the spring of 2015, with occupancy of the first building at the beginning of 2015 (id. at 113). Phase II would also consist of two 30-unit buildings, and construction is scheduled to begin in the fall of 2015 (id.).

equipment associated with the Project Change would be shielded by the existing equipment, with the exception of the expanded SVC located to the south of the existing equipment (Companies Brief at 26).

The Siting Board notes that the Barnstable Switching Station has been situated at its current location for over 40 years. There is significant forested buffer to the north and south of the site, as well as a buffer and industrial uses to the west. The majority of the new equipment would be situated to the west and south of the site. Currently, the closest residences are located approximately 1,250 feet and 1,600 feet to the north, well buffered from the Switching Station.

As noted above, the Village Green residential development would directly abut the Switching Station ROW to the east. Since the developer chose to remove a significant treed buffer on its own property, thus bringing the existing Switching Station into view, it is not reasonable to place the burden of mitigating visual impacts associated with the existing Switching Station on NSTAR. Were the Project Change to impose significant visual impacts on Village Green or others receptors in the area, then mitigation by the Companies could be warranted. However, the majority of the new equipment associated with the Project Change, located to the west of the Switching Station site, would be blocked from view at Village Green (east of the site) by the existing equipment, given both its location and height. Therefore, the new equipment associated with the Project Change would present a minor visual impact on Village Green, and does not require mitigation by the Companies. Accordingly the Siting Board finds that the potential land use and visual impacts of the Project along the primary route, with the Project Change, would be minimized.

2. Noise

a. Introduction

The Companies stated that they would install new equipment that is the quietest available and also replace the existing SVC air-core reactors with low-noise units (Exh. CW/NSTAR-1, Att. D at 5-2 ; Tr. 1, at 42-43). The Companies provided noise measurements and modeling at ten receptors to estimate the noise impacts in A-weighted decibels ("dBA") from the operation of the new equipment, as well as creation of pure tones as defined by the Massachusetts Department of

Environmental Protection ("MassDEP")[12] (Exhs. CW/NSTAR-1, Att. D; EFSB-11; EFSB-12; RR-EFSB-2).[13] The noise modeling was based on the assumption of all four shunt reactors operating, which the Companies stated was a very unlikely event (Exh. EFSB-16; Tr. 1, at 46). Specifically, the Companies explained that the only times all four shunt reactors would be operating is during commissioning, or when the temperature in Nantucket Sound is over 95 degrees Fahrenheit; once the wind farm is commissioned, it would be very unusual for more than two of the shunt reactors to be operating at any given time (Tr. 1, at 46). The Companies indicated that 90 percent of the time, two shunt reactors would be operating, and that ten percent of the time either no reactors or all four would be operating (id. at 50).

In looking at noise issues in past cases, the Siting Board has taken into account both the MassDEP policy of limiting A-weighted dBA increases to 10 dBA over background, and where appropriate, MassDEP's policy concerning pure tone conditions.[14] The Siting Board determines acceptable levels of noise increases on a case-by-case basis and is not required to allow noise increases to the extent allowed by MassDEP's policy. Frequently, the Siting Board has required more stringent noise requirements. In this proceeding, the Siting Board looks at both the dBA increase over ambient and pure tone conditions during operation of the Project that require additional study and mitigation, as described below.

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12 MassDEP states that a pure tone condition exists where any one octave band sound pressure level exceeds the two adjacent frequency bands by three dBA or more. Here, the octave band where pure tones are identified is in the 125 Hertz ("Hz") band (Exh. CW/NSTAR-1, Att. D at 5-2; Tr. 1, at 44).

13 The original noise analysis submitted by the Companies as an attachment to the Petition was based on six receptors. During the course of the proceeding, the Companies updated the noise analysis to include the four Village Green residential 30-unit buildings.

14 We note that historically, the vast majority of Siting Board (as well as Department) cases where noise has been at issue have involved increases in dBA noise levels compared to background and not pure tone conditions.

b. Intervenors

The Town and Dakota did not assert that any of the Companies' noise data was incorrect. Rather, in motions and in their briefs, they asserted that they did not have sufficient time to review some of the data, and moved to strike the data from the record (TOB/BFD Brief at 15; Dakota Motion/Brief at 1). The Town had filed a motion to strike on October 1, 2014, which was denied in a ruling issued on October 28, 2104. Dakota's motion to strike, which supported the Town's motion to strike, also was denied in the October 28, 2014 ruling. In its Motion/Brief, Dakota asserted that the Siting Board should impose adequate noise mitigation measures to protect the rights of Village Green residents to quiet enjoyment and healthful use of their homes (Dakota Motion/Brief at 3).[15]

c. Pure Tones

Based on the Companies' modeling, a potential pure tone condition would exist because sound in the 125 Hz octave band exceeds sound in the adjacent octave bands by more than the MassDEP three-decibel pure tone criterion. The model indicated a likely one or two decibel pure tone exceedance at the residences to the north, and a three-decibel exceedance at Village Green (RR-EFSB-2, Att. 2(2); Tr. 1, at 47). The Companies stated that information was not available from the manufacturer for the adjacent 63 Hz octave band for some of the pieces of equipment, and that the Companies' assumption of zero noise in the 63 Hz octave band is conservative with respect to evaluation of pure tones (Tr. 2, at 263; Exh. CW/NSTAR-1, Att. D at 5-2).[16] Therefore, the Companies asserted when the new equipment is operational there may, in fact, not be any pure tone (Tr. 1, at 44, 45). As modeled, the installation of sound barriers at various locations would eliminate any pure tone condition at any of the ten receptors (RR-EFSB-2).

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[15] As noted above, Dakota subsequently withdrew as a party to the proceeding, and has stated that it supports the relief requested by the Companies in this proceeding (Notice of Withdrawal by Dakota Partners, Inc. at 1 (October 29, 2014)).

[16] The Companies explained that when there is no data available on sound produced by a piece of equipment for a particular octave band, the model uses zero as the value, thereby increasing the likelihood of an assumed pure tone in the adjacent octave band (Tr. 2, at 401).

The Siting Board notes there are significant modeling uncertainties relating to potential pure tone conditions that might result from the Project Change and that attempting to mitigate these impacts now would be premature. The pure tone conditions, as modeled, are based on a one to three dBA increase over the MassDEP limit. The likelihood of such exceedances actually occurring is unclear, given the lack of detailed information about sound generation profiles for certain pieces of equipment involved in the Project Change from their manufacturers. In addition, the pure tone impacts are predominantly associated with the shunt reactors, which have been modeled based on the use of all four reactors being in operation, which is expected to be a very infrequent operating condition. Therefore, the Siting Board finds in this case that noise mitigation based on actual operational measurements, rather than on modeling, is both reasonable and necessary.

The Siting Board will determine the need for the installation of a sound barrier(s), as well as their location and dimension, based on the results of operational noise analyses to be performed by the Companies. Specifically, the Board directs the Companies to conduct operational noise measurements that evaluate potential pure tones under reasonable worst case conditions as soon as practicable after connection of the cables to the Barnstable Switching Station and commencement of operation of the Wind Farm. The Board requires that the following parameters be included in the measurements: (1) noise analysis based on the ambient measurements provided in Exh. CW/NSTAR-1, Attachment D, for all receptors; and, in addition, updated ambients should be measured to reflect the operational noise measurements for receptors R3, R4, R7, R8, R9A, and R10; (2) the noise analysis should include updates to Tables 1-6 of RR-EFSB-2, including nighttime measurements for all receptors; (3) the noise analysis should include an analysis of the mitigation provided by sound barriers or any other proposed mitigation, including a description of the proposed mitigation, locations and dimensions; and (4) the results of the updated noise analysis should be submitted to the Siting Board within 60 days after connection of the cables to the Barnstable Switching Station and commencement of operation of the Wind Farm or, with approval of the Board, such other time as may be necessary to conduct the assessment under reasonable worst case conditions.

d. A-Weighted Sound Levels

With regard to A-weighted sound levels at residential receptors, as shown in Table 1 below, the level at the nearest residence to the north would increase by six dBA; at the Village Green development, the increase at the residential building closest to the new equipment would be twelve dBA (RR-EFSB-2, Table 3).[17] The Companies indicated that the dominant source of noise at the Village Green development (Building A) would be the SVC expansion (RR-EFSB-2, at 2).[18] In order to reduce the noise impacts at Village Green associated with the SVC expansion, the Companies presented possible mitigation that includes several 20-foot high walls; each located approximately seven feet from each of the three SVC expansion sources (id.). This sound wall configuration was modeled to decrease the A-weighted noise impacts from twelve dBA to three dBA at the Village Green building closest to the new equipment (Building A) (id. at Table 5).

[17] In conducting the noise analysis for the Village Green development after the evidentiary hearings, the Companies created Figure 1 of RR-EFSB-2, which laid out the locations of the four residential buildings and the associated receptor designations. The Companies labeled Buildings C and D as Phase I (on the east side of the development), and Buildings A and B as Phase II (on the west side of the development) (RR-EFSB-2). However, in reviewing the transcript and the site plan for Village Green provided by the Town of Barnstable, dated June 2008, the phasing (not placement) of the four buildings is not conclusive (Exh. TOB-4; Tr. 1, at 110-113).

[18] The Village Green development consists of four 30-unit residential buildings. The southwest building (designated Building A in RR-EFSB-2) is 115 feet from the NSTAR property line and is the closest building to the new SVC equipment; the northwest building (designated Building B in RR-EFSB-2) is 75 feet from the NSTAR property line (see RR-EFSB-2).

Table 1: Predicted Noise Levels

Receptor[19]	Measured Ambient (dBA)	Project Only (dBA)	Project and Ambient (dBA)	Increase (dBA)	Increase with Mitigation (dBA)
Children's Cove Advocacy Center (R1)	41 day/29 night	36	42 day/37 night	1 day/8 night	1 day
Cape Cod Times (R2)	51 day/50 night	44	52 day/51 night	1 day/1 night	1 day
Trinity Christian Academy School (R3)	46 day/39 night	34	46 day/44 night	2 day/5 night	0 day
Brazilian Assembly of God Church (R4)	46 day/39 night	41	47 day/43 night	1 day/4 night	1 day
Northeast Residence (R5)	29 night	27	31 night	2 night	2 night
Northwest Residence (R6)	29 night	33	35 night	6 night	5 night
Village Green – Building A (R10)	39 night	51	51 night	12 night	3 night

Sources: RR-EFSB-2, Table 1, Table 3, and Table 5; Exh. EFSB-11

With regard to the A-weighted noise impacts at the existing receptors (not Village Green), the increase at residential receptors range from two to six dBA, and at the other receptors ranges from one to eight dBA (all measurements at night). At Village Green, the increase at the building closest to the new equipment is twelve dBA, which both exceeds the MassDEP policy and the levels accepted by the Siting Board in past cases. This location is east of the Barnstable Switching Station and is closest to the SVC expansion. Further, the dominant sounds at this location are not associated with the shunt reactors, which have been modeled with all four operating, but from the SVC expansion, which has been modeled under proposed operating conditions. Therefore, prior to commencement of operation of the Wind Farm, the Siting Board directs the Companies to install sound walls, as described above, around each of the SVC expansion sources.

[19] Given that the updated noise analysis conducted by the Companies incorporated the potential shielding of some of the Village Green buildings, as well the possible differing identification of the buildings for Phase I and II, the Siting Board focuses only on Receptor 10 (Building A), the closest residence to the new equipment, as representative of the Village Green development.

e. Conclusion

The Siting Board finds that with the implementation of the condition pertaining to pure tone impacts and the condition pertaining to A-weighted impacts, the noise impacts of the Project along the primary route, with the Project Change, would be minimized.

3. Oil-Filled Equipment

The four shunt reactors would be air-cooled with no oil stored or used as an insulating medium (Exh. EFSB-21; Tr. 1, at 23). The harmonic filter capacitors would require non-PCB dielectric fluid and the SVC would require non-PCB synthetic fluid as an insulating medium (Exh. EFSB-21).[20, 21] For both the harmonic filter capacitors and the SVC, the fluid would be filled and sealed in individual canisters by the manufacturer (id.). The two harmonic filters are each made up of three free-standing capacitor banks; the harmonic filter capacitors consist of 216 individually sealed canisters (108 for each of the harmonic filters), each containing 4.5 gallons of dielectric fluid (id.). The SVC is arranged in two capacitor banks; the capacitors consist of 72 individually sealed canisters, each containing 7.8 gallons of fluid (id.). The Companies stated that the harmonic filters and the SVC would be equipped with alarm systems, and that if any one of the 288 canisters experienced a failure and a release of dielectric fluid, the alarm system would be activated and the appropriate Company's operations center would be automatically notified (Tr. 1, at 33-34).[22, 23]

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20 The Companies explained that under the Massachusetts Contingency Plan ("MCP"), the fluids are rated or categorized as non-hazardous, non-PCB fluids (Tr. 1, at 28). Under the MCP plan, the reportable quantities for these fluids are 25 gallons or more (id. at 55).

21 The Companies stated that aside from the dielectric fluid amounts described above, there would be no additional hazardous material or hazardous waste generated, used or stored on site when the Project is in operation (Exh. EFSB-21).

22 The installation of the proposed new equipment would increase the amount of insulating oil in use at the Switching Station site by approximately 1,534 gallons (Exh. EFSB-21).

23 The Companies stated that the alarms detect imbalance within the capacitor bank (Tr. 1, at 33). If one canister were to fail, it would trigger an alarm (id.). If a second canister were to fail, it typically would trip the capacitor bank, de-energizing the capacitor bank (id.). The

The Companies assert that the physical failure of any individual canister is a very infrequent event and given the design of the system the simultaneous failure of more than one canister is rarer still (RR-EFSB-1; Companies Brief at 13). The Companies stated that the canisters are highly reliable from a physical integrity standpoint and have very low leakage rates (Tr. 1, at 28). Further, the probability of a single event causing the failure of multiple canisters is even more remote; thus, the probability of a release of a significant quantity of dielectric fluid involving multiple canisters is also extremely small (RR-EFSB-1; RR-BFD-1).[24]

The Switching Station is located in a groundwater protection overlay district and a well protection overlay district, approximately 2,500 feet north of two municipal water supply wells, one owned by the Barnstable Fire District and one by the Hyannis Water Department (Exh. TOB-1, at 1).[25] The groundwater level is 50 to 75 feet below the surface (id.; Tr. 1, at 72). The Companies explained, that in their opinion, a release of five to eight gallons of insulating fluid (one canister) would reach a depth of only four feet (significantly less than the 50-70 foot depth of the groundwater) before it would be cleaned up by their hazardous material contractor (RR-BFD-1; Tr. 2, at 241). Specifically, the Companies indicated that, in general, the amount of time between the receipt of a call precipitated by the alarm and an on-site response would be four hours, and the restoration of the site to its preexisting condition would be completed within 24 hours (RR-BFD-1; Tr. 1, at 69, 74). Therefore, the Companies asserted that the spill would not reach or even approach the groundwater; there would be no impact on the groundwater table, and no impact to the water supply wells (Tr. 1, at 74; Companies Brief at 17).

Companies noted that not every electrical failure in a capacitor bank results in a release of dielectric fluid (id.).

[24] On October 16, 2014 the USEPA issued a letter to the U.S. Department of Energy, Loan Programs Office, stating that "Provided that the Barnstable switching station meets all applicable federal, state, and local environmental protection standards (including, but not limited to the SPCC rule, 40 CFR 112), EPA does not believe that the proposed additions will pose a significant threat of ground water contamination which could pose a health hazard" (Exh. EFSB-21 (Supp)).

[25] The Barnstable Switching Station, including the expansion area, is located in the Town of Barnstable wellhead protection overlay district (Exh. EFSB-4; Tr. 1, at 20). However, the new equipment is not located in the groundwater protection overlay district (Tr. 1, at 20).

The Barnstable Switching Station currently has a Spill Prevention, Control and Countermeasure plan ("SPCC") in place, and NSTAR would be updating that plan; Cape Wind, in consultation with NSTAR, would also develop its own SPCC (Tr. 1, at 32, 35). The Companies indicated that, as required under the Massachusetts Contingency Plan, they would notify the Chief Municipal Officer and the Board of Health in the Town of Barnstable in the event of a reportable release of oil and/or hazardous materials (RR-TOB-5).

Based on the determination by the Companies, as discussed above, that the installation of the new equipment would not have a negative impact on the Town of Barnstable groundwater or wells, the Companies stated that a concrete contamination system beneath each capacitor was not warranted (RR-BFD-1; Companies Brief at 16-17). The Companies indicated that the placement of a concrete apron or moat under the capacitor racks would hinder the ability to clean up any spill due to the tight configuration of the capacitor racks (Tr. 1, at 31, 180-182). The Companies originally proposed to use crushed rock, also known as trap rock, as containment around the new equipment (id. at 29).[26] The Companies testified that use of trap rock is the industry standard (id. at 188-190). During the course of the proceeding the Companies proposed a revised containment method consisting of a semi-permeable geo-textile membrane placed above a layer of fine grain compacted material and shaped to form a bowl beneath each capacitor bank (RR-EFSB-1). The bowl area would be filled with a thick layer of well compacted processed gravel topped with a layer of trap rock (id.). The cost of the geo-textile liner system is estimated at $30,000 per capacitor rack for a total of $240,000; the cost of a concrete apron is estimated to be $75,000 per capacitor rack for a total of $600,000 (RR-BFD-1).

The Town and Barnstable Fire District assert that the oil contained in the new equipment to be installed at the Switching Station site would pose a threat to groundwater and, therefore, that the equipment should not be located on the site (TOB/BFD Brief at 1). The Town and Fire District assert in the alternative that, if the new equipment is to be located on the Switching Station site, the Siting Board should require the Companies to provide impervious, concrete containment for the

[26] NSTAR testified that it, as well as its affiliated companies, does not provide containment other than trap rock under capacitors (Tr. 1, at 30).

equipment, rather than the trap-rock and geo-textile membrane containment system that the Companies have proposed (id.).

The Town and Barnstable Fire District assert that, in contrast to the Town's witness, the Companies' witnesses lack the training and experience in geology, hydrology and soil testing to conclude that the new equipment on the site would not pose a significant threat to groundwater (TOB/BFD Brief at 3, 12). The Town and Fire District assert that the Companies' conclusion is not based on groundwater testing or modeling, and was reached without necessary underlying data regarding the properties of the oil contained in the equipment, such as viscosity and solubility, or necessary data regarding the site, such as soil types and the depth to groundwater (id. at 6). For the same reasons, the Town and Fire District take issue with the Companies' position that the enhanced containment system would adequately protect groundwater (id. at 13). The Town and Fire District assert that the Companies should install the same type of concrete containment system that NSTAR installed at its Hyannis Junction Substation in D.P.U. 13-64 (Exh. TOB-1; Tr. 1, at 133; TOB/BFD Brief at 1).[27]

The Siting Board notes that, while the total quantity of non-PCB dielectric oils stored in the proposed new equipment is 1,534 gallons, the oil would be stored in factory-sealed individual containers, ranging between 4.5 and 7.8 gallons each. The record indicates that the probability of leakage of even a single canister is quite low; therefore the simultaneous leakage of multiple canisters is remote. Moreover, the Project Change includes design features intended to mitigate the extent of any environmental impacts should a leak occur. First, the oil-filled equipment is monitored continuously and has alarms that activate in the event of a spill, triggering an immediate response. Second, the Companies initially proposed the use of trap rock, the industry standard. In response to concerns of the Town and the Fire District, the Companies now propose to install a semi-permeable geo-textile membrane beneath each capacitor bank, with fine grain compacted material below and well compacted processed gravel above, which in combination would slow migration of any spilled oil through the soil. Third, the record also demonstrates that, with the

[27] The Hyannis Junction Substation includes three transformers with 10,000 gallons each of dielectric fluid (30,000 gallons total); and the Substation is located 450 feet from a public well (Companies Brief at 15).

assistance of its remediation and spill response contractors, any potential leak that could occur would be cleaned up within 24 hours. In view of the above factors, the presence of insulating oil in the new equipment is not anticipated to have any significant adverse impacts on the groundwater or wells.[28] The Siting Board therefore directs the Companies to install a geo-textile liner system, as described above, under the six harmonic filter capacitor banks and the two SVC capacitor banks. The Siting Board also directs the Companies to notify the Town of Barnstable and the Barnstable Fire District immediately in the event of a release of fluid with respect to any of the equipment that is the subject of the Project Change.

The Siting Board finds that with the implementation of this condition, the potential water resource impacts of the Project along the primary route, with the Project Change, would be minimized.

4. Air

The Companies explained that upgrades performed as part of the Project would result in ten new circuit breakers with a total sulfur hexafluoride ("SF_6") quantity of 1,138 pounds (Exh. EFSB-20).[29] The equipment would have a guaranteed SF_6 emissions leakage rate of no more than 0.1 percent per year (Exh. EFSB-20; Tr. 1, at 172). The SF_6 equipment would have alarms that would be activated in the event of a leak (Exh. EFSB-20; Tr. 1, at 168). The Companies indicated it would not store any SF_6 on site in conjunction with the Project (Exh. EFSB-20).

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28 The Companies' witnesses were more credible than the Town's witness regarding whether the new Switching Station equipment would have adverse impacts on groundwater. Specifically, the testimony of the Companies' witnesses reflected significant experience with oil-filled electrical equipment, substation design, oil containment systems and spill response.

29 The Massachusetts Clean Energy and Climate Plan for 2020 identifies SF_6 as a non-toxic but highly potent greenhouse gas ("GHG") and estimates one pound to have the same global warming impact as eleven tons of CO_2. See G.L. c. 21N and Massachusetts Clean Energy and Climate Plan for 2020, at 77-78. Reducing SF_6 emissions is an important policy goal of the Clean Energy and Climate Plan. Id. The Siting Board's mandate requires it to ensure the consistency of new energy facilities with the Commonwealth's current health, environmental protection, and resource and development policies. In accordance with this mandate, the Siting Board reviews the Companies' proposed use of SF_6 to ensure reduction of SF_6 emissions to the maximum extent possible.

In terms of SF_6 air impacts, the Companies have proposed installing circuit breakers at the Barnstable Switching Station with a guaranteed SF_6 emissions rate of no more than 0.1 percent per year, along with alarms.[30] The Companies would also comply with USEPA SF_6 reporting requirements (Exh. EFSB-20). In addition, the Siting Board directs the Companies to inform the Board if it adds SF_6 to any of the ten new circuit breakers at the Barnstable Switching Station or replaces any of the ten new circuit breakers at the Switching Station due to SF_6 loss within five years of the completion and initial operation of the Project, after which time the Companies will consult with the Siting Board to determine whether the Siting Board will require continuing reporting. The Siting Board also directs the Companies to submit a copy to the Board of their annual SF_6 report(s) to MassDEP.

With or without the Project Change, diesel construction equipment emits particulate pollution. In cases filed since the Original Proceeding, the Siting Board has typically required retrofitting certain older diesel equipment to reduce particulate emissions. The Siting Board directs the Companies to ensure 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 the Project Change construction has U.S. Environmental Protection Agency-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 engines. Prior to the commencement of construction at the Barnstable Switching Station, the Companies shall submit to the Siting Board certification of compliance with this condition.

The Siting Board finds that with the implementation of these conditions, the air impacts of the Project along the primary route, with the Project Change, would be minimized.

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30 In April 2014, MassDEP promulgated final regulations that require companies to purchase new gas-insulated switchgear with a manufacturer's guaranteed SF_6 emission rate of one percent or less. The new regulations also include requirements for maintenance and handling of SF_6, and require NSTAR to comply with a declining SF_6 emission rate standard by 2020 (see 310 CMR 7.72).

5. Conclusions

a. EFSB 02-2B

Consistent with the Siting Board's directive to the Companies in the Final Decision to inform the Siting Board of any changes to the Project, other than minor variations, the Companies have informed the Siting Board of proposed changes to the Barnstable Switching Station, reflecting interconnection specifications contained in the recently-issued ISO-NE System Impact Study for the Project.

Based on the Companies' initial Project Change Filing, the Siting Board determined that further inquiry regarding the Project Change was warranted, to evaluate the potential land use, visual, noise, water resource, and air impacts that might result from these changes. In Sections 1 through 4 above, the Siting Board has evaluated the proposed changes, and has found that, with implementation of the conditions set forth in these sections, the land use, visual, noise, water resource, and air impacts of the Project along the primary route, with the Project Change, would be minimized.

Accordingly, the Siting Board finds that the Project Change, with implementation of the conditions set forth above, would not alter in any substantive way either the assumptions or conclusions reached in the Siting Board's analysis of the Project's environmental impacts in the Original Proceeding. The Siting Board also finds that the proposed changes would not alter in any substantive way the Board's finding in the Original Proceeding that interconnection of the Project at the Barnstable Switching Station using the primary route is preferable to other interconnection approaches with respect to providing a reliable energy supply for the Commonwealth, with a minimum impact on the environment at the lowest possible cost.

b. EFSB 07-8A

In addition to seeking approval of the proposed changes to the Barnstable Switching Station, the Companies in their Project Change Filing seek "confirmation" from the Siting Board that the changes "fall squarely within" the Certificate for the Project that was issued by the Siting Board in the Certificate Decision.

The Project Change was not part of the Project when the Certificate for the Project was issued; as a result of this Decision, however, the changes are now part of the Project. Based on our

examination of the Project Change and its potential impacts, above, the Siting Board finds that the Project Change would not alter in any substantive way the Board's findings or conclusions in the Certificate Decision. The existing Certificate, and the nine state and local permits granted by the Certificate, therefore apply to the Project as modified in this proceeding.

III. DECISION

The Energy Facilities Siting Board approves the Companies' proposed changes to the Project, consisting of the proposed modifications to the Barnstable Switching Station as presented in the Companies' August 8, 2014 Project Change Filing and in the record of this proceeding. The approval is conditioned on the Companies' compliance, as applicable, with Conditions A through J in the Final Decision; Condition K in the 2008 Project Change Decision; Conditions C.1 through C.7 in the Certificate Decision; and Conditions L through Q, below:

L. The Board directs the Companies to conduct operational noise measurements that evaluate potential pure tones under reasonable worst case conditions as soon as practicable after connection of the cables to the Barnstable Switching Station and commencement of operation of the Wind Farm. The Board requires that the following parameters be included in the measurements: (1) noise analysis based on the ambient measurements provided in Exh. CW/NSTAR-1, Attachment D, for all receptors; and, in addition, updated ambients should be measured to reflect the operational noise measurements for receptors R3, R4, R7, R8, R9A, and R10; (2) the noise analysis should include updates to Tables 1-6 of RR-EFSB-2, including nighttime measurements for all receptors; (3) the noise analysis should include an analysis of the mitigation provided by sound barriers or any other proposed mitigation, including a description of the proposed mitigation, locations and dimensions; and (4) the results of the updated noise analysis should be submitted to the Siting Board within 60 days after connection of the cables to the Barnstable Switching Station and commencement of operation of the Wind Farm or, with approval of the Board, such other time as may be necessary to conduct the assessment under reasonable worst case conditions. The Siting Board will determine the need for installation of a sound barrier(s), as well as their location and dimensions, based on the results of the Companies' noise analysis.

M. The Siting Board directs the Companies prior to commencement of operation of the Wind Farm, to install sound walls, as described above, around each of the SVC expansion sources.

N. The Siting Board directs the Companies to install a geo-textile liner system, as described above, under the six harmonic filter capacitor banks and the two SVC capacitor banks.

O. The Siting Board directs the Companies to notify the Town of Barnstable and the Barnstable Fire District immediately in the event of a release of fluid with respect to any of the equipment that is the subject of the Project Change.

P. The Siting Board directs the Companies to inform the Board if it adds SF_6 to the ten new circuit breakers at its Barnstable Switching Station or replaces any of the ten new circuit breakers at the Switching Station due to SF_6 loss within five years of the completion and initial operation of the Project, after which time the Companies will consult with the Siting Board to determine whether the Siting Board will require continuing reporting. The Siting Board also directs the Companies to submit to the Board a copy of their annual SF_6 report(s) to MassDEP.

Q. The Siting Board directs the Companies to ensure 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 the Project Change construction has U.S. Environmental Protection Agency-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 engines. Prior to the commencement of construction at the Barnstable Switching Station, the Companies shall submit to the Siting Board certification of compliance with this condition.

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

M. Kathryn Sedor

M. Kathryn Sedor
Presiding Officer

Dated this November 17, 2014

M. Kathryn Sedor

APPROVED by the Energy Facilities Siting Board at its meeting of November 13, 2014, by the members and designees present and voting. Voting for approval of the Tentative Decision (as amended): Mark Sylvia, Acting Chair, Designee of the Secretary of the Executive Office of Energy and Environmental Affairs; Meg Lusardi, Acting Commissioner, Department of Energy Resources; Ann. G. Berwick, Chair, Department of Public Utilities; Jolette A. Westbrook, Commissioner, Department of Public Utilities; Laurel MacKay, Designee for Commissioner, Department of Environmental Protection; George Durante, Designee for Secretary, Housing and Economic Development; Kevin Galligan, Public Member; Penn Loh, Public Member.

Mark Sylvia, Acting Chair
Energy Facilities Siting Board

Dated this November 17, 2014

Appeal as to matters of law from any final decision, order or ruling of the Siting Board may be taken to the Supreme Judicial Court by an aggrieved party in interest by the filing of a written petition praying that the order of the Siting Board be modified or set aside in whole or in part. Such petition for appeal shall be filed with the Siting Board within twenty days after the date of service of the decision, order or ruling of the Siting Board, or within such further time as the Siting Board may allow upon request filed prior to the expiration of the twenty days after the date of service of said decision, order or ruling. Within ten days after such petition has been filed, the appealing party shall enter the appeal in the Supreme Judicial Court sitting in Suffolk County by filing a copy thereof with the clerk of said court. (Massachusetts General Laws, Chapter 25, Sec. 5; Chapter 164, Sec. 69P).

COMMONWEALTH OF MASSACHUSETTS
Energy Facilities Siting Board

Petition of the University of Massachusetts for Jurisdictional Determination Pursuant to 980 C.M.R. § 2.09	)	EFSB 15-2

FINAL DECISION

James A. Buckley
Presiding Officer
September 21, 2015

On the Decision:

John Young

APPEARANCES: Kevin M. Lang, Esq.
Couch White, LLP
P.O. Box 22222
540 Broadway
Albany, New York 12201-2222
FOR: The University of Massachusetts
Petitioner

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Pursuant to 980 C.M.R. §2.09, the Energy Facilities Siting Board ("EFSB," "Board," or "Siting Board") determines that it does not have jurisdiction to approve or deny the construction of a liquefied natural gas ("LNG") storage facility in Hadley, Massachusetts, by the Petitioner, the University of Massachusetts Amherst ("UMASS" or "University").

I. INTRODUCTION

A. Petition for Jurisdictional Determination

On April 21, 2015, UMASS filed a petition pursuant to 980 C.M.R § 2.09 ("Petition") seeking a determination as to whether the University's proposed construction of a new LNG storage facility ("Project"), adjacent to its Central Heat and Power ("CHP") generation facility at 200 Mullins Way in Hadley, Massachusetts, is subject to Siting Board jurisdiction and would therefore require Siting Board approval. UMASS asserts that the University is not subject to the provisions of G.L. c. 164, §§ 69G – 69S (the "EFSB statute") and, therefore, that the Project would not require Siting Board approval under G.L. c. 164, § 69J.

If the Board were to determine that the University is subject to the EFSB statute, then, alternatively, UMASS asks that the Siting Board waive its jurisdiction pursuant to the waiver provision in 980 C.M.R. § 1.02(1). The University's rationale for a waiver is that the new LNG storage facility would only serve the University community and would not be part of the network of energy infrastructure designed to serve the public with a reliable energy supply. (Petition at 11-13).

B. Procedural History

The Presiding Officer directed UMASS to publish a Notice of Petition for Determination of Board Jurisdiction ("Notice") in the Boston Globe and the Daily Hampshire Gazette, and to send the Notice by electronic mail to all gas companies in Massachusetts, the Attorney General and the Department of Public Utilities' ("DPU" or "Department") generic service list for the gas industry, which includes, among others, representatives of environmental organizations. The Notice invited interested parties to submit comments on the Petition. The Berkshire Gas Company ("Berkshire") filed two comment letters ("Berkshire June 10 Comment" and

"Berkshire June 30 Comment") and the Northeast Gas Association ("NGA")[1] submitted a letter ("NGA Comment"). On July 6, 2015, UMASS submitted reply comments in response to Berkshire's letters ("UMASS Responses to Berkshire"). On July 15, 2015, the Siting Board staff submitted a set of Information Requests to UMASS. On August 7, 2015, UMASS filed its Responses to those Information Requests.

II. BACKGROUND

A. UMASS

The University of Massachusetts was founded under the Morrill Land-Grant Colleges Act in 1862. In 1962, the General Court enacted G.L. c. 75, § 1 et seq. creating the current University of Massachusetts System consisting of five campuses. The original campus in Amherst became the flagship campus and is now known as the University of Massachusetts Amherst. Situated on 1,450 acres, the Amherst campus is the largest public university in New England.

B. The Need for LNG and the Temporary Storage Facility

The CHP facility is a cogeneration system designed to produce steam for central heating and up to 16 megawatts of electricity for campus use (Petition at 2). The CHP facility is a flexible, dual-fuel unit that can burn either natural gas, ultra-low-sulfur distillate ("ULSD"), or combinations of both at the same time (id.). The plant receives interruptible natural gas transportation service from Berkshire via its distribution system, pursuant to a contract approved by the Department. See Berkshire Gas Company, D.T.E 04-GC-31 (2005).[2] UMASS stated

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[1] The NGA is a regional trade association that represents natural gas distribution companies, transmission companies, liquefied natural gas importers and associate member companies. Its member companies provide natural gas service to 10 million customers in eight northeastern states (all of New England, New York and New Jersey).

[2] On August 21, 2015, Berkshire filed its Petition for Approval of the First Amendment to the Transportation Agreement between Berkshire and UMASS, seeking Department approval. The Berkshire Gas Company, D.P.U. 15-GC-21. In the cover letter to that filing, Berkshire stated that the First Amendment contemplates a second amendment to the Transportation Agreement and that Berkshire and UMASS expect to execute the second amendment in the future (Cover letter to Petition for Approval of First Amendment, D.P.U. 15-GC-21). The review and approval, if appropriate, for that filing

that, given the limited capacity of the Berkshire Gas system, gas deliveries to the CHP unit are frequently curtailed during cold weather (up to 360 hours per heating season), when ambient temperatures are below 51 Heating Degree Days (i.e., below 14ºF) (Petition at 2). During such gas curtailments, UMASS must switch to ULSD, which is more costly and requires operators to shut off the exclusively gas-fueled duct-firing unit attached to the main turbine, thereby reducing the CHP unit's electrical output and supply of steam for campus heating. Further, the frequent winter gas supply interruptions reduce the efficiency of the CHP facility and increase its emissions and operating costs (id.).

Given the negative consequences of gas supply interruptions, UMASS decided to test the viability and economics of using LNG as a backup fuel for its CHP unit over the last three winters by installing temporary LNG storage and vaporization facilities. During this period, LNG suppliers provided supplemental natural gas to the CHP plant by connecting a skid-mounted vaporization unit and storing LNG in two tanker trailers, of up to 15,000 gallons capacity each, parked beside the vaporization unit. LNG was delivered as needed by tanker trailers from two LNG suppliers. The LNG equipment was dismantled and removed during the non-winter months.

Prior to constructing the temporary LNG facility, UMASS sought an Advisory Ruling from the Siting Board as to whether the facility required EFSB approval. In an Advisory Ruling issued on August 20, 2012, The University of Massachusetts at Amherst, Advisory Ruling (August 20, 2012) ("Advisory Ruling"), the Board advised UMASS that it could construct and operate the temporary LNG storage facility to fuel the CHP Plant without obtaining approval from the Siting Board under G.L. c. 164, §69J. Advisory Ruling at 6-7. The Board reasoned that: (1) the temporary facility's capacity would be only slightly greater than the minimum size threshold of 25,000 gallons for jurisdictional gas storage facilities specified in the Siting Board's regulation 980 CMR 1.01(4)(e); (2) the storage facility would be temporary; (3) the facility would serve a non-utility purpose[3] ; and (4) the overall benefits to UMASS, its faculty and

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will be determined by the Department in that separately docketed proceeding, and is beyond the scope of this Order.

[3] The Board noted that the minimum size threshold of 25,000 gallons for jurisdictional natural gas storage facilities was intended to retain jurisdiction over utility-scale natural gas facilities but to exempt non-utility facilities. Rulemaking to Amend 980 CMR 1.01(4)(e), 18 DOMSB 269, 272 (2012).

students, and taxpayers of the Commonwealth constituted good cause for granting a waiver from the regulation. Id. at 6. Accordingly, the Board advised UMASS that it would waive its jurisdictional minimum size threshold of 25,000 gallons pursuant to 980 CMR 1.02(1) and that UMASS did not require Section 69J approval.[4] Id. at 6-7.

C. The Project

Because the temporary storage facility demonstrated that LNG is a viable and economical backup fuel for its CHP facility, UMASS now proposes to construct and operate the Project, which would be a permanent LNG storage facility (Petition at 2). The Project would replace the temporary facility after the 2015/2016 winter, and become operational by the 2016/2017 winter (Exh. EFSB-2). The Project site is approximately 2.2 acres, located adjacent to the CHP facility in Hadley (Petition at 2). UMASS proposes to build the Project in two phases, the first creating 54,000 gallons of storage capacity, and the second phase increasing the total storage capacity up to 108,000 gallons (id.). With the CHP unit running at maximum capacity solely on vaporized LNG, the first phase of the Project would be capable of providing the CHP unit with a maximum of two days of fuel supply (Exh. EFSB-1).

The first phase would consist of: (1) three 18,000-gallon storage tanks with ancillary equipment necessary to control pressure and temperature; (2) an LNG vaporizer unit and piping connections; and (3) an access driveway and trucking station so that LNG can be off loaded from tanker trailers to the storage tanks (Petition at 2; Exh. EFSB-27(1)). The second phase would consist of up to three additional 18,000-gallon tanks and a second vaporization unit (Petition at 2). Each storage tank would be circular, and about 39 feet high and eleven feet in diameter (Exh. EFSB-27(1)). UMASS proposes to begin construction of phase one after the 2015/2016 heating season and to complete construction by the beginning of the 2016/2017 heating season. UMASS has not set a timetable for the second phase. However, during phase one, the containment system would be designed and constructed to accommodate all six tanks. The containment area would be about 55 feet by 120 feet, and would consist of a thick concrete liner designed to hold

[4] In the Advisory Ruling, the Board waived the minimum size jurisdictional threshold for the winters of 2012/2013 and 2013/2014. In a Supplemental Advisory Ruling issued on August 14, 2014, the Board waived the regulation through the winter of 2015/2016. The University of Massachusetts at Amherst, EFSB 14-3 (2014).

200 percent of the total storage volume of the first phase and 140 percent of the total storage volume of both phases of the Project[5] (Exhs. EFSB-4; EFSB-27(1)).

UMASS indicated that it has instructed its project team to design the facility to meet or exceed the applicable design guidelines, standards and codes, and to review the jurisdictional provisions of the environmental, building, mechanical, electrical, fire, safety, fuel gas and energy codes (UMASS Response at 3). Even though it contends that it is exempt from the administrative procedures of several of the codes, UMASS stated that the Project's design is based upon applicable sections of NFPA 59A and meets or exceeds the provisions set forth in the EFSB regulations (980 CMR §10.00), the Department's regulations (220 CMR § 101.00 & 112.00),[6] the Board of Fire Prevention regulations (529 CMR/NFPA 1), and the State Building Code regulations (780 CMR) (Response at 3). UMASS noted that the DPU Pipeline Engineering and Safety Division has inspected the temporary LNG facility before each of the past heating seasons, and UMASS will continue to provide access to the DPU staff to perform inspections (Exh. EFSB-16).

UMASS anticipates that it will apply for: (1) an Application for Construction and Installation under the Office of the State Fire Marshal, which applies to the installation of above-ground storage tanks of 10,000 gallons or more, for storage of fluids other than water; (2) a Building Inspector Approval under the State Building Inspector;[7] (3) a Multi-Sector General Permit for Stormwater Discharges Associated with Industrial Activity under the U.S. Environmental Protection Agency ("USEPA"); and (4) a Construction General Permit under the USEPA (Exh. EFSB-6).

With regard to local permitting, UMASS noted that the Project site is located on state-owned land and is being financed through state funding. Therefore, UMASS contends that the

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5 UMASS indicated that the concrete containment area would exceed the regulatory requirements of National Fire Protection Association ("NFPA") Standard 59A (Exh. EFSB-4)

6 220 CMR 101.00 is the Department's regulation of General Requirements for Gas Distribution Companies; 220 CMR § 112.00 is the Department's regulation: Design, Operation, Maintenance and Safety of Liquefied Natural Gas Plants and Facilities.

7 UMASS met with the State Building Inspector to discuss the Project on July 16, 2015 (Exh. EFSB-17).

Project does not need to comply with local laws or regulations or obtain local permits or approvals. However, UMASS stated that it cooperates with local governments to ensure that its projects comply with applicable safety codes (id.).

The closest adjacent property line to the 2.2-acre site is a sewage treatment plant owned and operated by the Town of Amherst ("Amherst"), located approximately 254 feet from the center of the LNG containment area (Exh. EFSB-13). The closest residences to the Project, which are private, are approximately 1,640 feet from the edge of the LNG containment area; the closest campus residence hall is approximately 1,975 feet from the edge of the LNG containment area (Exh. EFSB-20). Across Mullins Way, there are or have recently been tennis courts approximately 200 feet from the Project site (google.com/maps). UMASS has stated that it performed vapor dispersion modeling, thermal radiation modeling, and noise impact modeling for the Project (Exhs. EFSB-12; EFSB-13; EFSB-14; EFSB-21; EFSB-25).

The construction contract will include one year of oversight and maintenance (UMASS Response to Berkshire at 4). A commission agent is to be hired by UMASS to develop the operations and maintenance program as well as arrange for four training sessions to encompass all shift employees of the Amherst and Hadley fire departments (Exh. EFSB-17).[8] UMASS stated that it has developed a preliminary safety plan and has solicited input directly from the Amherst and Hadley fire departments; the plan will be updated after the final equipment selection (UMASS Response at 4).[9] With regard to emergency planning procedures and training, UMASS will continue the process that has been undertaken for the temporary LNG facility which consists of an annual table top exercise with the Amherst Fire Department (Exh. EFSB-28).

UMASS estimated that each phase of operation would require approximately 310 truckloads of LNG delivered annually, with no daily or hourly restrictions on deliveries (Exh. EFSB-9). UMASS stated that the U.S. Department of Transportation, the Federal Motor Carrier Safety Administration, the Pipeline and Hazardous Materials Safety Administration and the National Fire Protection Association Standard 59A specify and govern the safety procedures

[8] The Amherst Fire Department provides fire protection service to the CHP and temporary LNG facility, and will continue to provide such services to the Project (Exh. EFSB-18).

[9] UMASS met jointly with the Amherst and Hadley fire departments to discuss the Project on September 15, 2014 (Exh. EFSB-17).

and transportation of LNG (Exh. EFSB-10). Off-loading procedures would be developed in accordance with the requirements of Chapter 14 of NFPA Standard 59A (Exh. EFSB-11).

III. JURISDICTIONAL DETERMINATION

A. Position of UMASS

UMASS asserts that it is not subject to the EFSB statute because the University of Massachusetts system is exempt from regulation and control of any other state agency by the express terms of the University of Massachusetts enabling statute, G.L. c. 75, § 1 (Petition at 3). G.L. c. 75, § 1 provides that the University is governed by a Board of Trustees, which "shall have all authority, responsibility, powers and duties customarily and traditionally exercised by governing boards of institutions of higher learning." Furthermore, the Board of Trustees "shall not in the management of the university be subject to, or superseded by, any other state agency, board, bureau, commission, department or officer…." (G.L. c. 75, § 1). UMASS asserts that universities throughout the country invest considerable time and resources in planning and meeting the energy needs of their campuses (Petition at 3). Indeed, UMASS states that 153 universities operate CHP facilities (id.). UMASS therefore concludes that managing the fuel need of the CHP facility is one of duties customarily and traditionally exercised by governing boards of institutions of higher learning, and as such, the University is not subject to the EFSB statute.

UMASS cites a number of Opinions of the Attorney General of the Commonwealth of Massachusetts ("Attorney General") finding that the University is not subject to the regulatory authority of various state agencies (Petition at 4-8). UMASS asserts that in these opinions, the Attorney General concluded that the University of Massachusetts is exempt from state regulatory authority, absent a clear contrary legislative intent Id. at 4, citing 2000-01 Mass. Op. Att. Gen. No. 2, 2001 WL 505661 (2001) ("AG Opinion re: State Sanitary Code"). UMASS also asserts that the Attorney General affirmed that G.L. c. 75, § 1 plainly accords the Board of Trustees considerable autonomy in the management of its affairs, not only academic but also financial. Petition at 7-8, citing 1976-77 Mass. Op. Atty. Gen. No. 25, at 2, 1977 WL 36219 ("AG Opinion re: Small Business Purchasing Program"). In these opinions, UMASS contends that the Attorney General considered the statutory authority of the state agency or board to

regulate, but ultimately determined that the University's autonomy should not be restricted by the agency's jurisdiction or regulation (Petition at 4-7).

For example, the Attorney General opined that University swimming pools were not subject to the State Sanitary Code, enforced by local boards of health. AG Opinion re: State Sanitary Code. In addition, the Attorney General concluded that the General Court did not intend to limit the University's autonomy by subjecting it to the state statute that required state agencies to purchase five percent of their expenditures from small businesses. AG Opinion re: Small Business Purchasing Program. UMASS asserts that its ability to plan and provide for its energy needs is no less important for the University to maintain its fiscal and academic autonomy (Petition at 8).

UMASS also points out that, by the terms of G.L. c. 164, § 69G, Section 69J petitions must be brought by "a person or persons" and a longstanding rule of statutory construction holds that "person" does not include the Commonwealth or its agencies, citing Hansen v. Commonwealth, 344 Mass. 214, 219 (1962). Because the University of Massachusetts is an agency of the Commonwealth, and therefore not a person, UMASS asserts that the EFSB statute cannot apply to the University (Petition at 8-9). Even if the EFSB statute is only viewed as ambiguous on the question of whether state agencies are subject to it, UMASS argues that the clear legislative intent expressed in G.L. c. 75, § 1, that the University is not subject to other state agencies, means that its enabling statute should prevail over the EFSB statute (Petition at 10).

Lastly, if the Siting Board determines that it does have jurisdiction over the Project, UMASS asks that the Board waive its jurisdiction using its waiver provision in 980 CMR 1.02(1). UMASS reasons that its Project would not be part of the energy infrastructure of the State designed to serve the public unlike the typical project reviewed by the Siting Board (Petition at 11-12). Zoning exemptions and eminent domain, matters often referred to the EFSB by the DPU Chairman, are also not needed or available to the University's Project Petition at 12).

B. Comments of Berkshire

Berkshire notes that its precedent agreement with Tennessee Gas Company, which calls for Berkshire to purchase additional interstate pipeline capacity in the Amherst service area and

is pending before the Department for its review and approval (D.P.U. 15-48)[10], may eliminate the gas peak-day capacity limitations that UMASS cites as the reason the Project is needed (Berkshire June 10 Comment at 1). Berkshire asserts that its primary concerns relate to the safety and reliability of the LNG facilities, and its need to be certain that UMASS' design and operation of the Project will provide "for the safe and reliable integration and complementary operation" of the Project with Berkshire's gas pipeline facilities (id.).

Although Berkshire "defers to the Siting Board to interpret" its own statute and the scope of its jurisdiction over applicants like UMASS, Berkshire notes that the Siting Board has exercised jurisdiction over the construction of both gas and electric facilities by other governmental entities, namely municipal light and gas departments (id.). Berkshire adds that the EFSB statute was intended by the General Court to apply to significant energy facilities regardless of the identity of the developer (id. at 2). Berkshire notes that it built a similar LNG facility in Whately that was subject to EFSB approval (id. at 1). Berkshire cites the Siting Board's regulation (980 CMR 10.00) as intended to "ensure systemic review" of LNG facilities and "apply Massachusetts' more rigorous standards" (id. at 2). Berkshire also cites the Department's regulation for "Design, Operation, Maintenance and Safety of LNG Facilities" (220 CMR 112.00) and adds that its applicability to the UMASS Project would also be in question (id.). Because the Project and Berkshire's facilities will be "somewhat integrated," Berkshire wants "to be certain safety and responsibility concerns are clear and well-defined" (id.).

Berkshire filed another comment letter on June 30, 2015. In the letter, Berkshire stated that UMASS had asked that Berkshire "confirm and clarify its [June 10] comments" (Berkshire June 30 Comment, at 1). Berkshire added that as a participant in the natural gas industry within the Commonwealth, it is concerned about the safety and reliability of all natural gas infrastructure, including LNG facilities. Berkshire noted that its June 10 Comments "were intended to convey its view that all new LNG facilities should be designed to conform to and comply with all federal and Massachusetts requirements, under the oversight of appropriate regulators…." (id.).

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[10] The Department approved Berkshire's precedent agreement with Tennessee Gas Pipeline Company for its proposed Northeast Energy Direct Pipeline in D.P.U. 15-48 on August 31, 2015.

C. Comments of NGA

NGA submitted a comment letter on June 10, 2015, in which it notes that LNG is an important part of the regional gas supply chain (NGA Comment at 1). The NGA adds that it has developed several programs and protocols regarding LNG, including a safety training program at the Massachusetts Firefighting Academy and a New England-wide protocol and plan on responding to emergencies involving trucks transporting LNG (id.). While the NGA is encouraged that UMASS plans to enhance its energy system by using LNG, the NGA states that the issue of siting review warrants close consideration and that the Siting Board should keep the safe installation and operation of LNG facilities in mind while the Board considers the jurisdictional question (id.).

D. UMASS Response to Berkshire

UMASS asserts that, while Berkshire favors a statutory interpretation which finds Siting Board jurisdiction, Berkshire makes no legal argument to support its position (UMASS Response to Berkshire at 1). Instead, UMASS states, Berkshire only offers the observation that the EFSB has reviewed many energy facilities constructed by municipal light and gas departments (id.). However, UMASS argues, petitions to construct must be brought to the EFSB by an "applicant" and Section 69G defines an applicant to be a "person" (id.). UMASS cites numerous legal authorities that hold that "person" used in statute does not include the sovereign state, its agencies, or its political subdivisions (id. at 1-2). UMASS adds that, regardless of whether new pipeline capacity is constructed in central Massachusetts, the University will need to build the Project (id.).

Lastly, UMASS notes that Berkshire raises a number of safety concerns and implies that an LNG facility built outside of EFSB jurisdiction would be less safe than one reviewed by the Siting Board (id.). UMASS responds that it is fully aware of the rigorous standards established by the EFSB's regulation as well as in the Department's regulations. UMASS states that the University will construct the Project to meet or exceed the standards imposed by both the EFSB and Department regulations, and invites Berkshire to meet with the University's design team and project managers, as Berkshire did regarding the temporary LNG facility (id. at 3-4).

E. Analysis and Findings

1. Definition of "Facility"

The Project clearly is a "facility" as that term is defined in Section 69G, the definition section of the EFSB statute. The fifth clause under "facility" in that section defines as a facility: "(5) a unit…designed for or capable of the …storage of gas, except such units below a minimum threshold size as established by regulation." The definition of "gas" in Section 69G includes LNG, and the Board's regulation establishes a storage capacity threshold of 25,000 gallons, above which the Siting Board's regulations deem a gas storage unit (including multiple tanks and associated buildings and structures) to be a "facility." 980 C.M.R. § 1.01(4).

Considering just the first phase, the Project would create 54,000 gallons of LNG storage capacity, more than double the minimum threshold. Furthermore, because UMASS plans a second phase to increase the storage capacity of the facility, up to double the initial capacity, and build the concrete containment area large enough in the first phase to accommodate three more storage tanks and a second vaporization unit, it is likely that for jurisdiction determination purposes, the Project should be considered to have a 108,000-gallon storage capacity.[11] In any event, and even considering the first phase in isolation, UMASS proposes to construct a jurisdictional "facility."

2. EFSB Precedent

Because the Project is a facility within Section 69J, the Siting Board must decide whether UMASS is an entity that is subject to Section 69J. The Siting Board was confronted by a similar issue in 2000 when the Massachusetts Development Finance Agency ("MDFA") asked for an Advisory Ruling. Request by MDFA for Advisory Ruling, letter from Rubin & Rudman (June 23, 2000). The MDFA took the position that it did not require EFSB approval to construct a 69 kV electric transmission line of greater than one mile on land owned by MDFA at the former Fort Devens. Like the UMASS LNG storage facility, the MDFA-proposed transmission

[11] This jurisdictional concept is referred to as an "anti-segmentation" principle. See e.g. Delaware Riverkeeper Network v. FERC, 753 F.2d 1304, 2014 WL 2535225 (D.C. Cir. 2014) (FERC erred by segmenting the environmental review of four projects that were functionally and financially interdependent rather than considering the cumulative impacts of all the projects). The planned expansion of the facility would also seem relevant to considering UMASS's request to waive the minimum threshold regulation.

line was clearly a "facility." However, MDFA asserted that it was a separate public instrumentality of the Commonwealth and was not subject to the jurisdiction of the Siting Board because MDFA's enabling statute, G.L. c. 23G, § 2(a), provides that it was not subject to "the supervision or control … of any board, bureau department, or other agency of the commonwealth….". In addition, MDFA argued that it could not be an applicant before the EFSB because, as a state agency, it could not be a "person" as required by the definition of "applicant" in the EFSB statute, Section 69G.

In its Response to Request for Advisory Ruling ("MDFA Advisory Ruling"), the Siting Board declined to issue an advisory ruling as requested by MDFA. The Siting Board stated that MDFA's request raised "complex questions of law subject to varying interpretations which are better explored in the context of an adjudicatory (or judicial) proceeding rather than an advisory ruling." MDFA Advisory Ruling at 3. The Siting Board explained that MDFA's argument that its enabling statute exempted it from EFSB jurisdiction raised "vexing questions of law" with little precedent to guide the Board. Id. As to MDFA's second argument, that the EFSB statute applied only to "persons" and that the State, its agencies and political subdivisions, are not considered "persons," the Board concluded that "the issue is not as clear-cut as MDFA suggests." Id. The Board reasoned that, because of the EFSB's long-standing jurisdiction over energy facilities constructed by municipal electric departments, the Legislature intended Siting Board review of both public and private energy facilities. Id. Accordingly, the Siting Board concluded that MDFA's request was "too complex to rule on in an advisory ruling." Id.

3. Judicial Precedent

To demonstrate the "vexing" nature of the question of law presented by MDFA, the Board cited a Supreme Judicial Court ("SJC") decision involving the Massachusetts Port Authority ("Massport"), another public authority of the Commonwealth, similar in form to the MDFA. Id. at 3, citing City of Boston v. Massachusetts Port Authority, 364 Mass. 639 (1974) ("Massport Decision"). In the Massport Decision, the SJC held that Massport was subject to air pollution control regulations adopted by the State's Department of Health, even though Massport had statutory enabling language exempting it from supervision and control by other state

agencies (id.).[12] The Court noted that the statute authorizing the Department of Health's air pollution regulations provided that "all departments, agencies, commissions, authorities and political subdivisions shall be subject to rules and regulations adopted by the Department [of Health] …." (Id. at 641-642, n. 3, quoting G.L. c. 111, § 142E). Because of the quoted statutory language, the Court found that the Legislature intended the air pollution regulations to be applied universally throughout the State, enforceable against public bodies and not just private business (id.). Consequently, the Court decided "that the absolute language of the [Massport] enabling act must yield to the equally absolute language of § 142E." (Id. at 653).

4. Attorney General Opinion

In addition to the Attorney General Opinions discussed above that involved the University, UMASS cites a 2000 Opinion in which the Attorney General opined that the State Fire Code, a regulation promulgated by the State Fire Marshal, did not apply to state-owned buildings. 2000-01 Mass. Op. Att. Gen. No. 1, 2000 WL 1692752 (2000) ("AG Opinion: State Fire Code"). The Attorney General cited a long line of prior opinions that found that state agencies are not subject to proscriptions enacted by the General Court in the exercise of its police powers, absent an explicit legislative directive that state agencies are subject to the statute and any regulations promulgated pursuant to it. Id. at 2. For an example, the Attorney General noted the statute authorizing a state-wide building code explicitly waives the Commonwealth's exemption from regulation, citing G.L. c. 143, § 2A.[13] Id. at 4. Unlike the statute authorizing the State Building Code, the statute authorizing the State Fire Code does not contain language that waives the exemption of regulation of the Commonwealth and its agencies that is otherwise presumed. Consequently, the Attorney General concluded that the State Fire Code does not apply to state-owned buildings. Id.

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12 The enabling statute of Massport is found at St. 1956, c. 465, and the exemption language in Section 2 of that chapter.

13 Section 2A of Chapter 143 states that the provisions of that chapter, as they relate "to the safety of persons in buildings shall apply to buildings and structures, other than the state house, owned, operated or controlled by the commonwealth, and to buildings and structures owned, operated or controlled by any department, board or commission of the commonwealth, or by any of its political subdivisions, in the same manner and to the same extent as such provisions apply to privately owned or controlled buildings occupied, used or maintained for similar purposes."

5. State Agencies and Section 69J Jurisdiction

In order to determine whether the Legislature intended state agencies to be subject to the requirements of Section 69J, we first must review the statutory language that establishes the approval requirement. That requirement is established in the first sentence of Section 69J, which provides that:

> No *applicant* shall commence construction of a facility at a site unless a petition for approval of construction of that facility has been approved by the board and, 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. (emphasis added)

The obligation to obtain Section 69J approval is imposed on *applicants*. "Applicant" is defined in Section 69G, and means "a person or persons who submits to the department or board a long-range plan [pursuant to Section 69I or] a petition to construct a facility" pursuant to Section 69J.[14] The word "person" is neither defined in Section 69G nor in G.L. c. 164, § 1, the definitional section for the entire Chapter 164. While in G.L. c. 4, § 7, 23rd clause, the General Court directs that, in construing Massachusetts statutes, the word "person" includes corporations, societies, associations and partnerships, the General Court does not provide any statutory guidance on whether "person" includes the Commonwealth or its agencies. However, the SJC does provide such guidance. The Court accepted the long-standing rule of statutory construction that the word "'persons' will not ordinarily be construed to include the State," its agencies or its political subdivisions. Hansen v. Commonwealth, 344 Mass. 214, 219 (1962). Thus, the Court

[14] The entire definition of "Applicant" is:

> "Applicant", a person or persons who submits to the department or board a long-range plan, a petition to construct a facility, a petition for a certificate of environmental impact and public need, or a notice of intent to construct an oil facility, or any application, petition, or matter referred by the chairman of the department to the board pursuant to section sixty-nine H.

presumes that the word "person" in statute does not include state agencies. There appears to be no language in the EFSB statute that rebuts that presumption.

Furthermore, SJC precedent, cited by the Attorney General in AG Opinion re: State Fire Code, also holds that state agencies are not subject to police power statutes like Section 69J absent explicit legislative direction. There appears to be no implicit much less explicit direction in Section 69J that would indicate a legislative intent to impose the regulatory scheme within Section 69J upon state agencies.

6. Municipal Light and Gas Departments

In the MDFA Advisory Ruling, the Siting Board expressed concern that the Board's long-standing jurisdiction over energy facilities proposed by municipal electric departments could be jeopardized by a finding that state agencies like the MDFA were not subject to Section 69J approvals. It is accurate that the concept of the State as sovereign includes not only state agencies but also political subdivisions of the State and that political subdivisions include municipalities. However, the EFSB statute provides explicit legislative direction that a subset of municipal organizations, namely municipal light and gas departments, should be subject to Section 69J approvals.

As mentioned above, Section 69G defines an applicant as a person who submits a long-range plan pursuant to Section 69I. However, Section 69I imposes the obligation to submit long-range plans not on applicants but on certain types of *electric companies* and *gas companies*, both of which are also defined terms in Section 69G. Because electric and gas companies must submit long-range plans, they necessarily become "applicants" when they do so. Accordingly, electric and gas companies must be considered "persons" as that word is used in the definition of "applicant."

Similarly, "electric company" and "gas company" are mentioned in the first sentence of Section 69J, because electric and gas companies must demonstrate not only that their proposed energy facilities meet the standards in Section 69J, but also that their facilities are consistent with their approved Section 69I long-range forecasts for those companies that must file such plans. The sentence exhibits an expectation that when electric and gas companies construct facilities, the facilities need Section 69J approval. Because they must seek Section 69J approval, electric and gas companies necessarily must be "applicants" when they seek that approval. Thus, the

language of Section 69J also shows a legislative intent that an "electric company" and a "gas company" are "persons" as that word is used in the definition of "applicant" in Section 69G.

The Section 69G definitions of both "electric company" and "gas company" include municipal corporations that provide electricity or gas service to customers, as well as a myriad of different types of private companies, both Massachusetts and "foreign" corporations. In these definitions, the General Court has exhibited a clear intent that in the limited instance when municipal corporations provide essential electric or gas utility service, such municipal corporations are "electric" or "gas companies" as well as "persons" as those words are used in Section 69G. Accordingly, both private and *public* electric and gas companies are subject to the regulatory jurisdiction of the Siting Board when they construct large-scale energy facilities.

The express inclusion of municipal light and gas departments as electric and gas companies in the EFSB statute is also noteworthy to highlight the lack of similar statutory language including state agencies, departments, commissions or authorities in the definitions. The General Court has included such language in other statutes, as described in the Massport Decision and the AG Opinion re: State Fire Code.

7. UMASS and EFSB Statutory Comparison

The jurisdictional question presented here is not like the one in the Massport Decision, in which the regulatory exemption language as to Massport and the regulatory jurisdictional language over state agencies as to the Department of Health were both "absolute" in the words of the SJC. In this case, the regulatory exemption language of the University of Massachusetts enabling statute is clear, that its Board of Trustees "shall not in the management of the university be subject to, or superseded by, any other state agency, board, bureau, commission, department or officer…." G.L. c. 75, § 1. In addition, the last sentence of G.L. c. 75, § 1 directs that the University of Massachusetts enabling statute "shall be liberally construed to effectuate its purposes." However, the regulatory jurisdictional language over state agencies as to the Siting Board is far from clear. As discussed above, it would appear that the Legislature did not intend to impose the regulatory scheme of the EFSB statute on any state agency. Unlike the statute

authorizing the state building code at G.L. c. 143, § 2A, it is difficult to find any clear legislative intent to subject state agencies to the regulatory scheme imposed in the EFSB statute.[15]

Because the regulatory exemption language of the University of Massachusetts is clear, we do not need to decide whether all state agencies are exempt from the EFSB statute to decide this case, and we expressly limit our findings regarding Siting Board jurisdiction to the specific facts relating to the Project and its proponent, UMASS. The Board need only find that, at best, there is some ambiguity as to whether state agencies are subject to the EFSB statute. Because the statutory authority of the Siting Board is silent on this issue, then the regulatory exemption language in the University of Massachusetts enabling statute (G.L. c. 75, § 1) must prevail.[16]

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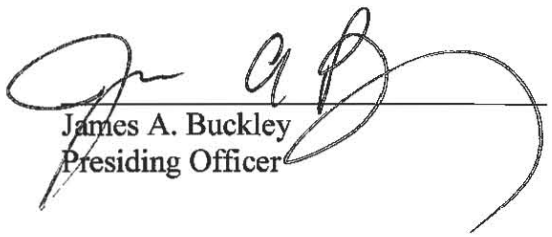
[15] As acknowledged by UMASS, the Siting Board's regulation, 980 CMR 1.00, entitled the "Rules for the Conduct of Adjudicatory Proceedings", contains a definition of "person" that includes an "agency or department of the Commonwealth" and "political subdivision of the Commonwealth including municipal corporations." 980 CMR 1.01(4). However, the introductory sentence to 980 CMR 1.01(4) makes clear that the definitions are intended to be used for the purpose of the regulation only. In any event, the regulation is not relevant for determining legislative intent behind the language of the EFSB statute. In addition, the regulatory definition of "person" cannot expand the jurisdiction of the Siting Board beyond that authorized by the Legislature in the statute. See Providence and Worcester R.R. Co. v. Energy Facilities Siting Board, 453 Mass. 135 (2009).

[16] We note Berkshire's concern that the applicability of the Department's Pipeline Engineering and Safety Division's design and operational requirements under 220 C.M.R. 112.00 is not clear with respect to the Project. The Siting Board makes no findings in this Decision regarding the proper role of the Department in its oversight of LNG facilities, such as the Project, pursuant to various state and federal requirements. In any event, UMASS indicated that it will coordinate with the Pipeline Engineering and Safety Division staff throughout the construction and operation of the Project. UMASS further stated that it will provide access to Department staff to perform inspections of the Project as the Department deems appropriate (Exh. EFSB-16).

IV. DECISION

For the reasons set forth above, the Siting Board concludes that it does not have jurisdiction pursuant to G.L. c. 164, §69J to approve the construction by the University of Massachusetts Amherst of the LNG storage facility on its campus in Hadley, Massachusetts.



Dated this September 21, 2015

APPROVED by the Energy Facilities Siting Board at its meeting of September 21, 2015, by the members and designees present and voting. **Voting for** approval of the Tentative Decision (as amended): Ned Bartlett, Chair, Designee for the Secretary of the Executive Office of Energy and Environmental Affairs; Angela M. O'Connor, Chairman, Department of Public Utilities; Jolette A. Westbrook, Commissioner, Department of Public Utilities; Judith Judson, Commissioner, Department of Energy Resources; Erica Kreuter, Designee for Secretary, Executive Office of Housing and Economic Development; Gary Moran, Designee for Commissioner, Department of Environmental Protection; Joseph C. Bonfiglio, Public Member; and Glenn Harkness, Public Member.

Ned Bartlett, Chair
Energy Facilities Siting Board

Dated this September 21, 2015

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 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).