Public Service of New Hampshire
Seacoast Reliability Project

Eelgrass Monitoring Plan
FINAL

Durham to Newington, NH

Presented To:
Public Service Company of New Hampshire
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Table of Contents

List of Figures

1.0 Introduction

Eversource Energy is constructing a new 115 kilovolt transmission line between their existing Madbury and Portsmouth substations to enhance the electric reliability in the seacoast region. On January 31, 2019, the NH Site Evaluation Committee (SEC) approved a permit application from Eversource for the Seacoast Reliability Project (SRP), located in the Towns of Madbury, Durham and Newington as well as the City of Portsmouth, in Strafford and Rockingham Counties, New Hampshire. The SRP transmission line will be approximately 12.9 miles long, including a 0.9 mile crossing under Little Bay.

Eversource has designed the SRP to avoid environmental impacts where possible. Temporary impacts to estuarine benthic habitat are unavoidable in Little Bay due to the proposal to bury the three submarine cables between 3.5 and 5 feet in the substrates via jet plow. The submarine cable crossing will directly impact a corridor approximately 100 feet wide along the 0.9 mile cable route. The cable crossing lies within a charted Cable Area approximately 1,000 feet wide.

The SEC Certificate of Site and Facility includes a number of conditions recommended by DES. DES Condition 41 addresses eelgrass surveys and states:

41. Eelgrass Survey: To assess the impact of work associated with laying cable in Little Bay on eelgrass, the Applicant shall conduct an eelgrass survey in the Little Bay estuary the summer before construction commences and, if directed by NHDES, approximately one year after work is completed. At least ninety (90) days prior to the scheduled date for conducting the pre- construction survey, the Applicant shall submit a plan describing

- how, when and where the survey will be conducted;
- how results will be assessed to determine impact on eelgrass;
- how and when results will be reported to NHDES;
- mitigation measures that will be implemented based on eelgrass impacts and recovery; and
- when the data will be provided to NHDES in a geodatabase that NHDES can use to update its current eelgrass GIS coverage.

The Applicant shall then implement the approved plan. To the maximum extent practicable, the methodology for conducting the survey shall be consistent with recent surveys conducted for the Piscataqua River Estuaries Program (PREP). Results of the pre-construction survey shall be submitted to NHDES no less than thirty (30) days prior to the scheduled cable installation date and shall be approved by NHDES prior to cable installation in Little Bay. A report comparing the pre to post- construction survey results shall be submitted to NHDES for approval no more than ninety {90) days after the post-construction survey is completed. Modifications to this condition may be allowed at the discretion of NHDES.

No known eelgrass (*Zostera marina*) has been documented in the project area since 2012, but the SRP has agreed to conduct additional monitoring immediately before, and potentially the year after, the cable installation. The following text and plans describe the existing conditions, construction activities, and plans for pre- and post-construction monitoring of the cable crossing area for eelgrass.

2.0 Eelgrass in the Great Bay Estuary

Eelgrass is the most widespread aquatic vegetation in the Great Bay system, and provides significant habitat values and functions both biologically and physically (Thayer et al. 1984; Jones 2000). In the Great Bay system, the plants create a three-dimensional structure on an otherwise flat substrate. This structure provides refuge, settlement surfaces, and feeding opportunities for numerous invertebrates and finfishes. Invertebrates, including lobsters, and finfishes, including winter flounder, have been documented as using eelgrass beds as breeding or nursery grounds. Plant growth is typically greatest from May through August (Nedeau 2004). Light penetration, or water clarity, is a critical factor in controlling the depth at which eelgrass can survive (Morrison et al. 2008) and can be affected by phytoplankton, suspended sediments, and colored dissolved organic matter. Based on the assumption that eelgrass needs 22% of surface incident light to survive (Koch 2001), Morrison et al. (2008) predicted that the survival depth of eelgrass in Little Bay would range from 1.068 to 1.679 m (3.4 to 5.4 feet) below mean water level (MWL) and average 1.404 m (4.5 feet) below MWL.

Eelgrass distribution in Little Bay has varied tremendously in the last 4 decades. In 1980, eelgrass beds were found throughout Little Bay, covering the entire length of the shallow subtidal zones along both sides of the upper bay from Adams Point to Fox Point (Jones 2000). It was completely absent from Little Bay in 1991 (Jones 2000). Short (2013) reported that it was essentially absent from Little Bay from 2007 through 2010, and his reports indicate it was absent from upper Little Bay since the annual surveys began in 2002. In 2011 and 2012, eelgrass was recorded in Welsh Cove and along the eastern shoreline from the point north of Welsh Cove nearly to Fox Point (south and north of the cable route, respectively). In 2013, Barker found that eelgrass was absent from both Welsh Cove and the eastern side of Little Bay, and it has not been recorded in either area or elsewhere in upper Little Bay since (Barker 2014, Short 2016a, Short 2016b, Barker 2017, Barker 2018).

On October 14, 2013, Normandeau Associates conducted a towed underwater video survey along transects within and south of the mapped cable area where eelgrass had been reported in 2012 (Normandeau 2016). One transect extended across the bay to the western shoreline. No attached eelgrass was observed on any of the five transects. In addition, because water clarity was good, the field crew was able to observe that eelgrass was absent to the shoreline in Welsh Cove. Other incidental observations by Normandeau biologists during shellfish surveys in September 2014 did not find eelgrass on the western tidal flats within the cable corridor.

3.0 Potential Impacts to Eelgrass

Installation of cables across Little Bay could have three potential mechanisms for impacting eelgrass, if it is present in the area: direct loss of eelgrass in the construction footprint; reduction of primary production from reduced light as a result of increased suspended sediments (i.e., suspended sediment plume); and sedimentation on existing eelgrass (i.e., settlement of sediments suspended by construction) .

Direct Loss

As described in Section 2.0, there has been no eelgrass bed on the project alignment since 2012 and that was a short-lived bed. Based on eelgrass mapping to date, the cable route does not pass through any eelgrass bed.

Reduced Water Clarity

Suspended sediment plume modeling conducted by RPS (2016, 2017) predicted that the duration of potentially reduced light at any given location in Little Bay during the installation of the SRP cables will be measured in minutes to hours and that the highest suspended sediment concentrations would be found in the immediate vicinity of the jet plow. Water clarity is a major factor affecting the depth to which eelgrass can thrive in an estuary. Prolonged periods of unusually high turbidity or suspended sediment loads can effectively reduce light penetration. In a mesocosm study, Short et al. (1993) found that after five months eelgrass maintained under reduced light conditions exhibited a logarithmic decline in shoot density and biomass productivity, a far longer period than the duration of the plume from cable installation. Thus, even if eelgrass were present in the area where the plume occurs, the duration of exposure would be too short to have a measurable effect on productivity. In addition, installation of the cables will occur in September-October, well after eelgrass productivity and biomass in the Great Bay system have peaked; as a result, any reduction in irradiance would have a smaller effect on annual productivity than were this to take place during the peak growing period (mid-summer).

Sedimentation

RPS (2016, 2017) predicted that resettlement of sediments suspended into the water column from the installation would occur predominantly in the vicinity of the cable route although deposition of less than 1 mm could extend beyond the area shown on Figure 1. Brodersen et al. (2017) examined the effects of settlement of sediment particles on eelgrass blades from a repeated exposure to highly concentrated levels of suspended sediments for several days to simulate a dredging operation. The authors found that coating the blades with sediments could reduce production either through reduced irradiance or by interfering with gas exchange through an increase in the diffusive boundary layer. While it is possible this effect could result from installation of the SRP cables, it is unlikely given that the plume will be very short-lived and localized, and would only accumulate sufficiently to affect eelgrass in the immediate vicinity of the cable installation.

4.0 Pre-Construction Monitoring

4.1 Ground Surveys

Eversource is proposing to conduct a project-specific survey in the summer of 2019 to document the presence or absence of eelgrass in the vicinity of the SRP project area. The survey will likely be conducted in mid-July in order to comply with the requirement in DES Condition 41 that the results be provided to DES at least 30 days in advance of the cable installation. The jet plow trial is slated to begin in early September and the cable installation will occur in late September-October. The eelgrass survey methods will be similar to those conducted in 2013 (Normandeau 2016), and, where applicable, will follow the most recent ground truthing protocols developed for the annual submerged aquatic vegetation surveys conducted by Piscataqua Region Estuary Program (PREP; Matso et al. 2018).

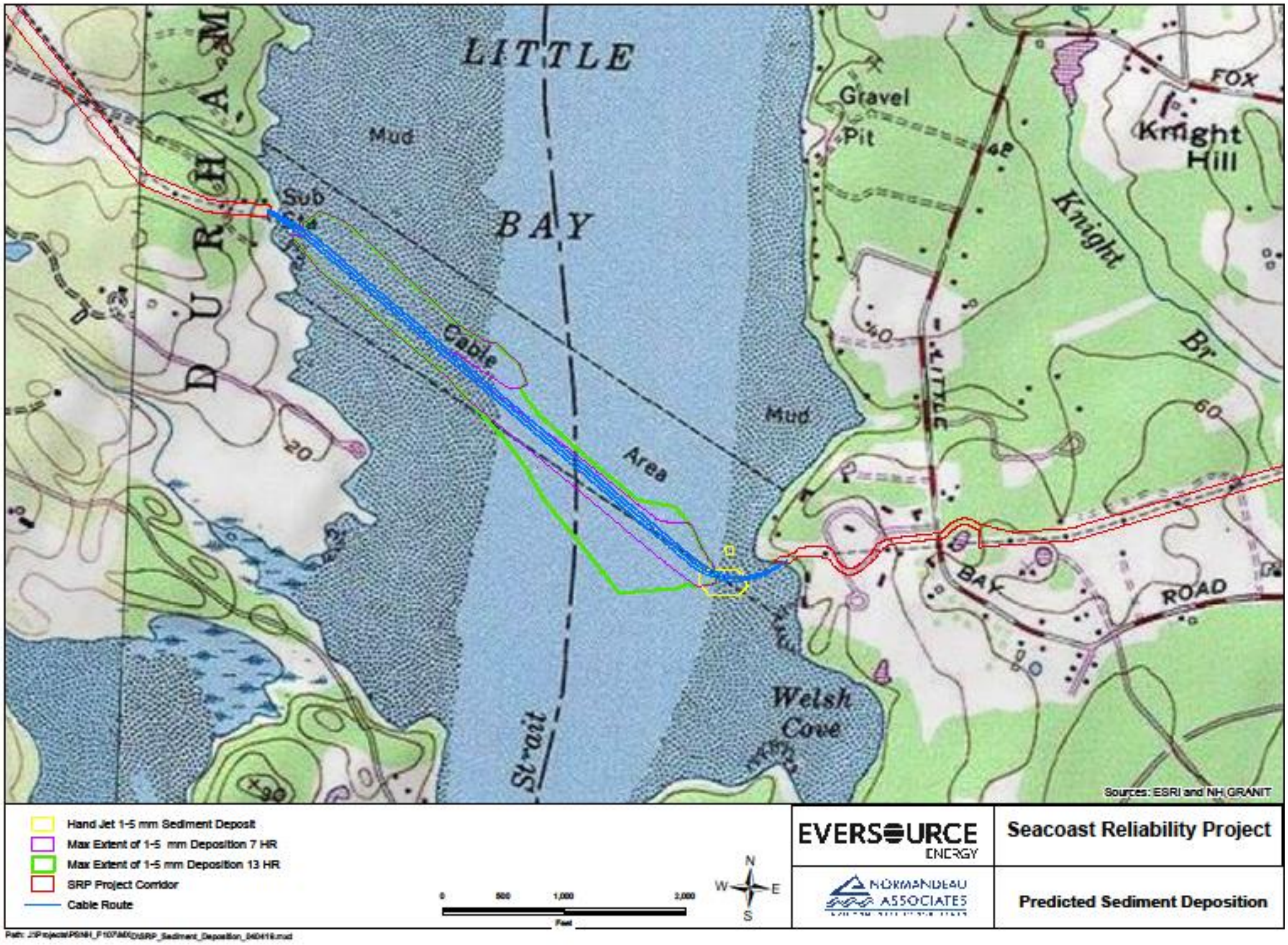

Figure 1. Area predicted to experience redeposition of sediments suspended during jet plowing or hand jetting.

On the east shore, 21 transects will be spaced approximately 16 m (50 feet) apart (Figure 2). The transects will be centered around the cable corridor, and extend approximately 160 m (500 feet) to the north and south of the cable route to include areas that could potentially experience some deposition as well as nearby reference areas. The transects will be approximately perpendicular to the shoreline and parallel to each other. Three transects will be conducted the full length of the project corridor, one along each cable route to the west shore to determine if any new eelgrass is present (Figure 2). Because eelgrass has not been observed in the channel in Little Bay by PREP, the video surveys will halt at approximately the 25 foot contour.

On the west shore, a total of six additional transects spaced approximately 16 m (50 feet) apart will be laid parallel to the full crossing transects to the north and to the south of the corridor (Figure 2).

Normandeau biologists will also conduct visual inspections in shallow waters on the east and west sides of the cable route.

Video recordings will be made with a Sea-Drop 950 made by SeaViewer Underwater Video Systems with a topside LCD viewer, GPS overlay, and a digital video recorder using SD cards. The camera will be attached to a weighted and balanced frame and towed alongside the vessel at the lowest speed possible (≤ 0.25 knots) providing optimal viewing of the substrate. The camera is generally kept approximately 2 feet off the bottom for an optimal viewing angle. Speed and direction will adjusted as needed to accommodate for drift caused by wind and currents. Normandeau field biologists will monitor the video and adjust the height of the camera off the seafloor, as depth and terrain vary, to maintain good visibility. Water depth, time and GPS coordinates and field accuracy will be recorded at the start and stop of each transect.

If eelgrass is detected, the linear extent and percent cover of the bed will be documented from the video footage. The percent cover will be estimated according to the density used in the Visual Guide for Eelgrass Percent Cover for Photointerpretation in Matso et al. (2018, Appendix A). The five density classes are not present (<10%), patchy (10-30%), half (30-60%), some bottom (60-90%) and dense (90-100%). Additional information on characteristics of the eelgrass bed such as presence of macroalagae, epiphytes and other organisms will be noted. After completion of the transect surveys, the edges of the bed will be approximated by multiple passes in different directions over the bed with the video camera.

Representative videos and still shots from each transect will be reviewed in the office to confirm field observations and to clarify any questionable interpretations made during sampling. A report will be generated that describes the methods and results of the survey, including the coordinates for the the endpoints of all transects, a table of results and descriptions of any rooted eelgrass, if encountered. The ArcGIS data will be provided to DES for inclusion in their database. The report, shapefiles, and a DVD of the transect videos will be provided to DES by approximately mid-September, 2019.

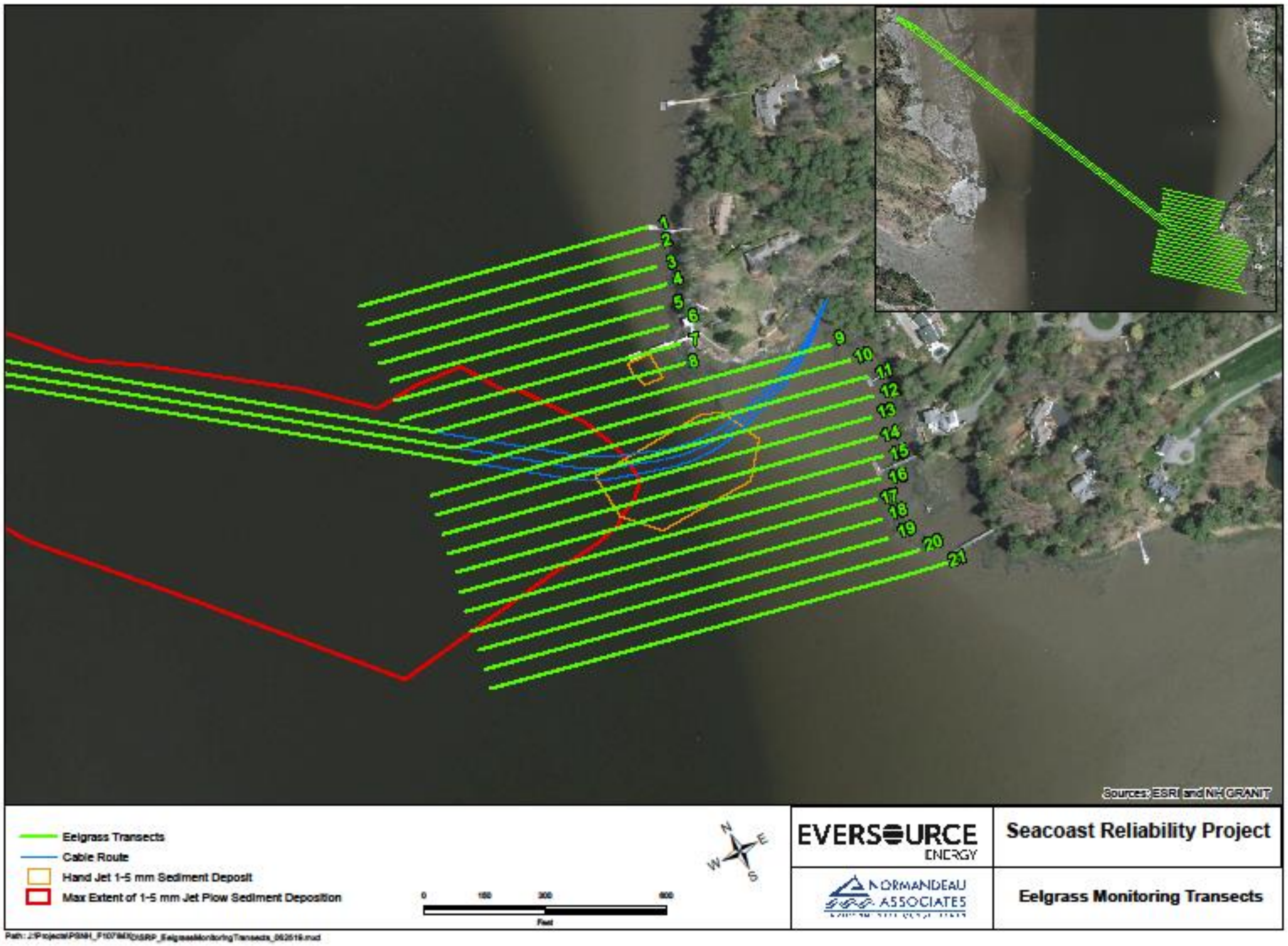

Figure 2. Location of pre-construction transects.

4.2 PREP Surveys

The Project is proposing to follow the same methods that we used to characterize eelgrass in 2013, i.e., video transects. The continued absence of eelgrass from the project area documented by PREP surveys subsequent to that baseline survey supports that decision. Following the same protocols for both project-specific surveys will allow comparisons between the surveys. However, we understand that NHDES' database has been built using the PREP surveys. In order to enhance comparisons in the database, Eversource is offering to provide NHDES with $25,000 to help support the standard PREP survey in 2019.

5.0 Post-Construction Monitoring

If rooted eelgrass is found to be not present in the pre-construction monitoring effort, and the PREP survey for upper Little Bay also does not have eelgrass present, no post-construction monitoring is proposed.

If rooted eelgrass was present in the Project vicinity during the SRP pre-construction surveys, or by the PREP survey in upper Little Bay, post-construction monitoring will be conducted within two weeks of completion of the jet plow cable installation to document any disturbance that may have affected the eelgrass. Using underwater video, the eelgrass bed will be revisited, and the extent and type of disturbance will be measured. Because the eelgrass will be senescing at that time (late fall), the stand edges and densities will be documented but not used for comparison to the earlier mid-summer conditions. A second post-construction survey will be conducted in mid July 2020 to approximate the pre-construction survey period. The same methods for sampling will be employed in 2020 as in 2019.

The final report will compare the pre- and post-construction conditions of the eelgrass in the vicinity of the project, and assess the measurable impact, if any, of the cable installation. Eelgrass characteristics such as size of the bed, eelgrass density, abundance of macroalgae and epiphytes and other measures of eelgrass habitat function will be assessed. Because eelgrass is naturally highly variable and it is common to have annual seedsets that do not persist, Eversource will consult with eelgrass experts familiar with Little Bay to best characterize any changes observed between 2019 and 2020. The final report and ArcGIS submittals will be provided to DES within 60 days of completion of data collection.

6.0 Mitigation for Impacts

If DES determines that post-construction monitoring based on the video surveys as well as a comparison of pre- and post construction PREP eel grass surveys indicate a decline in the extent of eelgrass that can be attributed, or partially attributed, to the cable installation, Eversource will consult with DES and develop a mitigation plan that is acceptable to DES within sixty (60) days of being notified. If Eversource does not develop a mitigation plan that is acceptable to DES within sixty (60) days of being notified, Eversource will implement a mitigation plan developed by DES. The degree of impact to the eelgrass will in part determine the type of mitigation required. Mitigation measures may include additional monitoring in future years, monetary support to the annual eelgrass mapping effort in Great Bay, restoration of natural oyster reefs, or other measures identified by DES. Once the final eelgrass monitoring report is submitted to DES, Eversource will request a meeting with DES to discuss mitigation.

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