# The Commonwealth of Massachusetts

## DEPARTMENT OF PUBLIC UTILITIES

D.P.U. 14-55/14-56 May 26, 2015

Petition of NSTAR Electric Company pursuant to G.L. c. 164, § 72 for approval to own and operate new 115 kV underground transmission line segments in the Town of Belmont and the City of Cambridge, and petition pursuant to G.L. c. 40A, § 3 for exemption from the Zoning By-Law of the Town of Belmont.

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# I. INTRODUCTION

NSTAR Electric Company ("NSTAR" or "Company") filed two petitions on April 18, 2014 with the Department of Public Utilities ("Department") seeking: (1) approval under G.L. c. 164, § 72 ("Section 72") to own, operate, and continue to use as constructed two proposed 0.85-mile 115 kilovolt ("kV") underground transmission lines between Cambridge and Belmont; and (2) approval under G.L. c. 40A, § 3 for an exemption from zoning requirements in Belmont to own and operate transmission-related 115 kV equipment at a proposed new 115/13.8 kV substation in Belmont. Belmont Municipal Light Department ("BMLD") would construct and initially own the proposed 115 kV lines and the 115 kV components of the new substation (together, the "Project") transferring ownership of the Project to NSTAR just prior to energization of the facilities (Exhs. NSTAR-1, NSTAR-2). BMLD would continue to own and operate the distribution-related (i.e., non-115 kV) portions of the new substation (id.).

## A. Description of Proposed Project

As directed by NSTAR, BMLD would construct two new parallel underground cables using 0.85 miles of 115 kV, high pressure, fluid-filled pipe-type ("HPFF") transmission cable (the "HPFF cable lines" or the "Proposed Line") to connect a new 115/13.8 kV electrical substation at 20 Flanders Road in Belmont ("Flanders Road Substation" or "Substation") with NSTAR's existing transmission system at its North Cambridge Substation (Exh. NSTAR-1, at 3-6). The route between the two substations would be located along a 16-foot-wide easement on property owned by the Massachusetts Bay Transportation Authority ("MBTA Easement"). The MBTA Easement is adjacent to the railroad tracks on the MBTA's Fitchburg Line (the

"MBTA Corridor").[1] Pursuant to the MBTA Easement and a recorded Consent and Approval obtained by BMLD from Pan Am Railways, Inc. ("Pan Am"), BMLD has the right to remove all shrubs, trees, and debris, including abandoned railroad sidings from the area within the MBTA Easement and to construct underground cables.[2] The Flanders Road Substation would consist of a brick-face masonry building that would house most of the 115 kV substation facilities (Exh. NSTAR-2 at 1, 3, and exhibits D, E and F).

The general sequence of construction would be as follows. First, a trench would be excavated by backhoe for most, but not all of the proposed route (Exh. NSTAR-1, at 8; Tr. at 13, 14). At five separate locations, the Proposed Line would cross existing utility infrastructure by trenchless construction, which would involve "micro-tunneling" beneath existing electrical lines, cables, and similar facilities (Tr. at 13, 14). Next, cable pulling and splicing would take place at manhole and terminal locations (Exh. NSTAR-1, at 8) and the Proposed Line would be filled with fluid and then pressurized. The oil used in the Proposed Line would be alkyl-benzene, a highly refined petroleum-based mineral oil (id. at 9). Most of the Proposed Line would ultimately lie in the trench, with each of the two HPFF cable lines parallel to each other, two feet

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1 Of the 0.85-mile route for the new lines, 0.71 miles is along the MBTA easement between the two substations, 0.11 miles is within the North Cambridge Substation, and 0.03 miles would be within the Flanders Road Substation (Exh. NSTAR-1, at 3).

2 Pan Am is the successor in interest to the original Boston & Maine Railroad ("B&M"), which deeded the MBTA Corridor to the MBTA in 1976. In the Deed, the B&M reserved to itself the exclusive rights to provide freight service on the MBTA Corridor. B&M had at one time operated various railroad sidings on, and crossing over, the MBTA Easement to serve industrial customers south of the MBTA Corridor in Cambridge (Exh. NSTAR-1, at 6 n.6). Those sidings were abandoned in place long ago and the MBTA Easement required BMLD to obtain the consent of Pan Am in order to remove the abandoned rails and to construct below the surface (id.).

apart (Exh. NSTAR-1, exh. 12, at 4). The Proposed Line would be buried at a minimum depth of five and one-half feet, and portions buried deeper (Tr. at 19).

The Massachusetts Bay Railroad Company ("MBRC") or its successor operates the Fitchburg Line passenger rail service (Exh. NSTAR-1, at 5). In constructing the Proposed Line, BMLD's contractor would work with MBRC flagmen to ensure that work would not be interrupted during train travel. In addition, all construction personnel would receive safety training before commencing work (id. at 6). To work most efficiently, BMLD would cooperate with the MBTA and MBCR to create detailed work and access plans that take advantage of times of infrequent or no train travel (id.).

**Figure. 1. Proposed Transmission Lines; Flanders Road Substation**


Exhs. NSTAR-1, exh. 4, at 1, 2; DPU 1-27(1).

NSTAR would own the transmission facilities ("115 kV Transmission Facilities") at the Flanders Road Substation (Exh. DPU 1-2(2), at 3). Those facilities would include: 0.03 miles of the Proposed Line; gas-insulated switchgear and bus connecting the Proposed Line to the two 115/13.8 kV transformers owned by BMLD; the transmission cable terminal structures, and gas-insulated bus, which would extend from the 115 kV switchgear through the Substation walls to

each 115 kV cable termination structure and to each of BMLD's two 115/13.8 kV power transformers (Exh. NSTAR-1, at 4).

The Substation land and building would be owned by BMLD (Exh. DPU 1-2). NSTAR would have easement use of approximately 20 percent of the area of the Substation for its property, fixtures and operational purposes while approximately 80 percent of the Substation would be devoted to BMLD's property, fixtures, and uses (id.).

B. Procedural History

On April 18, 2014, NSTAR filed two petitions: a petition pursuant to Section 72, seeking approval from the Department to own and operate the Proposed Line ("Section 72 Petition"); and a petition pursuant to G.L. c. 40A, § 3, requesting that the Department grant the Company an exemption from the operation of the Zoning By-Law of the Town of Belmont ("Zoning Exemption Petition"). On July 8, 2014, the Department conducted a site visit in Cambridge and Belmont followed by a duly noticed public comment hearing at the Chenery Middle School in Belmont. BMLD and the City of Cambridge moved to intervene as parties, and their motions were allowed. The Company submitted testimony from the following witnesses: John Zicko, acting director of substation and transmission engineering and manager of substation design engineering for NSTAR; Edmund Feloni, principal partner with Consulting Engineers Group; and Cindy J. Markowitz,[3] senior project manager with TetraTech.

The Department conducted an evidentiary hearing at its offices in Boston on November 3, 2014. The evidentiary record of this proceeding, in addition to the Company's Petition and

[3] In their pre-filed testimony, Mr. Feloni and Ms. Markowitz each state that they have been retained by BMLD to testify in support of NSTAR's petitions (Exhs. BMLD-EF-1, at 1; BMLD-CJM-1, at 1).

accompanying exhibits, includes the Company's response to 63 information requests and seven record requests. Both the Company and BMLD filed their briefs on December 3, 2014.

C. The Role of BMLD

Although it would construct the Project and retain ownership of the distribution-related portions of the Substation, BMLD is an intervenor and not a petitioner in this proceeding. Upon Project completion and before energization, NSTAR would purchase the 115 kV Substation Facilities and the Proposed Line from BMLD (Exh. NSTAR-2, at 3).

1. Belmont Zoning By-Law

BMLD asserts that its construction, operation, and use of the Flanders Road Substation are allowed as-of-right (Exh. NSTAR-2, at 2 n.3; BMLD Brief at 2-5). Consequently, BMLD does not seek an exemption from the operation of the Belmont Zoning By-Law ("By-Law") (Exh. NSTAR-2, at 2 n.3; BMLD Brief at 3, 4).

Although the Schedule of Use Regulations in the By-Law does not specifically enumerate a category for public utility or substation uses, the schedule does contain a category entitled "other municipal use," which allows municipal use as of right (Exh. NSTAR-2, at 7 and exh. A at 23). BMLD is a municipal corporation empowered to operate a municipal lighting plant pursuant to the provisions of G.L. c. 164, §§ 34 et seq. (Exh. NSTAR-2, at 7). Therefore, BMLD asserts that, in constructing the Flanders Road Substation, it is acting as a municipal corporation engaged in "other municipal use" and, consequently, it does not require any zoning exemptions for such construction and use (Exh. NSTAR-2, at 7; BMLD Brief at 2-5).

NSTAR, however, acknowledges that it stands in a different position. It is not a municipal corporation, but rather, an electric company as defined by G.L. c. 164,

§ 1 (Exh. NSTAR-2, at 7, 8). Therefore, NSTAR's proposed operation and continued use of the 115 kV Substation Facilities would not be consistent with the "other municipal use" category in the Schedule of Use Regulations (Exh. NSTAR-2, at 7, 8). For this reason, NSTAR has filed the zoning exemption petition (Exh. NSTAR-2, at 7, 8).

2. BMLD and Section 72 Approval

BMLD sought and was granted intervenor status in NSTAR's Section 72 petition. BMLD argues that, even though it would be constructing the Proposed Line, it is nevertheless not subject to Department jurisdiction pursuant to Section 72 (BMLD Brief at 2). Section 72 grants the Department jurisdiction over electric companies that seek to construct, or to use as constructed, "a line for the transmission of electricity."

BMLD argues that it is not an "electric company" for purposes of Section 72 (BMLD Brief at 2). In support of this argument, BMLD notes that Section 2 of Chapter 164, entitled "construction," provides that in construing certain sections of that chapter, the term "electric company" may include municipal corporations. G.L. c. 164, § 2. Section 72, however, is not one of the sections so listed. BMLD argues that if the legislature had wanted municipal light companies to be treated as electric companies for the purposes of Section 72, the legislature would have included that section in its list (BMLD Brief at 2, 3). BMLD further argues that the omission of Section 72 from the list of Chapter 164 sections in which a municipal corporation should be considered to be an "electric company" indicates that the legislature did not intend for municipal corporations to be treated as electric companies for the purposes of Section 72 (BMLD Brief at 2).

Although the Department agrees that, as a municipal light department, BMLD is not subject to jurisdiction under Section 72, NSTAR does need Section 72 approval to own and operate the two transmission lines that BMLD will construct and transfer to NSTAR. Accordingly, NSTAR must accept responsibility to ensure that BMLD constructs the Project as described in this Order, and further, that BMLD complies with any directives and conditions imposed by the Department in this Order.[4]

## II. REQUEST FOR INDIVIDUAL ZONING EXEMPTIONS PURSUANT TO G.L. C. 40A, §3

### A. 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 bylaw 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. First, the petitioner must qualify as a public service corporation. NSTAR Electric Company, D.P.U. 13-177/13-178, at 5 (2015) ("NSTAR Seafood Way"); NSTAR Electric Company, D.P.U. 13-64, at 4 (2014) ("NSTAR Barnstable"); 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

[4] Similarly, NSTAR must ensure that BMLD constructs and operates the Flanders Road Substation as described in this Order, and further, that BMLD complies with any directives and conditions related thereto. NSTAR's arrangement with BMLD is, for purposes of this Order and compliance with the Department's directives, no different than when NSTAR engages a private construction company to build a transmission project.

necessary for the convenience or welfare of the public. NSTAR Seafood Way at 5; NSTAR Barnstable at 4; Tennessee Gas Pipeline Company, D.T.E. 01-57, at 3-4 (2002) ("Tennessee Gas Pipeline Company (2002)"). Finally, the petitioner must establish that it requires exemption from the zoning ordinance or bylaw. NSTAR Seafood Way at 5-6; NSTAR Barnstable at 4; Boston Gas Company, D.T.E. 00-24, at 3 (2001).

1. Public Service Corporation

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, 366 Mass. at 680. See also NSTAR Seafood Way at 8; NSTAR Barnstable at 4-5; Berkshire Power Development, Inc., D.P.U. 96-104, at 26-36 (1997) ("Berkshire Power").

The Department interprets this list not as a test, but rather, as guidance to ensure that the intent of G.L. c. 40A, § 3, will 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. Berkshire Power at 30; Save the Bay 366 Mass. at 685-686; Town of Truro v. Department of Public Utilities, 365 Mass. 407, 410 (1974) ("Town of Truro"); NSTAR Seafood Way at 8. 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; NSTAR Seafood Way at 8; see also

Dispatch Communications of New England d/b/a Nextel Communications, Inc., D.P.U./D.T.E. 95-59-B/95-80/95-112/96-13, 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. Berkshire Power at 31; NSTAR Seafood Way at 8; NSTAR Barnstable at 5.

2. Public Convenience and Welfare

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, 366 Mass. at 680; Town of Truro, 365 Mass. at 410; NSTAR Seafood Way at 8. Specifically, the Department is empowered and required to undertake "a broad and balanced consideration of all aspects of the general public interest and welfare and not merely [make an] examination of the local and individual interests which might be affected." New York Central Railroad v. Department of Public Utilities, 347 Mass. 586, 592 (1964) ("New York Central Railroad"); NSTAR Seafood Way at 9.

With respect to the particular site chosen by a petitioner, G.L. c. 40A, § 3, does not require the petitioner to demonstrate that its primary site is the best possible alternative, nor does the statute require the Department to consider and reject every possible alternative site presented. Rather, the availability of alternative sites, the efforts necessary to secure them, and the relative advantages and disadvantages of those sites are matters of fact bearing solely upon the main issue of whether the primary site is reasonably necessary for the convenience or welfare of the public. Martarano v. Department of Public Utilities, 401 Mass. 257, 265 (1987); New York Central Railroad, 347 Mass. at 591; NSTAR Seafood Way at 9.

Therefore, when making a determination as to whether a petitioner's present or proposed use is reasonably necessary for the public convenience or welfare, the Department examines: (1) the present or proposed use and any alternatives or alternative sites identified; (2) the need for, or public benefits of, the present or proposed use; 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. NSTAR Seafood Way at 9-10; NSTAR Barnstable at 6-7; Tennessee Gas Company, D.T.E. 98-33, at 4-5 (1998).

3. Exemption Required

In determining whether exemption from a particular provision of a zoning bylaw is "required" for purposes of G.L. c. 40A, § 3, the Department makes a determination whether the exemption is necessary to allow construction or operation of the petitioner's Project. NSTAR Seafood Way at 10; NSTAR Barnstable at 7; Tennessee Gas Company, D.P.U. 92-261, at 20-21 (1993). It is a petitioner's burden to identify the individual zoning provisions applicable to the Project and then to establish on the record 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 will 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); NSTAR Seafood Way at 10; NSTAR Barnstable at 7.

B. Public Service Corporation Status

NSTAR is an electric company as defined by G.L. c. 164, § 1, and, as such, is a public service corporation. NSTAR Seafood Way at 10-11; NSTAR Barnstable at 7; NSTAR Electric Company, D.P.U. 11-80, at 4-7 (2012). Accordingly, the Department finds that NSTAR qualifies as a public service corporation for the purposes of G.L. c. 40A, § 3.

C. Public Convenience and Welfare

1. Need for or Public Benefit of Use

a. Existing Loads Approach the Firm Capacity of Area Substations

NSTAR stated that its six existing 13.8 kV sub-transmission feeders, which originate at Alewife Substation in Cambridge, next to the North Cambridge Substation, provide BMLD with a maximum firm supply of 34 megawatts ("MW") (Exh. NSTAR-1, at 2, 11). In four of five summers from 2010 to 2014, the summer peak in Belmont exceeded 33.2 MW (id.). The existing six 13.8 kV cables are at the maximum size (four inches in diameter) that the current underground ducts from Alewife Substation can accommodate (id.). In addition, the Company has no spare ducts available for additional cables from Alewife Substation. With anticipated load growth, NSTAR reports that BLMD's current electric system is unable to supply projected summer peak demand from 2014 onward under N-1 conditions[5] (id. at 10).[6]

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5 The term "N-1" refers to a contingency in which there is an unexpected fault or loss of a single electric element (New England Power Company d/b/a National Grid, EFSB 13-2/D.P.U. 13-151/152, at 12 n.9 (2014)).

6 The Company indicates that, as of 2014, loss of a 13.8/4.16 kV transformer with system loads above 80 percent at BMLD's Oakley Road Substation or above 85 percent at BMLD's Hittinger Substation would result in extended customer outages (Exh. NSTAR-1, at 11). The Company attributes these potential outages to insufficient capacity with the existing 13.8 kV cables from Alewife Substation under the identified load conditions (id.).

b. Significant Load Growth is Expected

NSTAR stated that ongoing economic recovery and construction of at least six major development projects in Belmont would result in significant load growth on the BMLD system (Exh. NSTAR-1, at 11, 17). The Company indicated that load growth on the BMLD system would also affect NSTAR's sub-transmission system at Alewife Substation in Cambridge, which is already experiencing load growth from nearby development. From 2009 to 2013, the 13.8 kV load at Alewife Substation grew from 109 MW to 117 MW (id.). According to NSTAR, new residential construction in Cambridge continues the 2009-to-2013 growth trend (Exhs. NSTAR-1, at 11, 17, 22; DPU 1-28). The Company asserts that the increased load on the Company's 13.8 kV feeder capacity at Alewife Substation would continue to constrain its ability to supply Belmont (Exhs. NSTAR-1, at 11-12, 17; DPU 1-22).

c. Additional Benefits of the Proposed Project

NSTAR indicated that the Project would have additional benefits, including facilitating BMLD's long-range plans to upgrade its distribution system from 4.16 kV to 13.8 kV. The Project would directly replace some components of BMLD's 13.8kV/4.16 kV substations and distribution system that are aging and operate at or near capacity (Exh. NSTAR-1, at 12). A number of these components, including existing substations, are over 60 years old and pose reliability concerns (id.). The Project would allow expansion of BMLD's existing substation and distribution system[7] to provide load relief to portions of its service territory served by 4.16 kV

[7] BMLD cannot further expand its existing Concord Substation (Exh. NSTAR-1, at 12). BMLD's existing Oakley Road and Hittinger Substations, single-ended facilities with one transformer and one bus, are not designed for expansion (id.). These two substations are each on a very small parcel of land, adjacent to a public school (id.).

feeders or to serve new loads (id.). The Project would establish a 13.8 kV three-phase grounded neutral system in Belmont, which BMLD needs for its 13.8 kV/4.16 kV conversion (id.). And finally, by discontinuing BMLD's use of the six existing 13.8 kV feeders from the Alewife Substation, this would allow NSTAR to gain additional 13.8 kV feeder capacity to serve the Company's expanding load in the Alewife Substation service area (id. at 17).

d. Analysis and Findings

In four of five summers (from 2010 to 2014), Belmont's summer peak has been within one MW of BMLD's total firm supply limit of 34 MW. Further, without system modification, BMLD cannot currently supply projected peak demand under N-1 conditions. Remedies for BMLD's system constraints are limited. First, NSTAR cannot expand supply to BMLD from its Alewife Substation given the current substation configuration. Second, there are no spare ducts at the Alewife Substation and cables presently in use are the maximum size that the existing ducts can accommodate.

Further stress to BMLD's system is anticipated due to construction of at least six major development projects in Belmont. For NSTAR to supply BMLD from Alewife Substation also presents problems to NSTAR's distribution system because the Alewife Substation load is increasing due to new residential construction in Cambridge. The Project would not only ease capacity constraints at BMLD's substations, but would also replace selected components of BMLD's aging 13.8 kV/4.16 kV substation and distribution system, thereby improving its reliability. From a longer-term perspective, the Project would serve as an important step in establishing a 13.8 kV three-phase grounded neutral system in Belmont, part of BMLD's plan to convert its distribution system systematically from 4.16 kV to 13.8 kV. Therefore, the

Department finds that a need exists for the Project in order to improve capacity and reliability, and that by meeting this need and providing other electrical system benefits, the construction and operation of the Project would also result in public benefits.

2. Alternatives Explored

a. Project Alternatives

The table below provides a comparative summary of the Project and the project alternatives, which include: (1) a major modification of the 13.8 kV supply into Belmont ("13.8 kV Approach"); (2) two new radially connected underground 115 kV cables from Cambridge to Belmont ("115 kV Radial Approach"); and (3) a phase-out of the existing 13.8/4.16 kV substations in Belmont with a major modification of the 13.8 kV supply into Belmont along with increased use of energy efficiency and local distributed generation ("Hybrid 13.8 kV/DSM/DG Approach").[8]

[8] NSTAR also considered a "no improvements" alternative, i.e., making no improvements to the existing electric supply system serving Belmont (Exh. NSTAR-1, at 14 n.14). The Company dismissed the idea because it would not provide a solution to BMLD's existing and projected transmission reliability needs (id.).

**Table 1. Company's Summary of Project Alternatives**

| | Description | Cost (Estimated) | Advantages | Disadvantages |
|---|---|---|---|---|
| 13.8 kV Approach | Add six new underground 13.8 kV feeders in new duct & manhole system along MBTA corridor; construct new 13.8/13.8 kV BMLD Substation at Flanders Rd. Substation would convert the incoming four-wire resistance-grounded supply from Alewife Substation to regulated 13.8 kV, grounded source. Would allow BMLD to develop 13.8 kV distribution system. | Estimated total cost : $58,900,000. | Substation would convert the incoming four-wire resistance-grounded supply from Alewife Substation to regulated 13.8 kV, grounded source. Would allow BMLD to develop 13.8 kV distribution system. | Modifications at Alewife Substation (NSTAR) needed to make available two more existing circuit breaker positions for reconfigured BMLD feeder lines. Must: (1) install another transformer to serve BMLD and NSTAR load on 13.8 kV feeder system; (2) relocate existing 115 kV shunt reactor to provide voltage support for Boston area. |
| 115 kV Radial Approach | Extend two new radial underground 115 kV solid dielectric transmission cables in MBTA corridor from NSTAR's North Cambridge Substation, adjacent to the Company's Alewife Substation, to supply newly constructed BMLD 115/13.8 kV gas-insulated switchgear ("GIS") substation at Flanders Road. Convert open-air 115 kV ring bus at N. Cambridge to breaker-and-a-half GIS substation. | Estimated total cost: $107,000,000. | Substation would phase out the 13.8/4.16 kV substations in Belmont and allow BMLD to develop 13.8 kV distribution system. | Conversion of open-air 115 kV ring bus at N. Cambridge to breaker-and-a-half GIS substation makes the 115 kV Radial Approach more costly than other alternatives. |
| Proposed Project | Construct single loop of two underground networked 115 kV transmission lines running from an interception point just outside the N. Cambridge Substation, along the MBTA ROW to a new 115/13.8 kV GIS substation at Flanders Road, then back to the terminal position at the N. Cambridge Substation. | Estimated total cost: $54,200,000. | Would require less duct and manhole construction than the 13.8 kV Approach. Anticipated completion time less than that for 13.8 kV Approach. Does not require additional work at N. Cambridge Substation; preserves future expansion options there. Provides benefit to NSTAR's sub-transmission system. | Work done in proximity to active rail lines. More capacity transmission and substation upgrades, less energy efficiency than Hybrid 13.8 kV/demand side management ("DSM")/distributed generation ("DG") Approach. |
| Hybrid 13.8 kV DSM/DG Approach | Energy efficiency and local BMLD generation additions. Lower capacity modification than other alternatives. Reconstruction of the 13.8 kV supply system into Belmont. Reconstruction includes a new BMLD 13.8/13.8 kV switching station to supply BMLD's 13.8 kV feeders. | Estimated total cost: $77,000,000. | Includes fewer capacity transmission and substation upgrades than the 13.8 kV Approach, the 115 kV Radial Approach, and the Proposed Project. Reconstructs 13.8 kV supply system into Belmont (provides new substation for BMLD's 13.8 kV feeders). | Acquisition of more/different space in addition to Flanders Road site increases cost of this alternative. To get enough DG would require initial installation of two new 2.5-MW generators, plus installation of two additional units over 2017-2023 time period. Future work (additional transformer, relocation of existing 115 kV shunt reactor) required at Alewife Substation. Does not provide benefits to NSTAR's sub-transmission system. |

Exh. NSTAR-1, at 10-12, 13-17.

b. Route Alternatives

In addition to its 0.85-mile proposed route, the Company considered two alternative routes for construction of the transmission line portions of the Project: (1) a 1.1-mile

underground route from a point of interconnection with NSTAR transmission facilities at the Alewife Brook Parkway Rotary in Cambridge, continuing along Concord Avenue in Cambridge, and then along Blanchard Road and Brighton Street in Belmont to the site on Flanders Road in Belmont where BMLD anticipates building a substation ("Concord Avenue Route"); and (2) a 1.0-mile underground route from a point of interconnection with NSTAR transmission facilities at the Alewife Brook Parkway Rotary in Cambridge, continuing along a series of roadways within the industrial park between the MBTA ROW and Concord Avenue, and then across or around Blair Pond to the site on Flanders Road in Belmont where BMLD anticipates building a substation ("Industrial Park Route") (Exh. NSTAR-1, at 18).

According to the Company, using the Concord Avenue Route would present spatial constraints and other construction complications not associated with the proposed Project route (Exh. NSTAR-1, at 18-19). The Project would compete for space with existing utilities in Concord Avenue (id. at 18).[9] In addition, Project installation would reopen portions of Concord Avenue recently repaved and upgraded by the City of Cambridge (id.).

Both the Industrial Park Route and the Concord Avenue Route would require interconnection at the Alewife Brook Parkway Rotary with attendant traffic disruption; the Industrial Park Route would involve crossing of extensive infrastructure within streets along the route (id.). The Industrial Park Route would also require a crossing at Blair Pond, potentially

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9 Blanchard Road, another segment of the Concord Avenue Route, also has limited space for additional utility infrastructure (Exh. NSTAR-1, at 19).

affecting that waterbody and its habitat (id. at 19).[10] The Project along the proposed route would require a crossing at Wellington Brook, north of Blair Pond, but would make use of trenchless crossing to avoid impacts at this location (Exh. DPU 1-24).

c. Analysis and Findings on Alternatives

The Company considered three alternatives in addition to the Project, as well as a "no-build" option.[11] The Project and the three project alternatives would all address contingencies on the BMLD system and would enable the gradual phasing out of 13.8/4.16 kV substations in Belmont. The Project would also benefit NSTAR's sub-transmission system in addition to providing BMLD with a network-connected[12] 115 kV transmission interconnection and a new 115/13.8 kV substation. The Project would involve less duct and manhole construction and shorter completion time than the 13.8 kV Approach; and, unlike the 115 kV Radial Approach, it would require no additional work at the Company's North Cambridge Substation. The Project would not incorporate energy efficiency measures used in the Hybrid 13.8 kV/DSM/DG Approach, but it would also cost significantly less (approximately $22,800,000) and would avoid

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10 Tree removal at Blair Pond would likely occur with construction of the Project along either the proposed route or the Industrial Park Route, but would be more extensive with use of the Industrial Park Route (Exhs. NSTAR-1, at 18-19; DPU 1-24).

11 As mentioned above, the no-build alternative would not address the identified need (see footnote 8, supra).

12 The lines of a radial system branch out from one power source directly to connected customers. In the event of service interruption on a given line of the system, all customers on the affected line lose power. In a network system, multiple lines (with multiple switches and conductors) loop through the service area. The system connects each customer to more than one power supply. A network system is more expensive to build than a radial system, but provides greater reliability.

future work at the Company's Alewife Substation that the Hybrid 13.8 kV/DSM/DG Approach would likely require. The Project would provide long-term operational advantages and cost an estimated $4,700,000 less than the 13.8 kV Approach, the next least expensive alternative. Thus, cost, construction impacts, and anticipated benefits of operation all make the Project preferable to the alternatives.

NSTAR considered two alternatives to the Project route, the Concord Avenue Route and the Industrial Park Route. Construction problems associated with each route alternative were greater than those associated with the proposed route for the Project. Construction of the Project along both alternative routes would disrupt traffic at the Alewife Brook Parkway Rotary, the intersection of several heavily traveled roadways. Along the Concord Avenue Route, installing the Project within the shoulder or near the center of Concord Avenue would be more technically difficult and time consuming than the proposed Project route. The Industrial Park Route would require crossing streets with existing infrastructure and making engineering accommodations accordingly. Crossing Blair Pond for the Industrial Park Route would be more difficult, and would involve more impacts, than crossing Wellington Brook for the proposed Project route.

The Company explored a reasonable range and number of project and route alternatives for the Project. The Project is superior overall to the project alternatives evaluated by the Company. The alternative routes are longer and would involve more disruptive construction impacts in the community. Accordingly, the Department finds the Company's decision to pursue the Project rather than the alternatives is reasonable.

3. Impacts of the Proposed Use

In accordance with its responsibility to undertake a broad and balanced consideration of the general public interest and welfare, the Department examines the potential impacts associated with the Project.

a. Construction

Both BMLD and NSTAR have established outreach teams and scheduled meetings to keep Belmont and Cambridge residents informed of local Project developments and their potential impacts (Exh. DPU 1-12). The proponents plan to use their outreach teams to communicate with citizens and local officials throughout the permitting and construction processes (id.).

BMLD would oversee its contractor's construction of the Project (Exh. DPU 1-48).[13] Project construction and any associated impacts would occur over approximately ten months, from May 2015 to March 2016, with construction at the Flanders Road Substation site beginning in early spring of 2015 and ending at the end of the same year in December (Exh. DPU 1-37). Construction would usually start at 7:00 a.m. and end at 5:00 p.m., Monday through Saturday, but could continue until 6:00 p.m., with sufficient daylight permitting (Tr. at 14-15). The MBTA has announced that no Fitchburg Line commuter rail service would run on summer weekends in 2015; therefore, for the length of its duration, BMLD and its contractor would take advantage of this weekend service suspension to construct the Project on a six-day-a-week schedule, Monday through Saturday (id.).

[13] Among other specific responsibilities, the contractor would choose construction staff and determine construction methods (Exh. DPU 1-48).

The Company stated that construction of transmission lines for the Project would proceed at the rate of approximately 100 linear feet per day (Tr. at 115). Workers and equipment would relocate every three to five days along much of the Project route (id. at 114). At five locations, however, NSTAR indicated that installing the Project transmission lines would require micro-tunneling (id. at 116). According to the Company, micro-tunneling would take two or three weeks per location, depending on crossing and culvert size (id.). During micro-tunneling at each location, there would be one or more periods of continuous construction extending 24 hours or more (id. at 118).[14] The Company stated that, to mitigate the duration of construction impacts, it would use micro-tunneling at a number of locations simultaneously (id. at 115-116). No bedrock was encountered during drilling of test wells and soil borings along the Project route and, therefore, the Company does not foresee any blasting as part of construction (id. at 140).

Construction would necessitate planned outages of each of a pair of existing 115 kV lines, but one of the paired 115 kV lines would always remain in service (Exh. DPU 1-17). Therefore, NSTAR anticipates no customer outages associated with construction (Tr. at 84-85). NSTAR indicated that it would coordinate its planned equipment outages with ISO New England, Inc. ("ISO-NE") for spring and fall periods (Tr. at 84-85). The Company explained that loads in these seasons are lower and the remaining local lines would have the capacity to meet area transmission service and distribution substation needs during construction (Exh. DPU 1-17; Tr. at 84-85).

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[14] NSTAR stated that it would work with BMLD on outreach to notify commercial and residential abutters on either side of the MBTA tracks of impending construction activities (Tr. at 118-119). Construction safety and noise impacts are discussed in Sections II.C.3.g and II.C.3.h, below.

b. Land Use Impacts

An active MBTA rail corridor, characterized by regular train passage generating dust and noise, is the predominant land use in the immediate vicinity of the underground Project transmission lines (Exh. NSTAR-1, at 21). The rail corridor adjoins an area of mixed use that includes forest, transitional, and water resource areas as well as commercial, industrial, and residential properties (id.). To the north of the rail corridor are existing commercial buildings; residential buildings under construction (Exh. DPU 1-28); the Fitchburg Cutoff Bike Path; and the Alewife Brook Reservation (Exh. NSTAR-1, at 21-22). An existing apartment development stands approximately 250 feet from the Proposed Line north of the rail corridor in the area of the planned Flanders Road Substation (id. at 22). Land use in the immediate vicinity of the Flanders Road Substation is consistent with the zoning of that location for general business (Tr. at 47; Exh. NSTAR-1, exh. 8).

Adjacent to the south side of the MBTA Corridor are industrial, open space, office, and general business land uses (Exh. NSTAR-1, at 21). Residential land uses are not immediately adjacent to the south of the MBTA Corridor (id. at exh. 8). Open space consists of both land and water resources, including Blair Pond, which is owned and managed by the Massachusetts Department of Conservation and Recreation ("DCR") (id. at 23-24). Industrial uses include a sand and gravel operation, a transfer station, and a lumberyard (id.).[15,16]

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15 The Company stated that parking lots and train tracks along the MBTA corridor buffer nearby existing properties and those under development located to the north of the Project (Exh. NSTAR-1, at 22). The Company also stated that area properties typically use sealed heating, ventilation, and cooling ("HVAC") systems that provide additional buffering from commuter rail noise and dust (id.).

The Project is not within, nor would it affect, any Areas of Critical Environmental Concern ("ACEC") (Exh. DPU 1-26). Similarly, the Project does not include, nor would it affect, rare species habitat (Exh. DPU 1-23). Also, there are no state or federally listed rare or endangered species in the Project area (id.). Finally, in a letter issued November 1, 2013, the Massachusetts Historical Commission ("MHC") determined that the Project is unlikely to affect significant historic or archeological resources (Exh. NSTAR-1, exh. 11).

c. Waste, Debris, Contaminated Soil, Hazardous Materials

The Company reported that BMLD would be responsible for management of excavated soil, including any contaminated soil, along the MBTA commuter rail corridor (Exh. NSTAR-1, at 29-30). BMLD or its contractor would handle soil containing any compounds of concern under a Utility Related Abatement Measure ("URAM") in accordance with Massachusetts Department of Environmental Protection ("MassDEP") regulation 310 CMR 40.0460 through 40.0467 (id.; Exh. DPU 1-45).[17] BMLD would otherwise ensure proper handling and disposal of transmission line trench excavation spoils on site (if appropriate), in landfills, or at another specialized location if necessary (Exh. DPU 1-47).

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16 NSTAR stated that it would hire a licensed animal control company if rodents or nesting insects became a hazard to workers, the public, or the electrical system during construction or operation of the Project (Exh. DPU 1-44). Were such problems to arise, BMLD indicated it would require its construction contractor to implement MBTA rodent and pest control practices and to follow any applicable local and state regulations (id.).

17 The URAM would address soil contamination associated with historic urban fill within the Project confines at concentrations above those allowed under Massachusetts Contingency Plan ("MCP") criteria (Exh. DPU 1-45). The MCP is under MassDEP jurisdiction (id.). MassDEP regulates soil contamination remediation under the MCP, 310 CMR 40.000 (Exh. NSTAR-1, at 29-30).

BMLD would develop a Spill Prevention, Control, and Countermeasure ("SPCC") Plan in conjunction with its construction and operation of the Flanders Road Substation (Exh. DPU 1-47). Each of the two 115 kV to 13.8 kV power transformers at the Flanders Road Substation would have containment structures of sufficient capacity to retain all transformer fluids in case of a catastrophic leak (id.). The Company indicated that construction of the Flanders Road Substation would include oil/water separators and a holding tank to prevent any fluids from migration beyond the substation property should accidental leakage occur (id.). In addition, NSTAR noted that it has a standard process for filling and operating the HPFF cables that it will use for the Proposed Line (id.). The Company will use this process to minimize potential spills of dielectric fluid at its North Cambridge Substation and will thereafter update its SPCC for that facility to reflect the addition of the Proposed Line (id.).

d. Vegetation Management

The Company indicated that, in conjunction with the Project, some tree removal would likely occur within the MBTA easement and within the 100-foot buffer zone of the bordering vegetated wetland at Blair Pond and Wellington Brook (Exh. DPU 1-23; Tr. at 119-126). The Company indicated that tree removal, however, would not significantly modify the habitat at the identified locations (Tr. at 119-126, 132-133). During Project construction, the Company would conduct tree and other vegetation removal using mechanical equipment (Exh. DPU 1-42). After construction, NSTAR would apply its Integrated Vegetated Management ("IVM") Plan to the control of vegetation in the ROW of the Proposed Line (id.). The IVM calls for controlling vegetation with both mechanical cutting and selective herbicide application (id.). NSTAR states that it maintains its ROWs with only those herbicides recommended by the Commonwealth of

Massachusetts Department of Agriculture Resources for use in sensitive areas, pursuant to 333 C.M.R. § 11.04(1)(d) (Exh. DPU 1-42; RR-DPU-7; Tr. at 132-135).

e. Wetland and Water Resources

NSTAR identified a small temporary impact to wetland resource areas as a result of Project construction (Exh. DPU 1-24). The Company estimated a temporary disturbance of 0.68 acres (2,989 square feet) of Riverfront Area at Wellington Brook (id.).[18] Laydown and temporary construction access for Project construction would temporarily disturb approximately 3.28 acres (143,000 square feet) of Bordering Land Subject to Flooding ("BLSF") (id.). NSTAR indicated that it plans to restore the affected BLSF to pre-construction elevations; there would be no loss of flood storage capacity (id.).[19]

To minimize erosion and sediment transport from construction areas to resource areas, the Company proposed updating and applying an existing Storm Water Pollution Prevention Plan ("SWPPP") initially drafted for use at the Flanders Road Substation. The SWPPP would guide construction contractors at the Flanders Road Substation and along the Project transmission line, and NSTAR construction crews at its North Cambridge Substation (Exh. DPU 1-46).[20]

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18 Redesign of a planned Wellington Brook crossing to use micro-tunneling beneath the water body has eliminated permanent wetland resource impacts at this location (Exh. DPU 1-24).

19 The Company stated that, while it anticipates restoring BLSF contours to their original grade, it plans to limit the height of replacement vegetation in accordance with NSTAR's ROW maintenance procedures (Tr. at 123-124).

20 NSTAR Electric would also submit the SWPPP to the Cambridge Department of Public Works in compliance with Land Disturbance Regulations of the City of Cambridge (Exhs. DPU 1-46; DPU 1-11(1)).

The Company stated that use of sump pumps for dewatering would maintain trench excavation stability and enable in-trench construction to proceed under dry conditions (Exh. NSTAR-1, at 26). The Company noted that it does not anticipate long-term impacts to groundwater from the Project, nor impacts to wellhead protection areas or water supply resource areas (id.).

f. Visual Impacts

The Company stated that, in general, the visual character of the Project area would not change from the perspective of either building occupants or passers-by (Exh. DPU 1-27). NSTAR indicated that the impact south of the MBTA ROW would be minimal for two reasons: first, because the Project is an underground line and would not require construction of new or larger structures in the MBTA ROW; and, second, because buildings along the southern edge of the MBTA ROW already have relatively open corridor views (Exh. DPU 1-27). The Company acknowledged that, along the north side of Blair Pond, Project construction may require removal of taller vegetation with some limited impacts to views (id.).[21] In addition, selective reduction in vegetative screening would slightly affect the view from a few buildings along the south side of the rail corridor (id.; Exh. DPU 1-27(1)).

The Company stated that landscaping at the Flanders Road Substation in connection with the Project would improve current views from the north and east of the site (Exhs. DPU 1-27, DPU 1-39). A combination of evergreen (arborvitae and blue holly) shrubs would line the northern edge of the Flanders Road Substation building (Exh. DPU 1-39). The eastern plantings

[21] NSTAR Electric reported that one benefit of the proposed trenchless crossing at Blair Pond would be protection of most, if not all, the vegetation immediately above the culverts (Tr. at 126).

would consist of a mixture of deciduous hardwood and understory trees in addition to evergreen shrubs (id.). The Project would not create intrusive lighting in the area since outdoor lighting fixtures to be installed at the Flanders Road Substation would be downward facing and the Project would not require lighting along the Proposed Line or at NSTAR's North Cambridge Substation (Exh. DPU 1-38).

g. Traffic and Safety

According to NSTAR, BMLD's contractor would handle crew parking, transportation, and safety for what would likely be a maximum of three twelve-person crews during peak construction (Exh. DPU 1-48). BMLD expects that construction activities would occur largely at the Flanders Road Substation site and along the MBTA Corridor, with staging for Proposed Line construction confined to the fenced-in area of the MBTA's ROW (id.; Tr. at 139).[22] The Company contends that Project construction would result in minimal interference to rail and road traffic and no impact to the bikeway located to the north of the MBTA rail corridor (Exhs. DPU 1-51; DPU 1-52; Tr. at 138-139). With respect to rail traffic, the Company stated that the MBTA's requirement that trained flaggers be present when construction activities take place would help ensure compliance with railroad operation and safety procedures (Exh. DPU 1-52; Tr. at 142-143). Construction supervisors would be present to monitor construction crews' adherence to safety procedures (Exh. DPU 1-52). An NSTAR substation

[22] The Company indicated that the "critical" distance for MBTA operations is 15 feet from the rail; Project construction at its closest location would be 22 feet from the rail and as much as 100 feet from the rail in the Mooney and Fawcett Street (Cambridge) area (Tr. at 141). Planned realignment by the MBTA of its Fitchburg track in the spring of 2015 would add an extra seven feet of clearance between the track and the Project (id.).

operator would supervise contractors' work and adherence to safety procedures in the Company's North Cambridge Substation (id.).

The Company stated that Project construction would not impede the progress or safe passage of emergency vehicles (Exh. DPU 1-52). The Company expects, however, that trenching and conduit system installation for the transmission line might affect vehicular traffic temporarily (Exh. NSTAR-1, at 28-29). For these and any other construction activities that interrupt traffic flow, especially in areas of heavier traffic near the Project location, the Company indicated that the construction contractor would develop a traffic management plan with local officials to ensure minimal impacts to motorists (id.).

h. Noise Impacts

According to NSTAR, construction crews working on the Project transmission line would proceed linearly, relocating equipment and activities every three to five days; therefore, noise impacts associated with construction of the Proposed Line at any one location would be of short duration (Exh. DPU 1-35).[23] NSTAR also indicated that operational changes on the Fitchburg rail line over the Project construction period, in addition to summer-specific changes, would allow BMLD and its contractor to confine most heavy construction and associated noise to daytime hours, 7:00 a.m. to no later than 6:00 p.m., Monday through Saturday (Tr. 14-15). Exceptions to the anticipated Project construction schedule would be those activities requiring work on a 24-hour continuous basis until completed (id. at 14-15). Noise impacts of these

[23] Only a small portion of the Proposed Line within the MBTA Easement (approximately 50 feet) is located in Belmont. Consequently, nighttime or weekend work associated with the Proposed Line in Belmont is anticipated to be of minimal duration (Exh. NSTAR-1, at 27 n.16).

continuous construction activities would depend at least in part on the use, if any, of heavy excavation equipment (Exh. DPU 1-35).

Project construction activities on a 24-hour continuous basis that would not require heavy excavation equipment include: dielectric fluid filling of pipe; evacuating air, moisture and gas from the transformer; dielectric fluid filling of the two power transformers at the Flanders Road Substation; vacuum and pressurization of the HPFF cable; and pre-energization testing (Exh. DPU 1-36). Tunneling, jacking, or boring operations near the railway might involve use of heavy excavation construction equipment. Per MBTA requirements, these excavation activities would have to take place on a 24-hour continuous basis to minimize exposure of railroad tracks to construction hazards (id.; Tr. at 13-14). According to the Company, the majority of all 24-hour construction activities for the Project would take place within NSTAR's North Cambridge Substation and at the Flanders Road Substation, the location of final interconnection activities (Exh. DPU 1-36).

BMLD stated that its contractor would minimize construction noise impacts by limiting any night-time work to low-noise activities (Exh. DPU 1-35). BMLD discussed the potential for an exceedance of local construction noise ordinances with the Cambridge License Commission and the Cambridge Department of Public Works (Exh. DPU 1-34). BMLD stated that it would apply to the Cambridge License Commission for a special variance from the appropriate sections of Cambridge Municipal Code[24] if BMLD and/or its contractor had to carry out work that might result in an exceedance of Cambridge noise ordinances (id.). BMLD noted it would meet with

[24] The referenced sections are Cambridge Municipal Code 8.16.08(F) and subsection B of Section 8.16.090 (Exh. DPU 1-34; RR-DPU-5(3)).

local officials to arrange for noise mitigation or seek an exception to the Belmont Noise By-Law for Project-related work in Belmont as necessary (Exh. NSTAR-1, at 27; RR-DPU-5(2)).

The Company anticipates that very little noise will be generated by the transmission equipment that NSTAR would own and operate at the Flanders Road Substation and by the overall operation of the Flanders Road Substation (Exh. DPU 1-33). The Company indicated that plans for the Flanders Road Substation include the installation of two low-noise transformers (Exh. DPU 1-32). The transformers, equipped with low-noise fans, would be located inside the building in individual bays with sound walls on three sides (id.).

The Company stated that operation of the Flanders Road Substation would be in compliance with the most restrictive nighttime noise limits in the Town of Belmont and the City of Cambridge, and in compliance with MassDEP's noise policy (Exh. DPU 1-32; Tr. at 108-111, 145).[25] Based on noise measurements, the Company estimated that the background nighttime noise level at the Substation is 35 dBA (RR-DPU-5(1) at 9). The Company stated that with normal operation (i.e., no fans operating) the maximum noise impact would not result in any noise increase over that background level (id. at 16). Even with fans running, the maximum noise impact would be no more than 40 dBA (id.). Consequently, the maximum noise increase would fall well within the 10 dBA limit established by MassDEP regulations 310 C.M.R. § 7.10 (id.).

[25] The referenced sections are Cambridge Municipal Code 8.16.08(F) and subsection B of Section 8.16.090 (Exh. DPU 1-34; RR-DPU-5(3)).

i. Air Impacts

NSTAR identified the various measures that would be used to minimize Project air impacts. First, contractual provisions for the Project stipulate that contractors must adhere to all applicable regulations regarding control of dust and emissions (Exh. NSTAR-1, at 23).[26] Second, all construction contracts for the Project would require using USEPA-verified (or equivalent) emission control devices, such as oxidation catalysts or other comparable technologies, in all diesel-powered non-road construction equipment rated 50 horsepower or above to be used for 30 or more days over the course of the Project (id.). In addition, the Company indicated that the operation of all Project-related vehicles would conform to Massachusetts anti-idling statutes and regulation, G.L. c. 90, § 16A, c. 111, §§ 142A-142M, and 310 CMR 7.11 (id.; Tr. at 112-113).

NSTAR noted that the proposed Project would require use of sulfur hexafluoride ("$SF_6$"), a gas identified as a non-toxic but a highly potent greenhouse gas (Exh. DPU 1-40).[27,28] NSTAR estimates that 115 kV switching equipment at the Flanders Road Substation would

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[26] If necessary, construction crews would spray water to control dust generated from earthwork and other construction activities (Exh. NSTAR-1, at 23).

[27] $SF_6$ is a greenhouse gas that is 23,900 times more potent than carbon dioxide ("$CO_2$"). One pound of $SF_6$ has the same global warming impact as eleven tons of $CO_2$. See the Massachusetts Clean Energy and Climate Plan for 2020, at 77.

[28] The Massachusetts Clean Energy and Climate Plan for 2020, issued by the Secretary of Energy and Environmental Affairs on December 29, 2010, adopts a 2020 statewide greenhouse gas emissions limit 25 percent below 1990 emissions levels and sets forth an integrated portfolio of policies to reach the Commonwealth's clean energy and climate goals. Reduction of an amount of $SF_6$ equivalent to a reduction of 0.2 million metric tons of $CO_2$ is one of the policies set forth in the Plan. See G.L. c. 21N and the Massachusetts Clean Energy and Climate Plan for 2020.

contain approximately 3,280 pounds of $SF_6$ in gas-insulated switchgear (id.). The Company stated that the new equipment would have an emission rate of less than 0.1 percent per year, the lowest known leakage rate for this equipment type (Exh. DPU 1-40).[29] For calendar year 2013, NSTAR's Massachusetts equipment had a nameplate capacity of 99,730 pounds of $SF_6$ and emissions of 917.5 pounds of $SF_6$, for a leakage rate of 0.92 percent (id.).[30]

j. Magnetic Fields

Based on its power-flow models, inputs, and assumptions, the Company and its consultant calculated pre-Project magnetic fields reflecting peak load and high transfers from north to south in the Boston area (Exh. NSTAR-1, exh. 12, at 10-11). To determine post-Project magnetic fields, NSTAR ran ISO-NE system power-flow models for Year 2023, with all lines in service (id.). The Company explained that, in making its calculations, it used a system annual peak load ("APL") estimated from the ISO-NE Year 2023 Capacity, Energy, Loads, and Transmission ("CELT") Report based on the 90/10 peak load forecast (id.).[31,32,33]

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29 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 NSTAR comply with a declining $SF_6$ emission rate standard by 2020 (see 310 C.M.R. § 7.72).

30 The Company joined the U.S. Environmental Protection Agency's ("USEPA") $SF_6$ Emissions Reduction Partnership for Electric Power Systems in 2006 but now reports under the current mandatory USEPA program (Exh. DPU 1-40).

31 The Company states that the models used include transmission changes approved by ISO-NE and included in the ISO-NE system for 2023 (Exh. NSTAR-1, exh. 12, at 10). The Year 2023 model represents the New England transmission grid five years after anticipated completion of the Project and related construction, as well as all resulting associated system changes (id.).

NSTAR's consultant modeled magnetic fields at the forecasted 2023 peak load using a shielding effect factor of ten[34] applied to the calculations (Exh. NSTAR-1, exh. 12, at 4). In addition to mitigation of magnetic fields by the surrounding steel pipe, the Project's pipe-type conduit design places the three phase conductors of the transmission lines in close proximity (Exh. DPU 1-61). The Company's consultant states that this proximity yields a cancellation effect on the magnetic field of each phase conductor by the magnetic fields of the other two phase conductors (id.).

**Table 2. Modeled Magnetic Fields Along Cables in the MBTA Corridor**

| Shielding Factor | Location | Magnetic Fields in milligauss ("mG") |
|---|---|---|
| 10 | 8 Feet North of Cable | 0.4 |
| | 8 Feet South of Cable | 0.2 |
| | Maximum Level | 0.9 |

Exh. NSTAR-1, exh. 12 at 12, 15.

NSTAR's consultant reported that maximum magnetic fields at the Flanders Road Substation southern fence line would be about 35 mG and the maximum at the northern fenceline

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32 The 90/10 peak load is a load forecast assuming a severity of heat for which there is a 90 percent probability that the actual maximum heat for the summer season will be less than the forecast and a 10 percent probability that it will be higher.

33 The APL forecast as projected for 2023 results in a net 33 MVA load on the Flanders Road Substation (Exh. NSTAR-1, exh. 12, at 11).

34 The Electric Power Research Institute ("EPRI") indicates that burying transmission circuits in steel pipe affords ten-fold the protection from magnetic fields that would result in the vicinity of the transmission line installation from simple direct burial of the circuits (Exh. NSTAR-1, exh. 12, at 4). The Company indicates that EPRI considers a shielding factor of ten to represent a conservative estimate of the protective effect of steel pipes under the referenced conditions (id.).

(MBTA Fitchburg commuter rail corridor) would be 7.0 mG; beyond the fence line, the magnetic fields would drop off rapidly with increasing distance (id.).

k. Analysis and Findings

Operational noise from the Flanders Road Substation would be mitigated by the use of low-noise transformers placed within the Substation building. Noise impacts associated with the Project would primarily stem from construction.

The Company proposed Project construction on a six-day-a-week 7:00 a.m. to 6:00 p.m. schedule through the summer months of 2015. The Company expects that a planned suspension of service on the Fitchburg commuter rail line and longer hours of daylight would make the proposed schedule feasible. The Company anticipates maintaining the same construction schedule for as long as the commuter rail schedule and extended hours of daylight permit. Construction would otherwise take place within the hours of 7:00 a.m. to 5:00 p.m. six days a week, as Fitchburg commuter rail service allows.

Recognizing the merits of expeditious construction of the Project, particularly given mixed commercial and residential land uses in the surrounding area, the Department approves the Project construction schedule proposed by the Company of: (1) between 7:00 a.m. and 5:00 p.m. generally, and until 6:00 p.m. as daylight permits; and (2) on a Monday through Saturday schedule, as coordinated with the MBTA regarding Fitchburg commuter rail service. Should the Company need to extend construction work beyond those days or hours, the Company is directed to seek written permission from the relevant municipal authorities prior to the commencement of such work and to provide the Department with a copy of such permission. If the Company and

municipal officials are not able to agree on whether such extended construction days or hours should occur, the Company may request prior authorization from the Department.

To minimize noise impacts of construction, the Department encourages the Company to limit any night work to low-noise activities, to the extent possible. The Department also directs that NSTAR minimize construction noise by using well-maintained mufflers and by conforming to the Massachusetts anti-idling regulation.

Use of well-maintained mufflers in addition to operating vehicles and equipment in conformance with Massachusetts anti-idling regulation would help limit air emissions as well as noise impacts from the Project. The Company has agreed that all diesel-powered non-road construction equipment rated 50 horsepower or above to be used for 30 or more days over the course of the Project would be retrofitted. The Department, consistent with its requirements, directs NSTAR to ensure that: (1) all diesel-powered non-road construction equipment with engines rated at 50 horsepower and above, to be used for 30 or more days over the course of Project construction, have USEPA-verified or equivalent emission control devices installed; and (2) all vehicle idling be limited, generally to five minutes, in accordance with MassDEP regulations. See NSTAR Electric Company, D.P.U. 13-126/13-127, at 29 (2014) ("Electric Avenue"); NSTAR Electric Company, D.P.U. 13-64, at 24-25 (2014) ("Barnstable"); New England Power Company, D.P.U. 10-77, at 37 (2011) ("Easton-Mansfield").

Project-related air emissions also include fugitive emissions of $SF_6$ from the 115 kV Substation Facilities. NSTAR has proposed installing circuit breakers at the Flanders Road Substation with a design annual $SF_6$ leakage rate of less than 0.1 percent per year. The Company's proposal would meet the Company's $SF_6$-related obligations under USEPA and

MassDEP. The Department directs NSTAR to inform the Department if it adds $SF_6$ to any equipment at the Flanders Road Substation or replaces any equipment there due to $SF_6$ loss within five years of the completion and initial operation of the Project, after which time, the Company would consult with the Department to determine whether the Department would require continued reporting, as deemed appropriate.

Area land uses would not change as a result of construction and operation of the Project; views would largely remain the same. The Project would not likely affect significant historic or archeological resources. The Department also observes that the Project is not in an ACEC or an area of rare species habitat.

The Company would apply its IVM Plan after construction to minimize impacts to vegetation along the Project ROW. BMLD or its contractor would handle contaminated soil in accordance with MassDEP regulations, and would otherwise ensure proper management of trench excavation soils. Best management practices for in-trench construction would minimize permanent impacts to groundwater from the Project.

Use of micro-tunneling at Wellington Brook and restoration of most wetland and water resource areas disturbed in the construction process would minimize permanent impacts to these resources. The Company has proposed updating and application of an existing SWPPP to limit erosion and sediment transport related to Project construction. The Department directs that the Company submit a copy of the updated SWPPP when finalized. Both BMLD and NSTAR would apply SPCC Plans to construction and operation of Project components where appropriate at the Flanders Road Substation and the North Cambridge Substation. The Department directs the Company to submit copies of these SPCC Plans when finalized.

Development of a traffic management plan in coordination with local officials would mitigate potential impacts to vehicle flow on local roadways. It would also ensure safe passage for emergency responders and equipment. Coordination with transportation officials would address potential safety concerns associated with Project construction along the MBTA Corridor. Enclosure in underground steel ducts would minimize magnetic fields from the Proposed Line; the magnetic field levels for the Project overall have also been minimized.

The Department concludes that with the Project's compliance with: (1) all applicable federal, state, and local laws and regulations; (2) the avoidance, minimization and mitigation measures that NSTAR has stated it would implement during Project construction; and (3) the Department's conditions as discussed above and set forth below, the impacts of the Project would be minimized.

4. Conclusion on Public Convenience and Welfare

Based on the foregoing analysis of: (1) need for or public benefit of use; (2) alternatives explored; and (3) impacts of the proposed use, the Department finds that the benefits of the Project exceed adverse local impacts and, thus, that the proposed use is reasonably necessary for the public convenience or welfare.

D. Exemptions Required

1. Introduction

The Company seeks two individual exemptions from specific sections of the Town of Belmont Zoning By-Law (Exh. NSTAR-2, at 44). The Company does not seek a comprehensive exemption from the Belmont Zoning By-Law, nor does it seek any exemption from the provisions of the Cambridge Zoning Ordinance (Exh. DPU 1-10).

NSTAR states that it seeks zoning relief because the construction of the Project is required as quickly as possible (Exh. NSTAR-2, at 2). BMLD asserts that it faces an "imminent" need to add firm supply for its growing customer load and to modernize and improve its aging distribution system (Exh. NSTAR-2, at 2). By granting the requested Zoning By-Law exemptions, the Company argues, the Department would expedite construction and operation of the Project (Exh. NSTAR-2, at 2). Quick construction of the Project, and its operation by NSTAR, would enable the Company to provide reliable transmission service to BMLD so that BMLD may continue to serve its customers in a reliable manner (Exh. NSTAR-2, at 2).

2. Individual Exemptions

The Company seeks exemptions from Sections 3.2 and 3.3 of the Belmont Zoning By-Law. These provisions are interrelated, and so will be examined together (Western Massachusetts Electric Company, D.P.U. 09-24/25 (2010)) (closely related zoning provisions are grouped together for analysis); see also, NSTAR Electric Company, D.P.U. 13-14, at 27-28 (2014).

**Table 3: NSTAR'S Position – Belmont Zoning By-Law Exemptions**

| Individual Zoning Exemption Requested | Relief Available from Town | Why the Project Cannot Comply: Company's Position |
|---|---|---|
| Use Regulations Schedule<br><br>Section 3.2 | Special Permit | The 115 kV Substation Facilities cannot be classified under any of the categories listed in the Belmont Zoning By-Law (Exh. NSTAR-2, at 8). Pursuant to this section, therefore, NSTAR would need to obtain a special permit from the Belmont Board of Appeals (Exh. NSTAR-2, at 8). The special permit section of the Belmont Zoning By-Law, § 7.4.3, lists 13 separate criteria that should be used to evaluate an application for a special permit (Exh. NSTAR-2, exh. A, at 125, 126). The Company asserts that these criteria are subjective (Exh. NSTAR-2, at 8). This subjectivity creates uncertainty and could result in lengthy and costly appeals (Exh. NSTAR-2, at 8). |
| Use Regulations Schedule<br><br>Section 3.3 | Special Permit | This section constitutes the "Schedule of Use Regulations" (Exh. NSTAR-2, at 7); and the Schedule does not contain a category for a public utility or substation use (Exh. NSTAR-2, at 7). While the Schedule does contain a category entitled "Other Municipal Uses" (Exh. NSTAR-2, at 7), when the 115 kV Substation Facilities are conveyed to NSTAR, the NSTAR Facilities would no longer be considered a municipal use (Exh. NSTAR-2, at 7). Consequently, the Company would need to obtain a Special Permit (Exh. NSTAR-2, at 7). As mentioned above, the special permit section of the Belmont Zoning By-Law, § 7.4.3, lists 13 separate criteria that should be used to evaluate an application for a special permit (Exh. NSTAR-2, exh. A at 125-126). The Company asserts that these criteria are subjective (Exh. NSTAR-2, at 8). This subjectivity creates uncertainty and could result in lengthy and costly appeals (Exh. NSTAR-2, at 8). |

3. Analysis and Findings

For the reasons set forth in the table above, the Department accepts the Company's argument: NSTAR would need to obtain a special permit in order for it to own and use as constructed the 115 kV Substation Facilities. The Department also concurs with the Company's assertion that the criteria for obtaining special permits are subjective. This subjectivity creates uncertainty and could result in lengthy and costly appeals. Therefore, granting the Company's request for individual zoning exemptions removes an obstacle that could delay the Project.

Consequently, the Department finds that the Company requires exemptions from Belmont Zoning By-Law Sections 3.2 and 3.3.

4. Consultations with Municipalities

a. Introduction

Prior to seeking zoning relief from the Department, a Company representative met with a number of Belmont officials on March 17, 2014 (Exh. NSTAR-2, at 9). These officials included a Selectman, the Town Administrator, the Director of Community Development and the Planning Coordinator (Exh. NSTAR-2, at 9). In addition, BMLD worked closely with the Town's Site Selection Committee to identify and evaluate the various potential substation sites in Belmont (Exh. NSTAR-1, at 19-20). Furthermore, from November 2011 through January 2012 BMLD held a series of meetings with, and presentations to, various town boards, committees, organizations, and residents (Exh. NSTAR-1, at 20).

On February 8, 2012, Belmont's Special Town Meeting voted unanimously to authorize the Board of Selectmen to acquire the property at 20 Flanders Road for the construction of a new substation (Exh. NSTAR-1, at 20). Furthermore, on that date the Town Meeting also voted unanimously to authorize the bonding necessary to fund the development and construction of the new substation and the Proposed Line (Exh. NSTAR-1, at 20). Additionally, on April 24, 2014, the Belmont Board of Selectmen sent a letter to NSTAR specifically "confirm[ing] that the Town supports NSTAR's plan to request from the DPU a zoning exemption for NSTAR's operation of the NSTAR 115 kV Substation Facilities" (Exh. NSTAR-2, exh. I).

b. Analysis and Findings

The Department continues to favor the resolution of local issues on a local level whenever possible to reduce concern regarding any intrusion on home rule. Russell Biomass LLC/Western Massachusetts Electric Company, EFSB 07-4/D.P.U. 07-35/07-36, at 60-65 (2009) ("Russell"). The Department believes that the most effective approach for doing so is for applicants to consult with local officials regarding their projects before seeking zoning exemptions pursuant to G.L. c. 40A, § 3. NSTAR Electric Company, D.P.U. 13-126/13-127, at 29 (2014) ("Electric Avenue"); NSTAR Electric Company, D.P.U. 13-64, at 24-25 (2014) ("Barnstable"); New England Power Company, D.P.U. 12-02 (2012) at 33-34 ("Westborough").

In the present case the Company and BMLD had multiple contacts with various authorities from Belmont as well as Belmont residents. The record shows that the Town of Belmont supports the granting of the individual zoning exemptions sought by NSTAR. Consequently, the Department finds that NSTAR, acting in concert with BMLD, has made a good faith effort to consult with municipal authorities and that these consultations were consistent with the spirit and intent of Russell. Accordingly, the Department grants the requested zoning exemptions.

## III. REQUEST FOR AUTHORITY TO CONSTRUCT AND USE TRANSMISSION LINE PURSUANT TO 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:

> 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.[35]

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. NSTAR Electric Company, D.P.U. 13-177/178, at 41 (January 7, 2015) ("Seafood Way"); Westborough, at 37-38 (2012); NSTAR Electric Company/New England Power Company d/b/a National Grid, D.P.U. 11-51, at 6 (2012). 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 Findings

In evaluating petitions filed pursuant to G.L. c. 164, § 72, the Department relies on the standard of review established for G.L. c. 40A, § 3, used above for determining whether the

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[35] 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.

Project is reasonably necessary for the convenience or welfare of the public. Based on the record in this proceeding and compliance with the directives and mitigation discussed in Section II.C.3.k, above, and compliance with applicable state and local regulations, the Department finds pursuant to G.L. c. 164, § 72, that the proposed transmission line is necessary for the purpose alleged, will serve the public convenience, and is consistent with the public interest.

## IV. SECTION 61 FINDINGS

The Massachusetts Environmental Policy Act 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 EIR is submitted to the Secretary of Energy and Environmental Affairs, and should be based on such EIR. Where an EIR is not required, Section 61 findings are not necessary. 301 C.M.R. § 11.01(3). NSTAR submitted the affidavit of Cindy J. Markowitz in which she asserts that the Project does not require the filing of an Environmental Notification Form with the Secretary of the Executive Office of Energy and Environmental Affairs (Exh. NSTAR-1, at exh. 14). Accordingly, Section 61 findings are not necessary in this case (NSTAR Barnstable at 37).[36]

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[36] The Department 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 Department nonetheless notes that this Project would have low greenhouse gas emissions because it does not itself generate power and because the new switchgear equipment has reduced leakage rates to a level lower than MassDEP standards. As such, the Project would have minimal direct emissions from a stationary source under normal operations and would have minimal indirect emissions from transportation sources limited to construction, occasional repair, or maintenance

V. ORDER

Accordingly, after due notice, hearing, and consideration, it is hereby

ORDERED: That the Petition of NSTAR Electric Company seeking approval pursuant to G.L. c. 164, § 72, to own, and operate and use as constructed, new 115 kV underground transmission line segments in Belmont and Cambridge is granted; and it is

FURTHER ORDERED: That the Petition of NSTAR Electric Company seeking specific exemptions from the operation of the Zoning By-Law of the Town of Belmont in connection with NSTAR's proposal to own, operate, and use as constructed, certain transmission facilities at a new 115/13.8 kV electrical substation located at 20 Flanders Road in Belmont, is granted; and it is

FURTHER ORDERED: That NSTAR must accept responsibility to ensure that BMLD constructs the Project as described in this Order, and further, that BMLD complies with any directives and conditions imposed by the Department in this Order; and it is

FURTHER ORDERED: That the Department approves the Project construction schedule proposed by the Company of: (1) between 7:00 a.m. and 5:00 p.m. generally, and until 6:00 p.m. as daylight permits; and (2) on a Monday through Saturday schedule, coordinated with the MBTA regarding Fitchburg commuter rail service. Should the Company need to extend construction work beyond those days or hours, the Company is directed to seek written permission from the relevant municipal authorities prior to the commencement of such work and to provide the Department with a copy of such permission. If the Company and municipal

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activities (NSTAR Barnstable at 37 n.18). The Department addresses Project $SF_6$ emissions in more detail in Section II.C.3.i.

officials are not able to agree on whether such extended construction days or hours should occur, the Company may request prior authorization from the Department; and it is

FURTHER ORDERED: That the Company minimize construction noise by using best construction practices (e.g., use of well-maintained mufflers); and it is

FURTHER ORDERED: That NSTAR inform the Department if it adds $SF_6$ to any equipment at the Flanders Road Substation or replaces any equipment there due to $SF_6$ loss within five years of the completion and initial operation of the Project, and thereafter consult with the Department to determine any continued reporting required by the Department; and it is

FURTHER ORDERED: That NSTAR ensure that (1) all diesel-powered non-road construction equipment with engines rated at 50 horsepower and above, to be used for 30 or more days over the course of Project construction, have USEPA-verified or equivalent emission control devices installed; and (2) that all vehicle idling be limited, generally to five minutes, in accordance with MassDEP regulations; and it is

FURTHER ORDERED: That NSTAR obtain all other governmental approvals necessary for the Project; and it is

FURTHER ORDERED: That NSTAR ensure that the Company, its employees, and any and all contractors and subcontractors associated with the Project, comply with all applicable federal, state and local laws and regulations for which the Company has not received an exemption, including those pertaining to noise, emissions, herbicides, and hazardous materials; and it is

FURTHER ORDERED: That NSTAR and its successors in interest notify the Department of any significant changes in the planned timing, design, or environmental impacts

of the Project so that the Department may decide whether to inquire further into a particular issue; and it is

FURTHER ORDERED: That within 90 days of Project completion, NSTAR submit a report to the Department 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; and it is

FURTHER ORDERED: That because the issues addressed in this Order relative to this Project are subject to change over time, construction of the Project commence within three years of the date of this Order; and it is

FURTHER ORDERED: That the Secretary of the Department transmit a certified copy of this Order to the Office of the Town Clerk of Belmont and the Office of the City Clerk of Cambridge, and that NSTAR serve a copy of this Order, within five business days of its issuance, on (1) the Board of Selectmen, the Planning Board, the Zoning Board of Appeals, and the Conservation Commission for the Town of Belmont, and (2) the Mayor and City Council members, the Planning Board, and the Zoning Board of Appeals for the City of Cambridge, and

certify to the Secretary of the Department within ten business days of its issuance that such service has been accomplished.

By Order of the Department:

/s/
_____
Angela M. O'Connor, Chairman

/s/
_____
Jolette A. Westbrook, Commissioner

/s/
_____
Robert Hayden, Commissioner

An appeal as to matters of law from any final decision, order or ruling of the Commission 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 Commission be modified or set aside in whole or in part. Such petition for appeal shall be filed with the Secretary of the Commission within twenty days after the date of service of the decision, order or ruling of the Commission, or within such further time as the Commission 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. G.L. c. 25, § 5.