

**THE STATE OF NEW HAMPSHIRE  
BEFORE THE  
SITE EVALUATION COMMITTEE  
DOCKET NO. 2015-04**

**AMENDED PRE-FILED TESTIMONY OF WILLIAM J. QUINLAN**

**APPLICATION OF PUBLIC SERVICE COMPANY OF NEW HAMPSHIRE  
D/B/A EVERSOURCE ENERGY  
FOR A CERTIFICATE OF SITE AND FACILITY FOR CONSTRUCTION OF A NEW  
115 kV TRANSMISSION LINE**

**THE SEACOAST RELIABILITY PROJECT**

**March 29, 2017**

**Qualifications**

1  
2 **Q. Please state your name, title and business address.**

3 A. My name is William J. Quinlan and I am the President and Chief Operating  
4 Officer at Public Service Company of New Hampshire d/b/a Eversource Energy (“PSNH” or the  
5 “Company”). My business address is 780 North Commercial St, Manchester, New Hampshire  
6 03101.

7 **Q. Please describe your employment experience and educational background.**

8 A. My background and qualifications were included in my direct pre-filed testimony  
9 filed with the NH SEC Application dated April 12, 2016 and have not changed since then.

10 **Q. What is the purpose of this amended testimony?**

11 A. The purpose of my testimony is to provide additional information to the SEC in  
12 support of PSNH’s Amendment to the April 12, 2016 Application.

13 **Q. Have you reviewed the amended Project Description submitted to the SEC?**

14 A. Yes, I have.

15 **Q. Does the amended Project Description change anything in your previously  
16 filed testimony?**

17 A. Yes. Since filing our Application on April 12, 2016, PSNH has continued to work  
18 closely with residents abutting the corridor and host communities to contract to acquire property  
19 rights to avoid, minimize, and mitigate potential impacts of the Project as described in the  
20 original Application. As a result, PSNH is proposing to make several design changes to the  
21 Project, including, siting approximately 2,680 additional feet of the Project underground through  
22 the Newington Center Historic District and Hannah Lane residential neighborhood, altering the  
23 route for the underground design in Newington through Gundalow Landing, relocating the site of  
24 a transition structure in Newington, and modifying segments of the overhead design in both of  
25 the Towns of Durham and Newington. These changes are intended to respond directly to the  
26 feedback received from these stakeholders and the NHDOT.

27 **Q. Please provide a brief overview of the changes that are contained in the  
28 Amendment and the reasons for making those changes.**

29 A. As anticipated in the Application, PSNH has been able to contract to acquire the  
30 necessary property rights to alter the proposed design to address many concerns relating to the  
31 Project’s potential impacts on these communities and abutting properties.

1           First, PSNH now proposes to site an additional 2,680 feet of the Project underground  
2 across the Frink Farm, in the Newington Center Historic District and in the Hannah Lane  
3 residential neighborhood. Through numerous discussions with the Town and its residents, PSNH  
4 was able to secure contracts to acquire the necessary land rights to site the Project underground  
5 for this additional segment to avoid and minimize potential impacts. For the Frink Farm, an  
6 amendment to the existing conservation easement has been executed and approved by the  
7 underlying property owners, the Town of Newington, and the Rockingham County Conservation  
8 District, the New Hampshire Department of Justice, and the United States Natural Resources  
9 Conservation Service. In addition to siting the Project underground in this area, PSNH will  
10 remove the existing distribution line across the Frink Farm thereby restoring the Newington  
11 Center Historic District to its original 19<sup>th</sup> century landscape and viewscape.

12           Second, the Town of Newington was concerned about the placement of the Project where  
13 the transmission line travels along Gundalow Landing Road, as well as the potential impact of  
14 construction in the area. PSNH worked closely with the Town and residents to successfully  
15 contract to acquire additional easement rights to modify the location of this underground portion  
16 of the transmission line.

17           Third, as originally discussed in the Application, the Town of Newington raised concerns  
18 about the location of the transition structure located at the edge of Little Bay Road. As originally  
19 proposed, PSNH intended to construct the transition structure within its existing electric utility  
20 corridor. The Town of Newington was concerned about the potential visibility of the transition  
21 structure at its proposed location. To accommodate those concerns, PSNH worked closely with  
22 the Town of Newington to secure contract rights to acquire an additional easement across Town  
23 owned property, commonly referred to as the Flynn Pit. Based on the acquisition of these  
24 additional property rights, PSNH is able to modify the location of this transition structure. The  
25 relocation of the transition structure will reduce its visibility in Gundalow Landing and from  
26 Little Bay Road in the Town of Newington.

27           Fourth, PSNH received considerable feedback from residents abutting the corridor in the  
28 Town of Durham and Newington regarding structure configuration. PSNH worked directly with  
29 these residents, and where feasible, made design alterations to accommodate individual  
30 landowner concerns. As a result of discussions and meetings with residents and other  
31 stakeholders in the Towns of Durham and Newington, PSNH made line design alterations to

1 structures supporting the overhead line design. In Durham, the alterations allow for longer span  
2 lengths and the elimination of a structure. At Route 108 in Durham, PSNH modified the design  
3 of the 34.5kV line to reduce wetland impacts and conform to newly completed distribution line  
4 and road construction at the transmission line crossing. Also in Durham, PSNH reviewed the  
5 required structure height for the underwater to overhead transition riser. PSNH determined it  
6 was feasible to reduce the riser structure from approximately 80 feet above ground to  
7 approximately 70 feet above ground. In Newington, near Fox Point Road, PSNH redesigned a  
8 section of the overhead transmission line to eliminate a structure located in the middle of the  
9 open field between Nimble Hill Road and Fox Point Road. Also in Newington, PSNH relocated  
10 two structures near Gosling Road to accommodate a new road easement for the Shattuck Way  
11 extension.

12 Lastly, PSNH has made minor changes to the overhead design to accommodate  
13 comments made by the NHDOT in their progress report submitted to the SEC on November 21,  
14 2016. These changes include minor structure shifts and configuration changes.

15 **Q. In light of these changes, do the conclusions in your pre-filed testimony of**  
16 **April 12, 2016 remain the same?**

17 A. Yes, they do. Based upon the additional outreach and discussions with  
18 stakeholders in the host communities, PSNH has listened to and responded to the expressed  
19 positions and concerns by making significant changes to the design of the Project. PSNH is  
20 committed to continuing to work with individual residents and host communities to further avoid,  
21 minimize, and mitigate potential impacts from the Project.

22 **Q. Does this conclude your amended testimony?**

23 A. Yes it does.

**THE STATE OF NEW HAMPSHIRE  
BEFORE THE  
SITE EVALUATION COMMITTEE  
DOCKET NO. 2015-04**

**AMENDED PRE-FILED TESTIMONY OF ROBERT D. ANDREW**

**APPLICATION OF PUBLIC SERVICE COMPANY OF NEW HAMPSHIRE  
D/B/A EVERSOURCE ENERGY  
FOR A CERTIFICATE OF SITE AND FACILITY FOR CONSTRUCTION OF A NEW  
115 kV TRANSMISSION LINE**

**THE SEACOAST RELIABILITY PROJECT**

**March 29, 2017**

**Qualifications and Purpose of Testimony**

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**Q. Please state your name and business address.**

A. My name is Robert D. Andrew. I am employed by Eversource Energy Service Company as a Director, System Planning. My business address is One NSTAR Way, Westwood, MA 02090. Eversource Energy Service Company provides centralized services to the Eversource Energy operating subsidiaries, including Public Service Company of New Hampshire d/b/a Eversource Energy (“PSNH”).

**Q. Briefly summarize your educational background and work experience.**

A. My educational background and work experience were included in my direct pre-filed testimony filed with the NH SEC Application dated April 12, 2016 and have not changed since then.

**Q. What is the purpose of this amended testimony?**

A. The purpose of my testimony is to provide additional information to the SEC in support PSNH’s Amendment to the original Application dated April 12, 2016.

**Q. Have you reviewed the amended Project Description submitted to the SEC?**

A. Yes, I have.

**Q. Does the amended Project Description change anything in your previously filed testimony?**

A. No, it does not. The amended Project design will not have an impact on system stability and reliability as described in my pre-filed testimony dated April 12, 2016. Further, it will not have an impact on the benefits of the Project to the regional transmission system as described in my original pre-filed testimony.

**Q. In light of these changes, do the conclusions in your pre-filed testimony of April 12, 2016 remain the same?**

A. Yes, they do.

**Q. Does this conclude your amended testimony?**

A. Yes it does.

**THE STATE OF NEW HAMPSHIRE  
BEFORE THE  
SITE EVALUATION COMMITTEE  
DOCKET NO. 2015-04**

**SUBSTITUTE PRE-FILED DIRECT AND AMENDED TESTIMONY OF  
AARON J. CULLEN**

**APPLICATION OF PUBLIC SERVICE COMPANY OF NEW HAMPSHIRE  
D/B/A EVERSOURCE ENERGY  
FOR A CERTIFICATE OF SITE AND FACILITY FOR CONSTRUCTION OF A NEW  
115 kV TRANSMISSION LINE**

**THE SEACOAST RELIABILITY PROJECT**

**March 29, 2017**

1 **Qualifications and Purpose of Testimony**

2 **Q. Please state your name and business address.**

3 A. My name is Aaron J. Cullen. My business address is 107 Selden Street, Berlin CT  
4 06037.

5 **Q. Who is your current employer and what position do you hold?**

6 A. I am Manager of Middle Office and Credit. I am employed by Eversource Energy  
7 Service Company.<sup>1</sup> Eversource Energy Service Company is a wholly-owned subsidiary of  
8 Eversource Energy (Eversource),<sup>2</sup> a public utility holding company system. Eversource Energy  
9 Service Company provides centralized services such as accounting, finance, treasury, legal,  
10 purchasing and administrative functions to Eversource's subsidiaries. For additional information on  
11 my background and qualifications, please refer to my resume, provided to the Site Evaluation  
12 Committee on December 8, 2016, and attached hereto as Attachment A.

13 **Q. What is the purpose of your testimony?**

14 A. The purpose of my testimony is to adopt the pre-filed testimony of Michael  
15 Auseré and to provide additional information to the SEC in support of PSNH's Amendment to  
16 the original Application dated April 12, 2016.

17 **Q. Have you reviewed the amended Project Description submitted to the SEC?**

18 A. Yes, I have.

19 **Q. Does the amended Project Description change anything in your previously  
20 filed testimony?**

21 A. Yes. With the amended Project design, PSNH expects its total investment in the  
22 Project to be approximately \$84 million, which is roughly \$7 million more than the original  
23 anticipated total Project cost of \$77 million.

24 **Q. In light of these changes, do the conclusions in the original pre-filed testimony  
25 of April 12, 2016 filed by Michael Auseré remain the same?**

26 A. Yes, they do. PSNH currently has and will continue to have the financial  
27 capability to construct and operate the Project. PSNH also has the financial capability to  
28 decommission the Project, if necessary.

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<sup>1</sup> Effective July 1, 2015, Northeast Utilities Service Company changed its name to Eversource Energy Service Company.

<sup>2</sup> Effective April 30, 2015, Northeast Utilities changed its name to Eversource Energy.



1           **Q.     In light of the foregoing, do you adopt the pre-filed testimony of Michael**  
2 **Auseré, dated April 12, 2016?**

3           **A.     Yes, I do.**

4           **Q.     Does this conclude your testimony?**

5           **A.     Yes, it does.**

**ATTACHMENT A.**  
**RESUME OF AARON J. CULLEN**

# AARON J. CULLEN

107 Selden Street • Berlin, CT 06037 • (860) 665-5377 • E-mail: aaron.cullen@eversource.com

## EXECUTIVE SUMMARY

Finance professional with ten years of management experience which includes supporting long-term debt and equity offerings in the capital markets, ensuring sufficient corporate liquidity by maintaining various bank credit lines and an accounts receivable sale program, and performing credit assessments of counterparties along with the negotiation of contractual credit provisions. In addition, I led the creation of a new Middle Office department to consolidate the tracking and reporting of various power, capacity, gas, and REC transactions in the utility industry.

- A problem solver with a proven ability to impact decisions and effectively communicate across the company.
- A flexible professional willing to initiate and manage change as needed.
- A leader who can effectively manage and develop a diverse team.

## PROFESSIONAL EXPERIENCE

**Eversource Energy**, Berlin, CT

*Manager, Middle Office & Credit*

**2014 - present**

*Manager, Corporate Finance & Credit*

**2007 - 2014**

*Senior Financial Analyst – Corporate Finance*

**2004 - 2007**

*Financial Analyst – Corporate Finance*

**2001 - 2004**

- Lead the design and implementation of a new Middle Office department in support of the Energy Supply Group, including design of a new deal capture system to manage the acquisition and storage of all relevant trade and market data, training and coordination with staff, and implementation of required policies and procedures.
- Responsible for assessing the creditworthiness of potential counterparties and negotiating all credit provisions in new procurement and energy supply contracts.
- Perform ongoing monitoring and reporting of existing contracts and counterparty credit exposures to senior management and maintain reporting compliance required by Dodd-Frank regulations.
- Established the corporate Credit Management Policy and associated procedures; periodically analyze and modify the corporate thresholds for the extension of unsecured credit.
- Provided briefings to state regulators on credit related issues in support of proposed energy supply transactions.
- Preparation and oversight of required financial disclosures for quarterly and annual SEC and FERC reporting.
- Managed a debt portfolio in excess of \$6 Billion, including the issuance and refinancing of at least \$2 Billion in long-term debt and equity securities across the corporation.
- Developed written testimony, provided responses to interrogatories, and managed post-hearing filings required to obtain needed state and federal regulatory approvals for securities issuances.
- Developed and maintained Policies and Procedures for Interest Rate Risk Management for the Treasury Group and evaluated interest rate hedging opportunities on planned and outstanding long-term debt issuances; performed ongoing evaluation and reporting of existing hedging instruments for management and Accounting.
- Financed multiple projects for an energy services subsidiary totaling in excess of \$100 Million and negotiated terms that earned on average an additional \$250 – 300k over expected net proceeds.
- Managed renewals of multi-year revolving credit facilities totaling between \$650 Million - \$1.1Billion with investment banks and supported compliance reporting under the terms of the respective credit agreements.
- Responsible for oversight and periodic renewal of a \$100 Million accounts receivable sale program.
- Negotiated components of EEI, NAESB and ISDA agreements with various counterparties to facilitate future interest rate hedging and commodity transactions.
- Built duration models and debt forecasts for the various operating companies.

**United Technologies: Pratt & Whitney**, East Hartford, CT

**2000 - 2001**

*Financial Analyst – Turbine Module Center*

- Managed capital budget and depreciation projections for the Turbine Module Center. Cost cutting efforts resulted in significant savings required to implement higher priority / higher return projects.
- Developed business cases for new capital requests utilizing NPV, IRR, and sensitivity analysis.

## EDUCATION

**William E. Simon Graduate School of Business Administration**, Rochester, NY

**2000**

**Master of Business Administration, Finance**

**Central Connecticut State University**, New Britain, CT

**1998**

**Bachelor of Arts, Economics**

**THE STATE OF NEW HAMPSHIRE  
BEFORE THE  
SITE EVALUATION COMMITTEE  
DOCKET NO. 2015-04**

**SUBSTITUTE PRE-FILED DIRECT AND AMENDED TESTIMONY OF  
KENNETH BOWES**

**APPLICATION OF PUBLIC SERVICE COMPANY OF NEW HAMPSHIRE  
D/B/A EVERSOURCE ENERGY  
FOR A CERTIFICATE OF SITE AND FACILITY FOR CONSTRUCTION OF A NEW  
115 kV TRANSMISSION LINE**

**THE SEACOAST RELIABILITY PROJECT**

**March 29, 2017**

1

**Qualifications and Purpose of Testimony**

2

**Q. Please state your name, title, and business address.**

3

A. My name is Kenneth Bowes. I am a Vice President of Transmission Performance at Eversource Energy (“Eversource”), currently assigned to the Seacoast Reliability Project ( the “Project”) being developed by Public Service Company of New Hampshire d/b/a Eversource Energy (“PSNH”) . My business address is 107 Selden Street, Berlin, Connecticut, 06037.

8

**Q. Briefly summarize your educational background and work experience.**

9

A. I hold a Bachelor of Science degree in Electrical Engineering from the University of New Hampshire in Durham, New Hampshire and a Master’s of Science degree in Electrical Engineering from Rensselaer Polytechnic Institute in Hartford, Connecticut. I presently serve on the Edison Electric Institute (“EEI”) Transmission Committee and the EEI Security Committee. As a result of my work at Eversource, I have received awards from EEI for Emergency Recovery Award in 2013, Emergency Assistance Award in 2013, the Institute of Electrical and Electronic Engineers (“IEEE”), Power Engineering Society, Working Group Award in 1998. I have considerable engineering and operations experience in the many areas of transmission and distribution, including engineering, construction, maintenance and operations. I have overseen the entire project life-cycle for numerous transmission line and substation projects for Eversource and have served as a company officer and director in a variety of roles in support of our transmission and distribution systems.

23

I previously held the role of Director of Transmission Projects where I was responsible for the siting, permitting, engineering, design, construction, testing and commissioning of more than 500 transmission projects in New England totaling more than \$2 billion in investments. Specific projects included the: Long Island Replacement Cable, Glenbrook Cables Projects, Killingly Substation, Fitzwilliam Substation, 345-kV autotransformer additions at Haddam, Barbour Hill, Scobie Pond, Deerfield, Berkshire and Ludlow.

30

Prior to this role, I was the Director of Transmission Construction, Test & Maintenance responsible for the field operations, construction and maintenance of the

31

1 Eversource transmission system. Previous to this position I was the Director of  
2 Transmission & Distribution maintenance responsible for the field operations and  
3 maintenance of the Eversource transmission, substation and distribution systems  
4 including the transmission rights-of-way maintenance. Attachment A is my resume,  
5 which includes a list of other projects I have managed.

6 **Q. What is the purpose of this testimony?**

7 A. The purpose of my testimony is to adopt the pre-filed testimony of James  
8 Jiottis and to provide additional information to the SEC in support of PSNH's  
9 Amendment to the original Application dated April 12, 2016. Specifically, I explain that  
10 the Amendment does not change the conclusions from the pre-filed testimony of James  
11 Jiottis dated April 12, 2016.

12 **Q. Have you reviewed the amended Project Description submitted to the**  
13 **SEC?**

14 A. Yes, I have.

15 **Q. Does the amended Project Description change anything in your**  
16 **previously filed testimony?**

17 A. Yes. Approximately an additional half mile of the Project will be placed  
18 underground in the Town of Newington. Since the initial filing, PSNH has worked with  
19 the Town of Newington and property owners to address local concerns. As a result of  
20 ongoing discussions with the Town of Newington and its residents, and agreements  
21 reached with affected landowners, PSNH proposes to place additional segments of the  
22 Project underground in the areas of the Flynn Pit Town Forest, Frink Farm, Newington  
23 Center Historic District and the Hannah Lane residential neighborhood. PSNH has also  
24 made other design modifications, including, making adjustments to individual structure  
25 locations and the configuration of the Project at the request of landowners and abutters in  
26 both the Towns of Durham and Newington, and at the request of the NH DOT in the  
27 Town of Durham.

1

**Property Rights**

2

**Q. Please describe whether the Applicant has a current right, an option, or other legal basis to acquire the right, to construct, operate, and maintain the facility on, over, or under the site as described in the Application Amendment dated October 21, 2016.**

3

A. Since filing the initial Application, the Applicant has secured new contracts to acquire additional property rights to construct the Project underground in certain locations within the Town of Newington. For the Frink Farm, an amendment to the existing conservation easement has been executed and approved by the underlying property owners, the Town of Newington, the Rockingham County Conservation District, the New Hampshire Department of Justice and the United States Natural Resources Conservation Service, which will allow for the underground on that land.

4

**Routing Study and Alternatives Analysis**

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**Q. Does the decision to go underground in two additional segments within the town of Newington, NH affect the Project's preferred route?**

6

A. The inclusion of the additional segments of underground through the Newington Center Historic District and along Little Bay Road does not change the preferred route or the cost effectiveness of the design.

7

**Overview of Project Design**

8

**Q. Please provide a general overview of the Amended Project design dated October 21, 2016?**

9

A. As anticipated in the original filing and after further consultation with the host communities, the Project has made significant modifications to the design of the Project, including the use of underground construction.

10

As originally proposed, the Project included approximately three-quarter miles underground, two segments in Durham and a segment in Newington. Based on continued discussions with the Town of Newington, PSNH was able to obtain additional contracts to acquire property rights to alter the underground location of the Project in and around Gundalow Landing, and the Flynn Pit. PSNH is also siting an additional half-mile of the Project underground across the Frink Farm, Newington Center Historic District and

11

1 Hannah Lane residential neighborhood; the total amount underground construction for  
2 the Project will be approximately 1.25 miles.

3 **Q. Please describe the design of the underground segments included in**  
4 **the Amended Project design dated October 21, 2016?**

5 A. In general, the underground cable system will be similar to the design  
6 proposed in the initial application, using the same size and number of cables, placed in a  
7 similar underground facility in conduit encased in thermal sand and/or concrete. For  
8 additional information on the design of the underground segments please *see* Section  
9 301.03 (h)(1) of the Application.

10 Upon exiting the manhole on the eastern shore of Little Bay, the Project will now  
11 travel underground across private property where PSNH has contracted to acquire new  
12 easements adjacent to Gundalow Landing Road. Traveling east from Gundalow Landing  
13 the Project crosses Little Bay Road where it changes from the original proposal. The line  
14 now shifts to the north continuing underground across the Town of Newington's Flynn  
15 Pit property to an altered transition structure location on the Town property where PSNH  
16 has contracted with the Town to acquire new property rights. From the transition  
17 structure, the Project will travel overhead within the existing ROW corridor to the Frink  
18 Farm.

19 At the western property boundary of the Frink Farm the overhead design will  
20 transition to underground construction at another transition structure. The underground  
21 section will traverse the Frink Farm and Newington Center Historic District where burial  
22 depth will be increased from approximately 3.5 feet to 8 feet. The increased depth is  
23 required so as not to limit agricultural activity on the farm. The underground line will  
24 continue east under Nimble Hill Road and within the existing electric ROW corridor until  
25 it passes through the Hannah Lane residential neighborhood. The Project will then  
26 transition from underground back to overhead using another transition structure.

27 From the transition structure west of Hannah Lane, the Project will travel  
28 overhead within the existing ROW corridor to the Spaulding Turnpike and to the  
29 Portsmouth Substation, as originally proposed.



1                    **Optimization of Project Design and Collaboration with Host Communities**

2                    **Q.     With respect to the selected route modifications utilized in the**  
3 **Amended Project design dated October 21, 2016, how did PSNH optimize the design**  
4 **to minimize impacts?**

5                    A.     In Newington, the section of underground cable along Gundalow Landing  
6 Road to the crossing of Little Bay Road was originally to be placed within the road  
7 ROW. PSNH relocated the Project to the edge of the road ROW at the request of the  
8 Town of Newington. PSNH was then asked to move the design further off the road onto  
9 private property owned by residents along Gundalow Landing Road. PSNH successfully  
10 negotiated with the landowners on the northern side of Gundalow Landing Road to obtain  
11 the rights to acquire additional underground rights to facilitate a shift in the location of  
12 the cable.

13                    The Town of Newington also requested that the transition structure, for the  
14 underground cable leaving Gundalow Landing to transition to overhead in the ROW  
15 across Little Bay Road, be relocated off the existing ROW onto Town owned property  
16 known as the Flynn Pit. The relocation of the transition structures will limit their  
17 visibility and minimize impacts to an existing environmentally sensitive area. PSNH  
18 successfully negotiated with the Town of Newington to obtain a contract to acquire  
19 additional land rights to facilitate a shift in the location of the cable utilizing a swap of  
20 portions of the existing 100 foot wide electric ROW corridor for a new 50 foot wide  
21 electric ROW corridor across Town property.

22                    Also, in Newington, PSNH received and considered feedback regarding the  
23 design, which resulted in the removal of one structure.

24                    As part of continuing discussions with the Town and its residents regarding the  
25 underground design, PSNH presented options to the Town and abutters at public  
26 meetings and separate meetings with Town officials. PSNH met several times with the  
27 underlying landowners and worked closely with the residents in the Hannah Lane  
28 residential neighborhood to discuss the underground design. PSNH presented specific  
29 design options to the owners of the Frink Farm, Rockingham County Conservation  
30 District (holder of an agricultural conservation easement on the Frink Farm) and the  
31 Town of Newington to address certain concerns that were raised regarding the

1 agricultural uses of the Frink Farm. PSNH has successfully negotiated with the  
2 landowners of the Frink Farm and within the Hannah Lane neighborhood to acquire  
3 contracts to obtain underground rights. As anticipated in the original application, PSNH  
4 now proposes to construct the Project underground across the Farm, which in  
5 combination with the removal of the existing distribution line, will allow for the  
6 unobstructed use of the agricultural fields and return the Farm scenery to its 19<sup>th</sup> century  
7 landscape and viewscape. It should be noted, however, that it is not typically the practice  
8 of PSNH to construct either a distribution line or transmission line underground in areas  
9 where PSNH currently has overhead rights to construct and operate electric distribution  
10 or transmission facilities. In this case, PSNH remained committed to working with the  
11 Town of Newington to reduce concerns about potential impacts. Based on PSNH's  
12 continued outreach with the Town of Newington, it is the Company's position that the  
13 amendment addresses the concerns raised by the Town and reflects a more effective  
14 Project design as it traverses previously disturbed agricultural land and is a more direct  
15 underground route.

16 **Q. Please describe any additional benefits associated with constructing**  
17 **the Project underground across the Frink Farm.**

18 A. During the negotiations for underground rights across the Frink Farm,  
19 PSNH collaborated with the Rockingham County Conservation District ("RCCD") and  
20 the Frink family to identify work methods and fund improvements to the Frink Farm.  
21 The work methods include specific soil handling practices to minimize disturbance to  
22 farm soils. PSNH has also committed to retaining a mutually agreed-upon outside expert  
23 to monitor the construction work across the Frink Farm and to ensure the protection of  
24 the soils.

25 PSNH has also agreed to fund improvements to the Frink Farm and enhance its  
26 future viability as a working farm. These improvements include, but are not limited to,  
27 the seeding of agricultural fields, improvement of fields and replacement of fencing.  
28 Improvements to the farm will be managed and monitored by the RCCD. PSNH has  
29 agreed to compensate the Frink Farm for lost crops during the construction process.

1           The underground rights negotiated with the Frink family also reduce the amount  
2 of area encumbered by the easement, which reduces future impact on the agricultural uses  
3 of the farm.

4           **Q.     Has the Project made any design modifications to the overhead**  
5 **portion of the Project?**

6           A.     Yes. PSNH has made changes to the overhead line design as a result of  
7 discussions and meetings with abutters and other stakeholders in the Towns of Durham  
8 and Newington. First, PSNH has made minor changes to the overhead design to  
9 accommodate comments made by the NHDOT in their progress report submitted to the  
10 SEC on November 21, 2016. These changes include minor structure shifts and  
11 configuration changes. Specifically, near Madbury Road and Route 4 in Durham, PSNH  
12 moved the alignment approximately ten feet west, within the originally proposed  
13 corridor, to increase spacing to the existing bridge abutments at those crossings. At the  
14 Madbury Road crossing, two H-frame structures were modified to be single pole  
15 structures. These changes allow additional clearance to the bridges and abutments to  
16 allow for maintenance and construction.

17           Second, PSNH moved the location where the overhead line transitions from a  
18 double circuit structure to a side-by-side configuration, where the 115kV line and 34.5kV  
19 line are on separate structures, near Durham Point Road. The transition occurs at  
20 Structure 91 instead of Structure 93 as originally proposed. The alteration allows for  
21 longer span lengths and the elimination of proposed Structure 92. Third, near Fox Point  
22 Road in Newington, PSNH redesigned the section between Structures 116 and 118 to  
23 eliminate Structure 117 located in the middle of the open field. Fourth, at Route 108,  
24 PSNH modified the design of the 34.5kV line to reduce wetland impacts and conform to  
25 newly completed distribution line and road construction at the transmission line crossing.  
26 Fifth, PSNH relocated two structures near Gosling Road in Newington to accommodate a  
27 new road easement for the Shattuck Way extension. Finally, PSNH reviewed the  
28 required structure height for the underwater to overhead transition riser at Structure 101  
29 to reduce it from approximately 80 feet above ground to approximately 70 feet above  
30 ground.



**ATTACHMENT A.**  
**RESUME OF KENNETH BOWES**

## **BIOGRAPHICAL INFORMATION**

### **Kenneth B. Bowes**

Kenneth B. Bowes is Vice President – Transmission Performance responsible for the leadership and direction of Transmission performance as it relates to short and long term customer impacts and benefits, development of key siting witnesses, Transmission performance indicators, FERC and state regulatory plans, and operational compliance. He serves as a technical consultant and expert witness for various regulatory proceedings and large transmission projects.

A native of New Hampshire, Bowes joined Eversource in July 1984 in the System Test department. He has held several engineering and management positions in the Energy Delivery organizations becoming the Director – Transmission and Distribution Maintenance in 1999, Director – Transmission Construction, Test, and Maintenance in 2002, Director – Transmission Projects in 2004, Vice President – Customer Operations in 2008, and Vice President of Energy Delivery in 2010, Vice President of Engineering in 2014.

Bowes earned a Bachelor of Electrical Engineering degree from the University of New Hampshire and a Master's Degree in Electrical Engineering from Rensselaer Polytechnic Institute. Bowes is the past Chairman of the Edison Electric Institute's Transmission Committee and presently serves on the EEI Transmission and EEI Security Committees.

## **PUBLICATIONS AND PREVIOUS TESTIMONY**

### **Kenneth B. Bowes**

#### Publications:

- Bowes K., Beehler M., "Defining the Value of the Grid", IEEE, The Sixth Annual IEEE PES Conference on Innovative Smart Grid Technology, February, 2015
- Bowes K., Hogan J., "CL&P Explores Sustainable Solutions", Transmission & Distribution World Magazine, January 2012, Volume 64, Number 1, pp. 24-31.
- IEEE Working Group on Nonsinusoidal Situations, "Practical Definitions for Powers in Systems with Nonsinusoidal Waveforms and Unbalanced Loads: A Discussion", 95 WM 040-6 PWRD, 1995
- IEEE Working Group on Nonsinusoidal Situations, "A Survey of North American Electric Utility Concerns Regarding Nonsinusoidal Waveforms", 95 WM 036-4 PWRD, 1995
- Bowes, K. B., "The Effects of Temporary Overvoltage (TOV) on Consumer Products", POWER QUALITY '91 USA, Official Proceedings of the Third International Power Quality Conference, Universal City, CA, September 22-27, 1991
- Bowes, K. B., Lorusso, A., "Harmonic and Power Characteristics of Electronic Ballasts for Fluorescent Lighting Applications", POWER QUALITY '90 USA, Official Proceedings of the Second International Power Quality ASD Conference, Philadelphia, PA, October 21, 29, 1990
- Anderson, L.M., Bowes, K.B., "The Effects of Power-line Disturbances on Consumer Electronic Equipment", IEEE Transactions on Power Delivery, Volume 5, Number 2, pp. 1062-65, April 1990
- Bowes, K. B., "The Effects of Power-line Disturbances on Electronic Products", POWER QUALITY '89 USA, Official Proceedings of the First International Power Quality Conference, Long Beach, CA, October 15-20-1989 (Also edited and reprinted in Power Quality Magazine - Premier V Issue)

Mr. Bowes has testified extensively in many cases in a variety of forums, including;

- Connecticut Siting Council Docket No. 461 – Eversource Energy application for a Certificate of Environmental Compatibility and Public Need for the construction, maintenance, and operation of a 115-kilovolt (kV) bulk substation located at 290 Railroad Avenue, Greenwich, Connecticut, and two 115-kV underground transmission circuits extending approximately 2.3 miles between the proposed substation and the existing Cos Cob Substation, Greenwich, Connecticut, and related substation improvements.
- Connecticut Siting Council Docket No. 292 – The Connecticut Light & Power Company application for a Certificate of Environmental Compatibility and Public Need for the construction and operation of 8.7 miles of new underground 115-kilovolt electric transmission cables extending from CL&P's existing Glenbrook Substation in the City of

Stamford, through the Town of Darien, to CL&P's existing Norwalk Substation in the City of Norwalk;

- Connecticut Siting Council Docket No. 302 – Northeast Utilities Service Company, on behalf of The Connecticut Light and Power Company (CL&P) application for a Certificate of Environmental Compatibility and Public Need for the construction, maintenance and operation of the proposed Killingly 2G Substation at 193 Tracy Road and 227-257 Park Road in the Towns of Killingly and Putnam, and the proposed connections to the existing #347 345-kV line and the existing #1607 and #1505 115-kV lines;
- Connecticut Siting Council Docket No. 311 – Northeast Utilities Service Company, on behalf of The Connecticut Light and Power Company (CL&P) Application for a Certificate of Environmental Compatibility and Public Need for the construction, maintenance and operation of the proposed Wilton 35A Substation at 53 Old Danbury Road in the Town of Wilton;
- Connecticut Siting Council Docket No. 326 – The Connecticut Light and Power Company application for a Certificate of Environmental Compatibility and Public Need for the construction, maintenance, and operation of a proposed substation located at Stepstone Hill Road, Guilford, Connecticut; and
- Connecticut Siting Council Docket No. 327 – The Connecticut Light and Power Company application for a Certificate of Environmental Compatibility and Public Need for the construction, maintenance, and operation of a proposed substation located off Commerce Drive, Oxford, Connecticut.
- Connecticut Siting Council Docket No. 352 – The Connecticut Light and Power Company application for a Certificate of Environmental Compatibility and Public Need for the construction, maintenance, and operation of a proposed substation located at 264 Rood Avenue and 25 Shelley Avenue, Windsor, Connecticut;
- Connecticut Siting Council Docket No. 461 - Eversource Energy application for a Certificate of Environmental Compatibility and Public Need for the construction, maintenance, and operation of a 115-kilovolt (kV) bulk substation located at 290 Railroad Avenue, Greenwich, Connecticut, and two 115-kV underground transmission circuits extending approximately 2.3 miles between the proposed substation and the existing Cos Cob Substation, Greenwich, Connecticut, and related substation improvements.
- State of New Hampshire, Before the Site Evaluation Committee, Docket No. 2015-06, Joint Application of Northern Pass Transmission LLC and Public Service Company of New Hampshire d/b/a Eversource Energy For A Certificate of Site and Facility To Construct A New High Voltage Transmission Line And Related Facilities In New Hampshire.
- Commonwealth of Massachusetts, Energy Facilities Siting Board, EFSB 07-4/D.P.U. 07-35/07-36, Petition of Russell Biomass, LLC. and Western Massachusetts Electric Company for a proposed project consisting of (1) an approximately 5.3-mile, 115 kilovolt transmission line from the proposed Russell Biomass generating facility in Russell to Western Massachusetts Electric Company's ("WMECo") transmission system in Westfield, and (2) a new switching station facility in Westfield.



- Connecticut Superior Court, Allyn vs. CL&P, CV-96-0109273-S;
- Connecticut Superior Court, Scanlon vs. CL&P, CV-96-0536911S;
- Connecticut Superior Court, Segalla vs. CL&P, X-04-CV-98-0117225S;
- DSV MR. SONNY: Damage to submarine electric cables in Long Island Sound. Complex, multi-party limitation of liability proceeding in U.S. District Court for the Eastern District of New York. Settled at mediation;
- Connecticut DPUC Docket No. 94-05-35 - DPUC Investigation Into Stray Voltage On Dairy Farms;
- Connecticut DPUC Docket No. 08-02-06, DPUC Investigation into The Connecticut Light and Power Company's Billing Issues;
- Connecticut DPUC Docket No. 09-12-05 - Application of The Connecticut Light and Power Company to Amend Its Rate Schedules;
- Connecticut DPUC Docket No. 10-03-08 – Investigation of the Service Response and Communications of The Connecticut Light and Power Company (CL&P) and The United Illuminating Company (UI) Following the Outages from the Severe Weather over the Period of March 12 through March 14, 2010;
- Connecticut DPUC Docket No. 10-05-09 - DPUC Investigation of the Safety of the Connecticut Light and Power Company Underground Electric Distribution System in Waterbury;
- Connecticut PURA Docket No. 11-03-07, PURA Investigation Into The Appointment Of A Third Party Statewide Utility Telephone Pole Administrator For The State Of Connecticut; and,
- Connecticut PURA Docket No. 11-09-09 - PURA Investigation of Public Service Companies' Response to 2011 Storms;
- Connecticut PURA Docket No. 12-01-07 – Application for Approval of Holding Company Transaction Involving Northeast Utilities and NSTAR;
- Connecticut PURA Docket No. 12-01-10 - Investigation into the Tree Trimming Practices of CT Utility Companies;
- Connecticut PURA Docket No. 12-06-09 - PURA Establishment of Industry Performance Standards for Electric and Gas Companies;
- Connecticut PURA Docket No. 12-07-06RE01 – Application of the Connecticut Light and Power Company For Approval of its System Resiliency Plan – Expanded Plan;
- Connecticut PURA Docket No. 12-06-12 – PURA Investigation of the Feasibility of the Establishment of a Program to Reimburse Residential Customers for Spoilage Loss of Food items or Refrigerated Medications Caused by a Lack of Refrigeration During Electric Service Outages;
- Connecticut PURA Docket No. 12-09-13 – PURA Investigation of the Best Practices of Other State Public Utility Commissions, Public Utility Companies and Municipal Utilities' Emergency Management Best Practices;
- Connecticut PURA Docket No. 12-11-07, PURA Investigation into the Performance of Connecticut's Electric Distribution Companies and Gas Companies in Restoring Service Following Storm Sandy;

- Connecticut PURA Docket No. 13-03-23, Petition of the Connecticut Light and Power Company for Approval to Recover its 2011-2012 Major Storm Costs;
- Connecticut PURA Docket No. 14-05-06 – Application of the Connecticut Light and Power Company To Amend Rate Schedules;
- Connecticut PURA Docket No. 14-07-18 – PURA Report to the General Assembly Concerning its Review of Each Electric Distribution Company’s Vegetation Management Practices;
- Connecticut PURA Docket No. 15-01-27 - Attorney General and Office of Consumer Counsel Request for Investigation of Northeast Utilities Facilities Closures in Connecticut
- Connecticut PURA Docket No. 15-12-20 – PURA Review of Electric Companies’ and Electric Distribution Companies’ Plans for Maintenance of Transmission and Distribution Overhead and Underground Lines
- Public Act 15-5 - Section 103 - Grid-Side System Enhancements Demonstration Projects

**THE STATE OF NEW HAMPSHIRE  
BEFORE THE  
SITE EVALUATION COMMITTEE  
DOCKET NO. 2015-04**

**AMENDED PRE-FILED TESTIMONY OF DAVID L. PLANTE**

**APPLICATION OF PUBLIC SERVICE COMPANY OF NEW HAMPSHIRE  
D/B/A EVERSOURCE ENERGY  
FOR A CERTIFICATE OF SITE AND FACILITY FOR CONSTRUCTION OF A NEW  
115 kV TRANSMISSION LINE**

**THE SEACOAST RELIABILITY PROJECT**

**March 29, 2017**

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**Qualifications**

**Q. Please state your name and business address.**

A. My name is David L. Plante. I am the Manager of the Project Management Department for Public Service Company of New Hampshire d/b/a Eversource Energy (“PSNH”). My business address is 13 Legends Drive, Hooksett, NH.

**Q. Please describe your background, experience and qualifications.**

A. My background and qualifications were included in my direct pre-filed testimony filed with the NH SEC Application dated April 12, 2016 and have not changed since then.

**Purpose of Testimony**

**Q. What is the purpose of this amended testimony?**

A. The purpose of my testimony is to provide additional information to the SEC in support of PSNH’s Amendment to the original Application dated April 12, 2016.

**Amended Project Description**

**Q. Have you reviewed the amended Project Description submitted to the SEC?**

A. Yes, I have.

**Q. Does the amended Project Description change anything in your previously filed testimony?**

A. Yes. My previously filed testimony included a Project description that has changed. Since filing the original application, the Applicant has continued to work with the Town of Newington and local property owners to address concerns. PSNH now proposes to construct an additional 0.5 miles of the Project underground. Pursuant to the Amendment, additional segments of the Project will be sited underground in the areas of the Flynn Pit Town Forest, Newington Center Historic District, Frink Farm, and the Hannah Lane residential neighborhood.

**Q. In consideration of these changes, do the conclusions in your pre-filed testimony of April 4, 2016 remain the same?**

A. Yes, they do.

**Q. Does this conclude your amended testimony?**

A. Yes, it does.

**THE STATE OF NEW HAMPSHIRE  
BEFORE THE  
SITE EVALUATION COMMITTEE  
DOCKET NO. 2015-04**

**SUBSTITUTE PRE-FILED DIRECT AND AMENDED TESTIMONY OF  
WILLIAM F. WALL**

**APPLICATION OF PUBLIC SERVICE COMPANY OF NEW HAMPSHIRE  
D/B/A EVERSOURCE ENERGY  
FOR A CERTIFICATE OF SITE AND FACILITY FOR CONSTRUCTION OF A NEW  
115 kV TRANSMISSION LINE**

**THE SEACOAST RELIABILITY PROJECT**

**March 29, 2017**

1 **Qualifications and Purpose of Testimony**

2 **Q. Please state your name, title, and business address.**

3 A. My name is William Wall and I am a Project Director for LS Cable America  
4 with a registered address of 222 Bridge Plaza South, Suite 530, Fort Lee, NJ 07024.

5 **Q. Briefly summarize your educational background and work experience.**

6 A. I hold a City & Guilds Final Technical Certificate from the City & Guilds  
7 institute in London UK. I joined the submarine cable industry in 1973 as a Cable Technician  
8 with Cable & Wireless Ltd on a submarine cable installation vessel (Cablesip) and spent 10  
9 years installing & repairing submarine cables worldwide. I then formed an independent  
10 contracting company based in NJ specializing in submarine cable installation and repair in the  
11 US and overseas markets and operated that company for 18 years. In 2001 I joined Caldwell  
12 Marine International (then a subsidiary of General Dynamics) as Development Manager for  
13 submarine cables. In 2007 I joined Deepwater Wind as VP of marine operations. Deepwater  
14 Wind is a private developer of offshore wind farms on the east coast. In 2011 I joined Atlantic  
15 Grid Holdings as Director of Marine Operations. Atlantic Grid is the developer of the Atlantic  
16 Wind Connection (AWC) which is a High Voltage Direct Current (HVDC) submarine cable  
17 system planned to connect NJ to VA in the Atlantic off the east coast to transmit energy from  
18 future OSW facilities. In 2015 I joined LS Cable America ("LSCA") as a Project Director.

19 Please refer to my resume, Attachment A, for further details.

20 **Q. Have you previously testified before the Site Evaluation Committee?**

21 A. No, I have not.

22 **Q. What is your role in the Project?**

23 A. Public Service Company of New Hampshire ("PSNH") has awarded LSCA a  
24 contract to manufacture and install the submarine cable portion of this project. I am the Project  
25 Director for LSCA.

26 **Q. What is the purpose of your testimony?**

27 A. The purpose of my testimony is to provide additional information to the SEC in  
28 support of PSNH's Amendment to the original Application dated April 12, 2016. I will be  
29 replacing Marc Dodeman for the purposes of testifying in support of the Project.

30

**Underwater Construction**

1  
2 **Q. Please describe LS Cable America’s experience installing and maintaining**  
3 **underwater electric transmission lines.**

4 A. LSCA has extensive experience in this area. Most recently in 2016, LSCA  
5 manufactured and directed the installation of a 32KM, 34.5KV submarine transmission cable  
6 system between Block Island RI and Narragansett on mainland RI for National Grid as part of  
7 the Block Island Wind Farm project. Within the same project LSCA manufactured and installed  
8 the 34.5KV distribution and export submarine power cables for the 5 offshore wind turbines of  
9 the Block Island Wind Farm. LSCA is currently manufacturing and installing a 230KV  
10 submarine cable system for the New York Power Authority. Other recent major projects under  
11 our responsibility were the National Grid submarine cable system between mainland Long  
12 Island NY and Captree Island NY. LS Cable has manufactured and installed numerous  
13 submarine cable systems and further details can be found in Attachment B.

14 **Q. Please describe the existing cable corridor for the Project.**

15 A. The existing mapped cable corridor runs from West to East across Little Bay. It  
16 can be located on National Oceanographic and Atmospheric Administration (“NOAA”) Chart  
17 #13285 just adjacent to Welsh Cove. For further details, please refer to Attachment C, “NOAA  
18 Chartlet Little Bay Crossing.”

19 **Q. Please describe the cable survey that PSNH conducted.**

20 A. PSNH hired a separate contractor who performed a dive survey of the area to  
21 determine the location and condition of existing out-of-service cables crossing Little Bay within  
22 the cable corridor. During the dive survey, divers made positive contact with all of the existing  
23 cables within the PSNH chartered cable corridor in a non-invasive visual dive survey, and  
24 critically obstructive existing cable positions were verified. In all diver reported accounts, the  
25 physical condition of all existing out-of-service cables had been found to be structurally sound.  
26 The sediment found to be covering the cables in the inspection area trended toward soft, non-  
27 cohesive fine sands and soft mud with burial depths ranging from a maximum of 24” to areas of  
28 full exposure. Finally, divers reported that in none of the inspection sites were any of the cables  
29 found to be cemented in place by stiff sediment overburden or silt/clay accretion. Complete  
30 details can be found in the document “F107 Cable Survey Final Report (31Jul14),” Attachment  
31 D.

1           **Q.     Please describe what data was collected during the marine route survey, and**  
2 **describe how LSCA utilized the Marine Route Survey data that was collected by Ocean**  
3 **Surveys, Inc. (OSI) in the cable corridor area.**

4           A.     A Marine Route Survey (Marine Geophysical Survey) was performed April 20-  
5 23, 2013 by Ocean Surveys, Inc., (OSI) at the behest of Power Engineers, Inc. (Engineering  
6 consultant to PSNH). The tasks undertaken during this marine route survey were:

7           1)     A hydrographic survey to determine water depths and record the existing  
8 topography.

9           2)     A shallow subbottom profile survey to map shallow subsurface geology and  
10 identify buried submarine utilities.

11          3)     Deep subbottom profile survey to map deeper subsurface stratigraphy and  
12 geology.

13          4)     Side scan sonar survey, to map surficial sediments and obstructions as well as  
14 identify exposures of existing submarine utilities.

15          5)     Magnetic intensity measurements, to measure the deviation in the earth's total  
16 magnetic field generated by ferrous objects on and below the bottom.

17          Subsequent sediment cores were taken along the anticipated submarine cable route by  
18 Normandeau Associates Inc. Geotherm, USA, an underground and underwater substrate testing  
19 company, analyzed the cores to provide further subbottom data in terms of geomorphology and  
20 substrate plasticity to assist in determining thermal resistivity and burial feasibility.

21          LSCA utilized this data to determine soil characteristics, identify obstructions and  
22 assess burial feasibility for the cable installation.

23           **Q.     Please describe how existing sections of the inactive cables that are currently**  
24 **in the cable corridor will be removed.**

25           A.     Data acquired by OSI during the Marine Route Survey and additional surveys  
26 will be utilized by to provide rough positioning of the existing out-of-service cables. Reference  
27 positions will be entered into a navigation suite, which will act as the central navigation system  
28 of the cable removal barge.

29           The installer will utilize surface grapnels to hook the existing power cable bringing the  
30 end on board. Divers may be used to assist in locating the cable end. All information to date  
31 indicates that the cables lie on or close to the surface in unconsolidated sediments. If some



1 areas are more resistant to removal, hand jetting may be necessary to free those sections of  
2 cable.

3           Once a cable end is on board and a suitable length laid out on deck, it will be tied off  
4 with chain stays and sections will be cut off and prepared for onshore disposal. The barge will  
5 move along the cable and sections will be cut off until it is determined that the section of the  
6 cable corridor needed for the new cable system is clear. The cable end shall be capped before it  
7 is returned to the bottom of the bay. Should the cable snap before being entirely cleared from  
8 the route, additional grapnel runs or diver locates will be undertaken to relocate the cable and  
9 continue clearing the route.

10           Only sections of the existing out-of-service cables will be removed to create a clear  
11 route for the new cable system.

12           **Q.     Once the new 115 kV cables are ready for installation, how will the cables be**  
13 **transferred to the Project site?**

14           A.     Cable reels will be delivered by LSCA to a local port via a freighter. At this time  
15 it is understood that the local port will be a commercial dock in Newington, NH with suitable  
16 facilities.

17           It is expected that only one power cable reel will be loaded onto the installation barge  
18 and installed at a time. The barge will return to the storage dock between installations. Separate  
19 loading and installation operations are necessary due to the weight of the cable reels. Individual  
20 reels will be loaded between installations to allow the barge to operate with minimum draft.

21           **Q.     Please describe the jet plow.**

22           A.     The cable jet plow is a device which is laid on the seafloor and towed from the  
23 barge. Its main mechanical components are two skids which allow the sled to slide across the  
24 bottom, and an articulated blade which rotates down into the seafloor. The blade is fitted with  
25 water injectors along its leading edge which liquefy the sediment immediately ahead of the  
26 blade greatly reducing the force required to pull the plow forward. See Attachment E for  
27 “Jetting Sled Data Sheet.” The cable is strung through the plow blade from the barge, and as the  
28 plow moves forward, the cable runs through the blade and is left embedded at a pre-determined  
29 depth underneath the seafloor.

30           **Q.     Please describe the process for making landfall on both the western and**  
31 **eastern sides of Little Bay.**

1           A.       The west shore of Little Bay will be the initial landing site for all three cable  
2 runs. They will terminate on the East shore. The cables will be landed into a common open-cut  
3 trench at each landing area. These trenches will extend as far seaward as practicable as can be  
4 reached by a tracked excavator at low tide. The landing trenches will be dug deep enough that a  
5 minimum of 42 inches of cover from the top of installed cables is met. The common landing  
6 trenches will be approximately 3 to 5 feet in width. Personnel staffed at the beach landings will  
7 include experienced project managers familiar with cable landing operations, field supervisors,  
8 and site engineers.

9           A jet plow will be set as close to the shoreline as possible at high tide to minimize the  
10 amount of diver burial between the end of the open-cut landing trench, and the start of the plow  
11 launch position. The cable, strung through the plow at its initial launch position, will be hauled  
12 ashore until its end is at the position of the transition structure with a suitable amount of over-  
13 pull to allow the cable engineers to terminate the end at the transition structure. Once the cable  
14 end is secured ashore, the jet plow will start moving seaward along the planned route. This  
15 initial landing procedure will be performed for all three cable installation runs.

16           The Eastern shore landing will be the final landing site for all three cable runs. The jet  
17 plow will be towed as close to the shoreline as possible at high tide to minimize the amount of  
18 diver burial between the plow recovery position and the end of the open-cut landing trench. At  
19 the Eastern shore landing, the cable will be unloaded from the jet plow by divers. A sufficient  
20 amount of cable to reach the termination point will be floated from the barge and pulled to  
21 shore. This initial landing procedure will be performed for all three cable installation runs.

22           **Q.       Please describe the submarine cable installation process.**

23           A.       Submarine power cable installation will be performed from an installation barge  
24 equipped with a four point mooring system. The lay barge will be fitted with a Differential  
25 Global Positioning System (“DGPS”), which will allow for the precise positioning of the lay  
26 barge and towed jet plow system.

27           The installation plan calls for laying the submarine cables from reels in three continuous  
28 parallel runs from shore to shore. The first installation run will include one power cable segment  
29 with one externally strapped fiber optic cable segment bundled in the same trench. The second  
30 installation run will include one power cable segment with one externally strapped fiber optic

1 cable segment bundled in the same trench. The third installation run will include one power  
2 cable segment. The cables will be installed using the jet plow.

3       Following each jet plow operation, the lay barge will be towed back to the staging port  
4 to load the next reel of cable segments.

5       The cable lay barge, typically a 180' x 54' barge, will be fitted with a four point anchor  
6 winch system, and may also include a centrally placed pulling anchor. All anchors will be  
7 controlled by anchor winches on the barge, this will allow precise movement of the barge across  
8 Little Bay by controlling the anchor wires.

9       The cable lay barge is fitted with a DGPS that is capable of positioning the barge and jet  
10 plow to +/- 1.0 meter accuracy. The lay barge will be supported by a dedicated support tug boat,  
11 a crew boat to ferry crew and customer representatives to and from the barge, and several small  
12 work skiffs.

13       The jet plow will be controlled from the barge utilizing a program that allows for the  
14 accurate real-time measurement of cable positioning as the installation occurs, residual cable  
15 tension, and burial depth.

16       Cable handling will be controlled utilizing specialty linear cable engines and powered  
17 reel stands to precisely control the pay-out and hold-back of the cables during the installation  
18 operations.

19       Cable landfall operations will include the use of a large winch on the beach. This will be  
20 used to haul the cable end onto the beach at the beginning and the end of each cable laying and  
21 burial run. The winch will be fitted with a dynamometer to ensure the cable tension during the  
22 pull-in operation stays within LSCA recommended ranges.

23       Per National Electrical Safety Code ("NESC") requirement, the minimum the submarine  
24 cable can be buried at any point is 42 inches. The 42-inch requirement will extend from the  
25 landing trench out to the start of plow burial. Once the plow progresses to the line delineating  
26 the deep water channel, the plow blade will be lowered to the 8-foot burial depth. A typical 30  
27 foot separation between the cables is required in the area where jet-plow installation is taking  
28 place, as this is the minimum safe working distance of the plow from each previously installed  
29 cable section. Wherever a 42-inch burial cannot be achieved with the jet-plow, articulated  
30 concrete mattresses will be installed over the top of the submarine cables as required. The intent

1 of the concrete mattresses is to provide the submarine cables with robust, permanent protection  
2 from forces of external aggression such as anchors and fishing gear strikes.

3 Each run will have an initial cable landing on the Western shoreline, and be installed  
4 from West to East. The final landing (end being floated in) will occur from the end of plow  
5 position to the Eastern landing.

6 The remaining sections of cable between the open-cut trench on the shorelines and the  
7 end of the jet plow operation will be buried by divers using a hand jetting process. Prior to the  
8 start of diver burial operations at the Western shore landing area, a turbidity curtain will be  
9 deployed surrounding the entire work area. As divers bury the cable utilizing a jet hose, the  
10 deployed turbidity curtain will create a barrier to prevent suspended particulates from being  
11 allowed to migrate from the vicinity of the work area. Stronger currents preclude deployment of  
12 turbidity curtains in the deeper sections of the bay. Prior to the start of diver burial operations at  
13 the Eastern shore landing area, a turbidity curtain will be deployed around the intertidal portion  
14 of the work area. As divers bury the cable utilizing a jet hose, the deployed turbidity curtain will  
15 create a barrier to prevent suspended particulates from being allowed to migrate from the  
16 vicinity of the work area. See Attachment F for "Driver Jet Burial Procedure."

17 **Q. How will PSNH ensure that the underwater segments of the Project comply**  
18 **with all of the requirements of the Certificate of Site and Facility when implementing the**  
19 **construction plan, including, the conditions set under each State and federal permit?**

20 A. PSNH will require all contractors to comply with the requirements identified in  
21 the Certificate of Site and Facility in performance of this installation. The installer will be  
22 required to provide all as-built documentation for submittal to NOAA for the purposes of  
23 nautical charting. Per final permit requirements, it is anticipated that an environmental monitor  
24 will be on-site during the marine operations.

25 **Q. Please describe any maintenance that is required for an underwater electric**  
26 **transmission line of this nature.**

27 A. Typically, no maintenance is required on a buried submarine cable. Should a  
28 break occur due to a high voltage blowout or fault due to external aggression, the cable will be  
29 cut, raised to the surface, a section of new cable spliced in, laid on the seafloor, and diver buried  
30 and/or covered with an articulated concrete mattress.

31 **Amendment to Application**

1           **Q.    Have you reviewed the amended Project Description?**

2           A.    Yes, I have.

3           **Q.    Does the amended Project Description change anything to the pre-filed**  
4 **testimony originally submitted by Mr. Marc Dodeman of CMI?**

5           A.    No, it does not. The submarine cable design and installation across Little Bay  
6 has not changed since originally filed with the SEC.

7           **Q.    Does this conclude your testimony?**

8           A.    Yes.

**ATTACHMENT A.**  
**RESUME OF WILLIAM F. WALL**

## William F Wall

### **BIOGRAPHICAL DATA**



Bill Wall has over 40 years of worldwide offshore marine experience specializing in submarine cable, marine utility and offshore wind projects. He has held positions ranging from sales, marketing, project management, contract negotiation and project implementation in the marine construction industry for companies including his previous positions at offshore wind developer Deepwater Wind, Caldwell Marine International, General Dynamics, Cable & Wireless PLC and British Telecom. He is currently the Marine Operations Director at The Atlantic Wind Connection. Having worked on projects as diverse as, submarine cable repair/installation, offshore wind farm installation, submarine pipeline projects and offshore oil & gas drilling Bill is well versed in the planning process and the day to day operational aspects of submarine cable projects. Very comfortable in presenting to any and all stakeholder groups, particularly skilled in delivering Power Point presentations and have often presented at industry conferences and seminars.

Mr. Wall received his Final Certificate from the City & Guilds Engineering Institute of London.

**DOB:** March 1 1952  
**Citizenship:** US Citizen  
**Address:** 42 Curtis Avenue, Manasquan NJ 08736 USA  
**E-mail:** [bill.wall@lscableamerica.com](mailto:bill.wall@lscableamerica.com)

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### **RECENT CAREER REVIEW**

#### **LS Cable America**

Joined LS Cable America in December 2015, as Project Director, have conducted operations across the full spectrum of submarine cable developments. Some highlights are:

- Sea-to-Shore 20 mile + submarine transmission cable Block Island RI to Mainland RI
- 230KV Submarine Cable Interconnector NY to VT for New York Power Authority
- 138KV Submarine Cable Interconnector PEI to New Brunswick Northumberland Strait, Canada
- Contract administration interface with utilities and system owners
- Operations interface with all major subcontractors

#### **Atlantic Wind Connection**

Joined AWC in May 2011, as Director, Marine Operations but have conducted operations across the full spectrum of project development. Some highlights are:

- Initiated Master Service Agreement (MSA) process to hire major sub-contractors
- Authored & developed RFP/specification documents for major engineering/geo-tech/geophysical contractors
- Reviewed all major subcontract bids, adjudicated bid process and hired successful bidders
- Conducted Desk Top Study processes
- Operations interface with EPC contractor (Bechtel)
- Conducted major port study with EPC contractor to vet mobilization & fabrication capabilities
- Developed & operated a web based supply chain portal to enable local supplier registration
- Actively recruited local, qualified vendors and sub-contractors to join the supply chain

- Provided supply chain portal template and operating model to BizMDOSW organization.
- Developed and authored Method of Procedure (MOP) documents for submarine cable system installation
- Developed and authored Method of Procedure (MOP) for jacket foundation operations
- Authored various technical chapters of the General Activities Plan (GAP) submittal to BOEM
- Interfaced with Labor organizations and contractors
- Responsible for both state & federal permitting activities for AWC.
- Main interface with BOEM, USACE and state DEP departments.
- Developed PAM acoustic responses to NMFS as part of USACE NWP 6 application
- Received NWP 6 from USACE for survey operations of Mid-Atlantic
- Developed survey & crossing plan with 10 existing submarine cable owners

## **Deepwater Wind**

Joined Deepwater November 2007 (3rd employee on team), official title VP Marine Operations but again conducted operations across the full spectrum of project development. Some highlights are:

- Part of team that developed Joint Venture with PSEG to form Garden State Offshore Energy in NJ
- Developed technical presentations to NJ BPU & RI PUC as part of state OSW competition
- Technical member of team that wrote original proposals for the Block Island Wind Farm project
- Technical interface with Turbine manufacturers
- Developed the original submarine cable plan for the 34.5kv BITS & BIWF cable systems
- Authored original RFI for Block Island cable projects with multiple manufacturers
- Developed RFP/specification documents for engineering/geo-tech/geophysical subcontractors
- Reviewed all major subcontract bids, adjudicated bid process and hired successful bidders
- Conducted Desk Top Study program(s)
- Developed and managed geophysical survey campaigns NJ & RI in within BOEM/USACE regulations
- Specified and assembled team (drill ship, driller and geo-tech engineer firm) to conduct deep-bore drilling campaigns in accordance with BOEM/USACE requirements
- Developed and managed operations on deep bore geo-technical programs, 8 holes off RI and 1 hole off NJ all to +/- 300' depth. Due to Hurricane I had to develop and negotiate a stand-by agreement with drill ship.
- Interfaced with Supply Chain and contractors
- Developed and managed floating Lidar program offshore RI. Hired & managed CVA contractor for BOEM requirements. Installed first tension leg buoy with Zephyr Lidar system on board.
- Interface with foundation fabricators: visited major jacket/mono pile yards in GOM region.
- Interface with US Navy & existing submarine cable owners.

## **US Offshore Wind**

I am experienced in all BOEM requirements both for OSW leases and transmission cable ROW in accordance with 30CFR585. I have worked closely with and know personally all US offshore wind developers and most of their management and financial equity teams.

## **European Offshore Wind**

I have stayed current with the OSW industry in Europe, especially from the submarine cable aspect. I have good relationships with many in Europe on both the developer front and the supply chain. I have built good relationships with key staff at DONG, Elia and 50Hz (Belgium & Germany).



**Submarine Cable Supply & Installation**

I am well known by all in the submarine cable industry both on the supply/installation side and the utility/owners side. I have worked with many of the US & Canadian utilities (NYPA, N-Star, NGrid, PSEG, Smeco, BC Hydro etc) on major submarine cable projects. I know all the major engineering/environmental/permitting consultant firms who have worked on submarine cable and/or offshore wind projects. (Black & Veatch, AECOM, Mott MacDonald, Tetra Tech etc)

**Merchant & Rate Based Transmission**

Due to the inherent opposition in the US to overhead high voltage transmission lines many developers are now turning to innovative submarine cable solutions for long-haul transmission requirements. These projects can be either on a “Merchant” basis or a “Rate Based” approach. Either approach requires close interface with grid and Independent System Operators (ISO) such as PJM, NYISO, ISO New England etc. I am very familiar with this type of approach from a technical, business and financial point of view.

**References**

References from industry professionals are available upon request.

## **WILLIAM F. WALL (BILL)**

### **Summary of Experience:**

Mr. Wall has over 40 years of worldwide marine construction experience specializing in submarine power transmission cable and offshore wind development. In-Depth knowledge of the complete offshore wind and submarine power cable development, procurement and implementation processes.

Sales, marketing and contract negotiation experience covering the complete spectrum of marine projects, including risk management, insurance, indemnity, warranty and other contract areas. Project development & financing. Labor & project staffing experience in the marine market. Supply chain creation & management.

Hands-on project management experience in marine construction and offshore utility projects. Qualified in all aspects of submarine utility burial and embedment. Extensive experience in permit application and retention. Full scope of regulatory interface including outreach and stakeholder engagement.

**Representative Projects:** Representative Projects in which Mr. Wall has participated are outlined below:

- *Long Island NY:* 345kV NYPA Submarine power transmission cable project – Lay & burial of 4 EHV SCFF cables across LI Sound. Project Manager for cable embedment.
- *San Juan Islands WA:* Turnkey supply and installation of a 69kV 3/C submarine power transmission cable system inter-connecting 4 islands. All buried to 2m burial depth.
- *Rockland ME:* Fox Island Project - Turnkey supply and installation of 16kM of 35kV 3/C submarine power transmission cable buried to 2m burial depth.
- *Long Island NY:* ConocoPhillips Project – Major marine construction upgrade to the ConocoPhillips offshore loading facility in Long Island Sound, including the installation of 60” diameter mono-piles, 170’ in length.
- *Vancouver Is. – WA State:* Installation of 3x SCFF 242Kv Submarine power transmission cable system 33km in length
- *Long Island NY/Norwalk CT:* Cross Sound Cable – Standby repair contract for the HVDC submarine power transmission cable system connecting Connecticut and New York across LI Sound.
- *London, England:* Centrica Project – Consultant contract to advise a major UK OSW developer on the installation of shallow water submarine cables off the coast of England. Desk Top Study presented to upper management in London.
- *Rhode Island & New Jersey:* Development of offshore wind farms & associated submarine cable systems
- *US Mid-Atlantic Region:* Development of an offshore Multi-Terminal HVDC submarine cable system (AWC)

**Education:** City & Guilds Engineering Institute London, Final Certificate 1975-1979

### **Professional History:**

LS Cable America Inc.: Project Director 2015 -Present  
Atlantic Wind Connection: Dir. Marine Operations 2011 - 2015  
Deepwater Wind: VP 2007 - 2011  
Caldwell Marine International: Business Development 2003 – 2007  
General Dynamics: VP Business Development: 2001 - 2003  
Margus Co. Inc: Vice President Operations: 1983 – 2001  
Cable & Wireless (Marine): Submarine Cable Engineer: 1972-1983  
British Telecom: Underground OSP Engineer: 1968 - 1972

### **Professional Certifications:**

Offshore Survival & Operations Training Courses  
Various Computer Application Courses

**ATTACHMENT B.**  
**LS CABLE & SYSTEM: SUBMARINE POWER**  
**CABLES 2017**





# Submarine Power Cables – 2017





# LS Cable & Systems – South Korea



**Head Office**

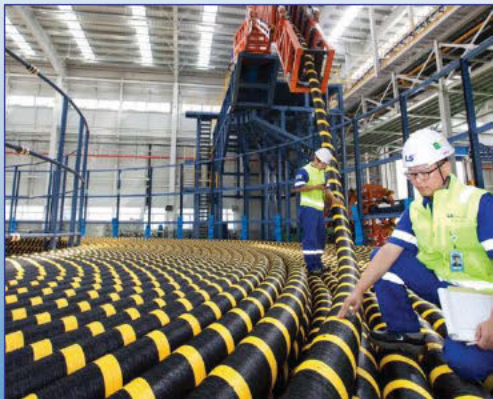


**Central Research Lab**



**Donghae Plant**

# LS Cable & Systems – Manufacturing Process Donghae Plant





# Selected Global Project Supply Experiences







Van Oord (Eneco)
HVAC 150kV
25.7km
EPC
2013-2015





Dong Energy
HVAC 150kV
10.5km
EPC
2012-2014





Energinet.dk
HVDC 285kV
23.5km
EPC
2013-2014





ZTT (Corpoelec)
HVAC 230kV
40km
EPCI
2012 -2015





Qatar Petro.
HVAC 132kV
100km x 2
EPCI
2012 - Present





KEPCO
HVDC 250kV
3 x 101.3 km
EPCI
2009 - 2012



# North American Submarine Cable Projects



Client	Project	Voltage	Contract
National Grid	Captree Island NY	35KV AC 3/C	S & I
NYPA	NY – Vermont Interconnector	230KV AC 1/C	EPC
Maritime Elec.	PEI – NB Interconnector	138KV AC 3/C	EPC
Deepwater Wind	Block Island Wind Farm	35KV AC 3/C	S & I
National Grid	Block Island Transmission	35KV AC 3/C	S & I



# Captree Island NY Submarine Cable Project



## SUBMARINE CABLE PROJECT

- Engineering & Project Planning
- Cable Manufacturing & Shipping
- RC/PLGR
- Initial Landing
- Cable Burial by Plow
- Final Landing



# Block Island RI Submarine Cable Project



## SUBMARINE CABLE PROJECT

- Engineering & Project Planning
- Cable Manufacturing & Shipping
- RC/PLGR
- Initial Landing
- Cable Burial by Plow
- Final Landing





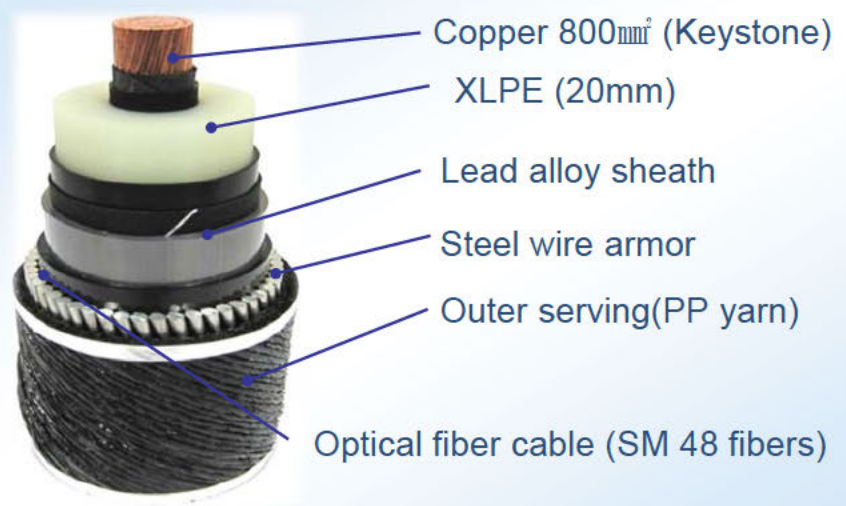


# AC 230kV XLPE Margarita Island Interconnector (Turnkey)

## Project Site & Cable Route



## Cable Construction



## Project Descriptions

Customer	Corpoelec
Capacity / Voltage	350 MVA / AC 230kV
Outer dia. / Weight in air	134mm / 42 kg/m
Route length	Total 80km (1cct + 1 spare line)
Water depth	Up to 80m
Period	Jul. 2012 - May 2015

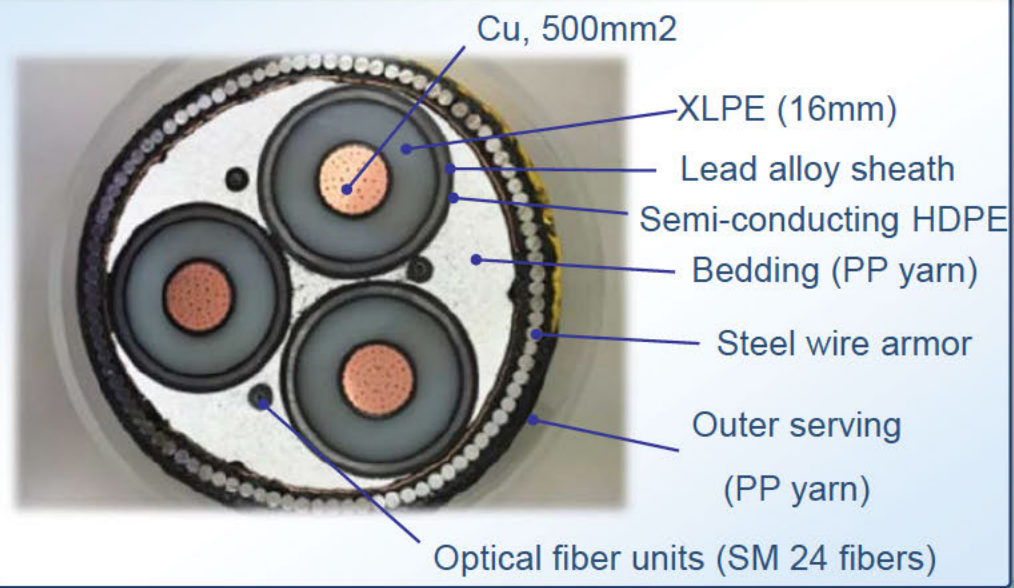


# AC 132kV XLPE Halul Island Interconnector (Turnkey)

## Cable Route



## Cable Design



Customer Name	Qatar Petroleum
Contact Point	almarri@qp.com.qa
Capacity	200MW (100MW x 2ccts)
Outer dia. / Weight in air	193mm / 72 kg/m
Cable length / Water depth	2 x 100km / Up to 40m
Period	May 2012 ~ Jun. 2016 (Ongoing)
Installation partner	Jan De Nul (protection by Canyon)



Confidential





# AC 132kV XLPE Halul Island Interconnector (Turnkey)

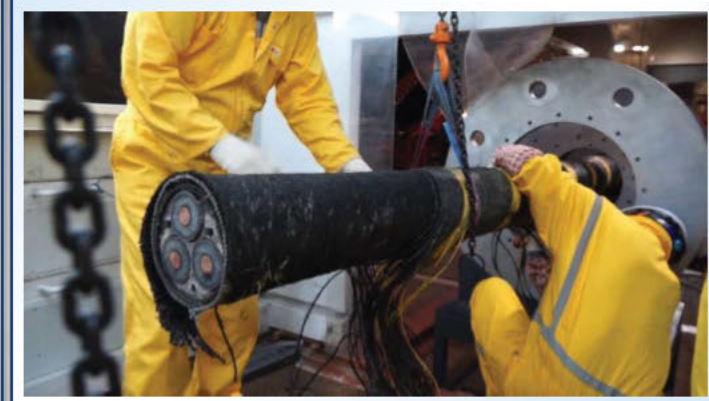
### Cable Transfer



### Loaded Turntables



### Cable End Cut



### Shore Landing



### Transition to Land



### Substation Construction





# Thank You

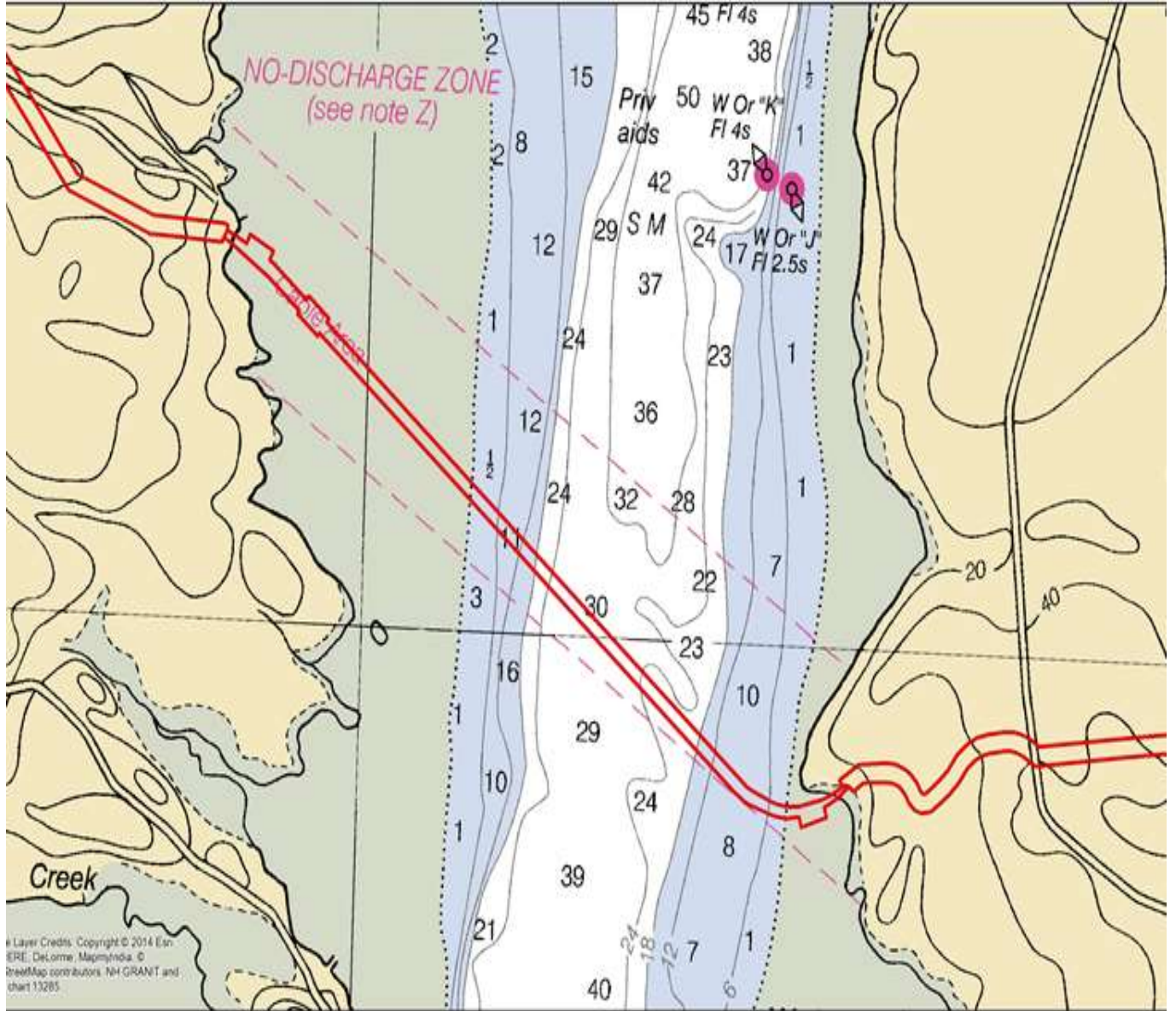
Enable  
the Cabled World

선으로 하나되는 세상

**LS** Cable & System

**ATTACHMENT C.**  
**NOAA CHARTLET LITTLE BAY CROSSING**



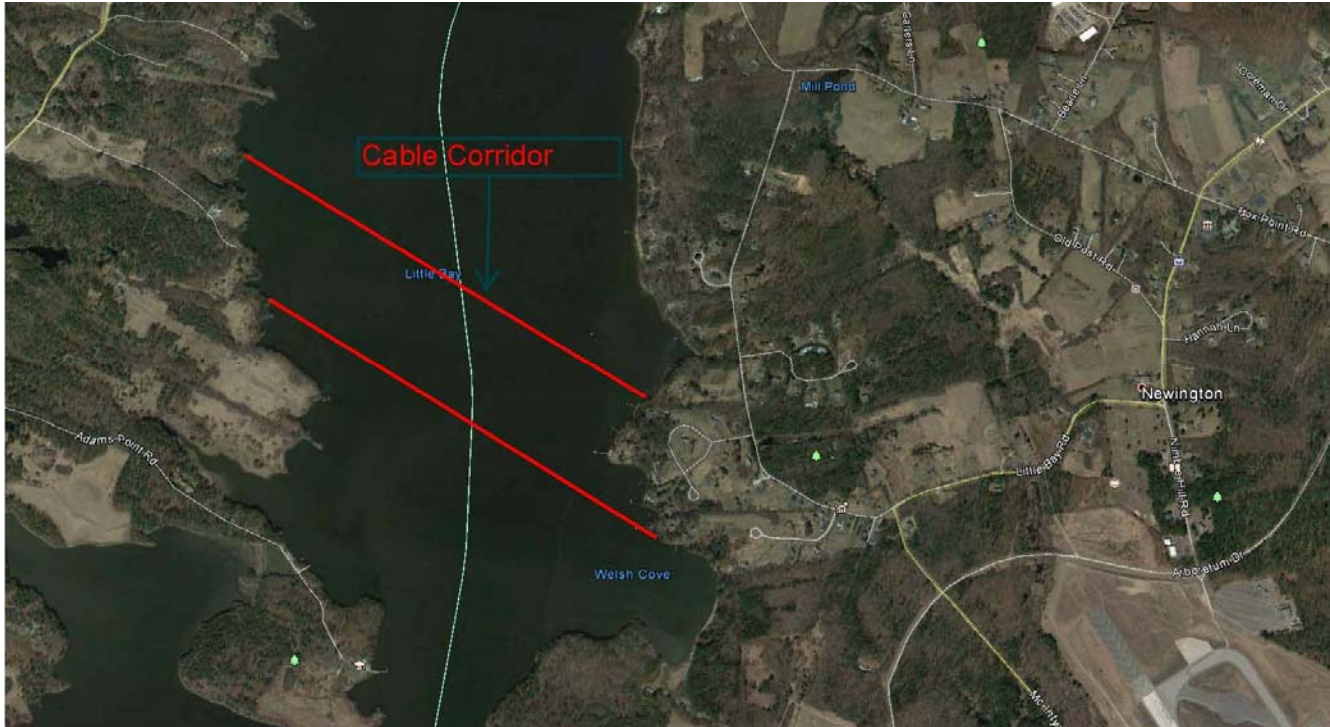


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InetMap contributors, NH GRANIT and  
chart 13285



**ATTACHMENT D.**  
**F107 CABLE SURVEY FINAL REPORT**

## PSNH – F107 CABLE SURVEY FINAL REPORT



**Presented to Public Service New Hampshire / Northeast Utilities**

**31 July, 2014**

**Presented to:**  
**Gary O’Kula**  
Transmissions Projects  
PSNH/NU  
Legends Dr  
Hookset, NH 03106

**Prepared by:**  
**Marc A. Dodeman**  
Director of Survey Operations  
Caldwell Marine International, LLC  
1433 Hwy 34 South, B1  
Farmingdale, NJ 07727  
P: 732-557-6100  
F: 732-736-8910

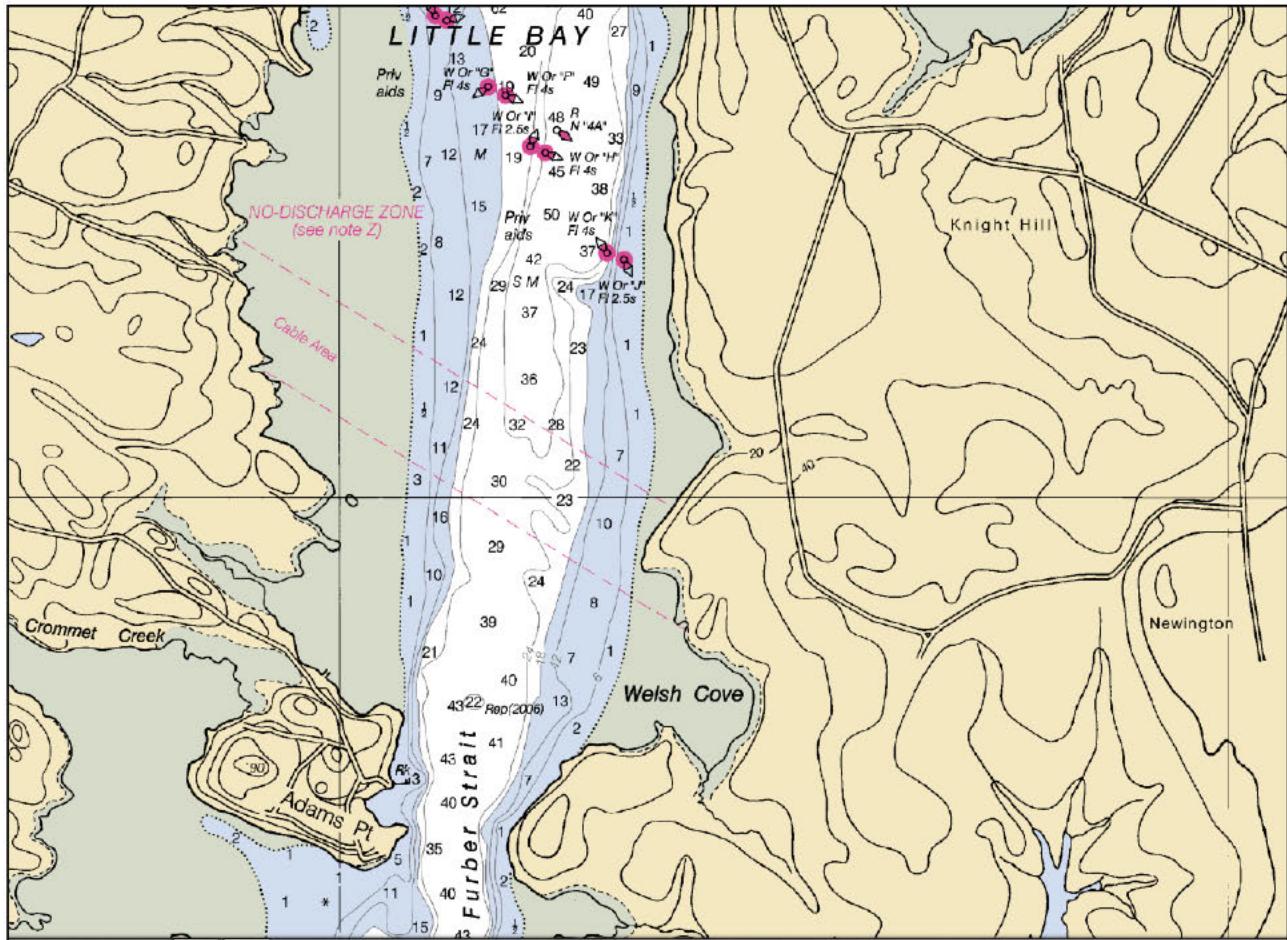
## **Introduction and Project Background**

In May 2014, Public Service New Hampshire following their review of bids received for the supply and installation of the F107 cable system, invited bid teams (submarine cable manufacturers / installers) to provide technical presentations of their installation proposals. During the review of Caldwell Marine's installation pricing and methodologies, the requirement to clear the submarine cable corridor (see **Figure 1**) in Little Bay (West of Newington, NH) was discussed.

Since this cable corridor is populated by four existing out-of-service PSNH cables, the section of the corridor being considered for the new F-107 cables must be cleared of existing utilities to allow unhindered cable plow burial during installation operations. Public Service New Hampshire contracted Caldwell Marine International, LLC to conduct a dive investigation of the four existing out-of-service cables that cross Little Bay.

During the week of July 14, 2014, Caldwell Marine conducted a diver investigation and hydrographic sounding survey within the Public Service of New Hampshire cable corridor spanning Little Bay.

## Project Area (from NOAA Chart 13285)



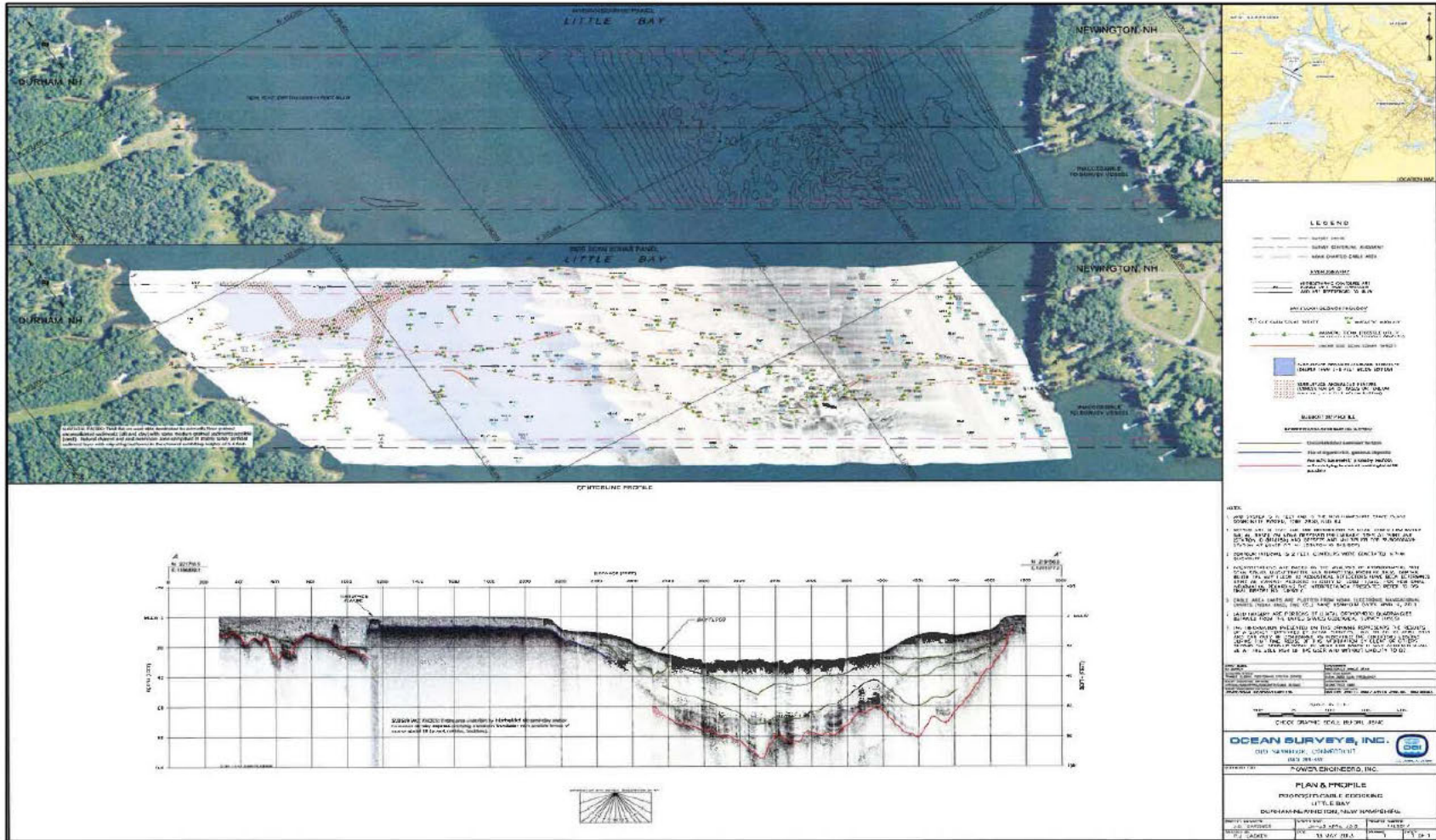
**Figure 1. Little Bay Cable Corridor**

The primary focus of this survey was to determine existing out of service as-laid cable locations and cable conditions for consideration of recovery operations in preparation of the route design of the future F107 transmission project.



**Owner Supplied Areal Information**

In April 2013, Ocean Survey, Inc (OSI) conducted a full scale hydrographic survey, which included side scan, magnetometer, and sub bottom profile data collection within the cable corridor (Figure 2).



**Figure 2: OSI Survey Drawing**

1433 Highway 34 South  
Building B  
Farmingdale, NJ 07727  
Tel: 732-557-6100

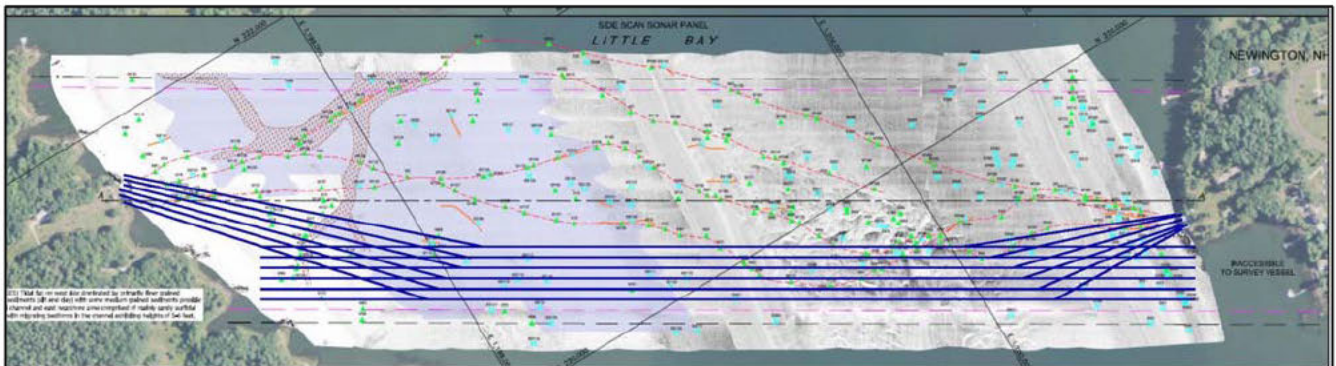
Fax: 732-736-8910 [www.caldwellmarine.com](http://www.caldwellmarine.com)



AN EQUAL OPPORTUNITY EMPLOYER



This survey identified the four (4) existing out of service cables, as well as other anomalies, within the corridor. Due to the existing cables being located mostly in the northern half of the cable corridor, CMI advised PSNH that the most feasible route for a new cable would be in the southern part of the corridor (**Figure 3.**)



**Figure 3**

CMI divers first inspected the cable corridor where the new system would most likely be obstructed by the existing cable segments. CMI divers then proceeded along the proposed cable route inspecting for any other possible obstructions. Finally, divers searched for the other existing cables in the northern half of the corridor to verify the as-laid position of the remaining out of service cable segments, and determine their condition and depth.

Surface supplied dive operations were conducted from the *Little Johnny*, a 26' aluminum hulled work vessel. Survey operations were conducted from the *Little Lexi*, a 25' aluminum hulled shallow water survey vessel.

Upon arrival at the work site, utilizing a Differential Global Positioning System (DGPS,) the CMI team located the position of the existing four cables at the approach to the Eastern shore (**Figure 4.**) These locations were consistent with the OSI drawings provided. Over the next four days, divers followed the cables westerly across Little Bay marking as-laid position, overall cable condition, and depth of burial. Divers also investigated the various anomalies identified in the OSI as-found survey drawing and found them to be sunken trees and light debris covered by sand overburden.



**Figure 4: View of the work area at the Eastern Shore landing approach; floats were affixed to the as-found cables by divers.**



**Summary of Field Investigation Operations**

**Public Service New Hampshire  
As-Found Cable Dive Investigation and Sounding Survey**

**Coordinate System Ref:** State Plane

Page 1 of 2

**Datum:** NAD 83

**Zone:** 2800-New Hampshire

Cables numbered 1-4 from South to North

**Units:** U.S. Survey Foot

Soundings Referenced to MLLW in feet

Date	Dive #	Cable #	Geoid		NAD 83		Water Depth (ft)	Burial Depth (in)	Cable Condition and Bottom Notes
			Latitude	Longitude	Northing	Easting			
15-Jul-2014	1	1	43° 05.9263' N	70° 51 3857' W	219269 20	1200652.47	11.9	0	Pt. 5873. 3"Cable in good condition. Recoverable. Compact gravel bottom.
15-Jul-2014	1	1	43° 05.9233' N	70° 51 3763' W	219251 06	1200694.60	11.6	0	Pt. 5875. 3"Cable in good condition. Recoverable. Compact gravel bottom. SS126, M71
15-Jul-2014	1	2	43° 05.9249' N	70° 51 3745' W	219260 88	1200702.54	11.3	0	Pt.5876. 1" cable in good condition. Recoverable. Compact gravel bottom.
15-Jul-2014	1	3	43° 05.9326' N	70° 51 3707' W	219307 81	1200719.00	11.0	0	Pt.5877. 1" cable in good condition. Recoverable. Compact gravel bottom.
15-Jul-2014	1	4	43° 05.9357' N	70° 51 3660' W	219326 85	1200739.74	10.6	0	Pt. 5878. 1" Cable in good condition. Gravel bottom.
15-Jul-2014	1	1	43° 05.9368' N	70° 51.4027' W	219331 96	1200576.10	12.0	0	Pt. 5879. 3"Cable in good condition. Recoverable. Compact gravel bottom.
15-Jul-2014	2	1	43° 05.9523' N	70° 51.4482' W	219424.15	1200372.86	15.0	3-6	Pt. 5880. 3"Cable in good condition. Recoverable. Compact gravel bottom.
16-Jul-2014	1	1	43° 05.9401' N	70° 51.4081' W	219351 81	1200551.89	12.0	0-3	Pt. 5883. 3"Cable in good condition. Recoverable. Compact gravel bottom.
16-Jul-2014	1	1	43° 05.9473' N	70° 51.4280' W	219394.69	1200462.88	12.0	0-3	Pt. 5925. 3"Cable in good condition. Recoverable. Compact gravel bottom.
16-Jul-2014	1	1	43° 05.9524' N	70° 51.4491' W	219424.77	1200368.66	15.2	3-6	Pt. 5926. 3"Cable in good condition. Recoverable. Compact gravel bottom.
16-Jul-2014	1	1	43° 05.9536' N	70° 51.4617' W	219431 51	1200312.50	19.0	3-6	Pt. 5929. 3"Cable in good condition. Recoverable. Compact gravel bottom. M167, M192
16-Jul-2014	1	1	43° 05.9543' N	70° 51.4767' W	219435.12	1200245.69	24.0	12	Pt. 5931. 3"Cable in good condition. Recoverable. Compact gravel bottom. M35, M188
16-Jul-2014	1	2	43° 05.9342' N	70° 51 3903' W	219316.69	1200631.66	12.0	0-4	Pt. 5932. 1"Cable in good condition. Recoverable. Compact gravel bottom. M153.
16-Jul-2014	1	2	43° 05.9430' N	70° 51.4076' W	219369.40	1200554.13	12.0	0-4	Pt. 5933. 1"Cable in good condition. Recoverable. Compact gravel bottom.
16-Jul-2014	1	2	43° 05.9486' N	70° 51.4245' W	219402.69	1200478.58	12.0	0-4	Pt. 5937. 1"Cable in good condition. Recoverable. Compact gravel bottom.
16-Jul-2014	1	2	43° 05.9602' N	70° 51.4447' W	219472 29	1200387.98	14.6	1-5	Pt. 5939. 1"Cable in good condition. Recoverable. Compact gravel bottom.
16-Jul-2014	1	2	43° 05.9708' N	70° 51.4665' W	219535.74	1200290.32	22.0	1-6	Pt. 5941. 1"Cable in good condition. Recoverable. Compact gravel bottom. M44
17-Jul-2014	1	2	43° 05.9708' N	70° 51.4665' W	219535.74	1200290.32	27.9	10	Pt. 5942. 1"Cable in good condition. Recoverable. Compact gravel bottom.



**Public Service New Hampshire  
As-Found Cable Dive Investigation and Sounding Survey**

Coordinate System Ref: State Plane

Datum: NAD 83

Zone: 2800-New Hampshire

Units: U.S. Survey Foot

Cables numbered 1-4 from South to North

Soundings Referenced to MLLW in feet

Page 2 of 2

Date	Dive #	Cable #	Geoid		NAD 83		Water Depth (ft)	Burial Depth (in)	Cable Condition and Bottom Notes
			Latitude	Longitude	Northing	Easting			
16-Jul-2014	1	2	43° 05.9761' N	70° 51.4788' W	219567.46	1200235.06	25.3	4-6	Pt. 5943. 1" Cable in good condition. Recoverable. Compact gravel bottom. M44
16-Jul-2014	1	2	43° 05.9877' N	70° 51.5010' W	219636.92	1200135.75	27.4	0	Pt. 5944. 1" Cable in good condition. Recoverable. Compact gravel bottom. Cable on surface. SS52, M165
16-Jul-2014	1	2	43° 06.0008' N	70° 51.5227' W	219715.57	1200038.39	28.0	6-8	Pt. 5945. 1" Cable in good condition. Recoverable. Compact gravel bottom. SS52, M166
16-Jul-2014	1	2	43° 06.0065' N	70° 51.5309' W	219749.84	1200001.56	30.0	12	Pt. 5946. 1" Cable in good condition. Recoverable. Compact gravel bottom. SS52, M167
16-Jul-2014	2	1	43° 06.1121' N	70° 51.7867' W	220380.38	1198856.76	10.9	0-3	Pt. 5950. 3" Cable in good condition. Recoverable. Compact gravel bottom. M15, SS132
16-Jul-2014	2	1	43° 06.0928' N	70° 51.7586' W	220264.34	1198982.96	14.0	3	Pt. 5951. 3" Cable in good condition. Recoverable. Compact gravel bottom. M97
16-Jul-2014	2	1	43° 06.0800' N	70° 51.7404' W	220187.36	1199064.72	18.3	5	Pt. 5952. 3" Cable in good condition. Recoverable. Compact gravel bottom. M67
16-Jul-2014	2	1	43° 06.0719' N	70° 51.7335' W	220138.45	1199095.90	20.5	0	Pt. 5953. 3" Cable in good condition. Recoverable. Compact gravel bottom. M67, M21
16-Jul-2014	2	1	43° 06.0512' N	70° 51.7236' W	220013.13	1199141.18	23.7	0-4	Pt. 5954. 3" Cable in good condition. Recoverable. Compact gravel bottom. M187, M20
17-Jul-2014	1	1	43° 06.0018' N	70° 51.6624' W	219715.71	1199416.29	32.0	0-12	Pt. 5958. 3" Cable in good condition. Recoverable. Compact gravel bottom. Southern most point of cable route. M40
17-Jul-2014	1	NA	43° 06.0162' N	70° 51.6629' W	219803.10	1199413.46	32.0	NA	Pt. 5960. Investigation of SS69. Found sand and gravel bank piled against tree.
17-Jul-2014	1	1	43° 06.0069' N	70° 51.6637' W	219746.45	1199410.35	32.0	24+	Pt. 5961. 3" Cable in good condition. Recoverable, but with 2' of burial. Compact gravel bottom. M40
17-Jul-2014	1	1	43° 05.9999' N	70° 51.6519' W	219704.29	1199463.24	32.0	18	Pt. 5963. 3" Cable in good condition. Recoverable, but with 1.5' of burial. Large anchor hooked on cable. Compact gravel bottom. M175
17-Jul-2014	1	1	43° 05.9999' N	70° 51.6519' W	219704.29	1199463.24	28.0	NA	Pt. 5964. 100' Circle search for Cable1, SS73, M180, M57. Tree with sand piled against it found.
17-Jul-2014	2	NA	43° 05.9926' N	70° 51.5796' W	219663.11	1199785.44	28.0	NA	Pt. 5965. Search for SS73, M180, M57. Sand and Gravel bank against tree.
17-Jul-2014	2	NA	43° 05.9589' N	70° 51.4781' W	219463.19	1200239.52	22.0	NA	Pt. 5968. 50' circle search for SS50. Tree with sand piled against it.
18-Jul-2014	1	4	43° 05.9725' N	70° 51.4113' W	219548.44	1200535.93	12.0	0-6	Pt. 5972. 1" cable followed from Pt. 5878. A 2' square cinder mooring block SS12.
18-Jul-2014	1	3	43° 05.9686' N	70° 51.4236' W	219524.22	1200481.41	12.0	4-6	Pt. 5973. 1" cable followed from Pt. 5878. A 2' square cinder mooring block SS12.

## Conclusions

Having made positive contact with all of the existing cables identified by the OSI survey within the PSNH charted cable corridor in a non-invasive visual dive survey, critically obstructive existing cable positions have been verified. In all diver reported accounts, the physical condition of all existing out of service cables were found to be structurally sound. The sediment found covering the cables in the inspection area trended toward soft, non-cohesive fine sands and soft mud with burial depths ranging from a maximum of 24” to areas of full exposure. Finally, divers reported that in none of the inspection sites were any of the cables found to be cemented in place by stiff sediment overburden or silt/clay accretion, which means that any of the cables within the corridor would be suitable for removal. It should be noted that the sections of the approach areas nearest to the landings areas are very shallow and inaccessible by boat. Should permitting or regulatory agencies require PSNH / NU to remove all existing cables identified during the survey within the corridor, it is probable that this could be achieved.

As per the originally anticipated design of the F-107 cable route, the new cables should be routed towards the Southern half of the charted cable corridor. Using an assumed minimum 10m separation between each new phase cable and a safety buffer zone on either side of each of the extend cables, it is recommended that at least 150-200m (~500-660 feet) from the southern edge of the cable route be cleared of existing cables and debris. Caldwell also recommends a route clearance swath towards the existing cable vaults being performed as needed where the cable route turns northerly towards the vaults at the landing approaches. This translates effectively to removing the two cable sections at a minimum:

- 1) The southernmost cable (identified as Cable #1) should be removed from the area of recorded data point 5876 across Little Bay to at least the area of recorded data point 5950.
- 2) Cable #2 (immediately north of Cable #1) should be removed from the area of recorded data point 5876 to ~500 feet west of recorded data point 5965.

An as-found drawing overview of data points collected by Caldwell Marine is shown in figure 5.

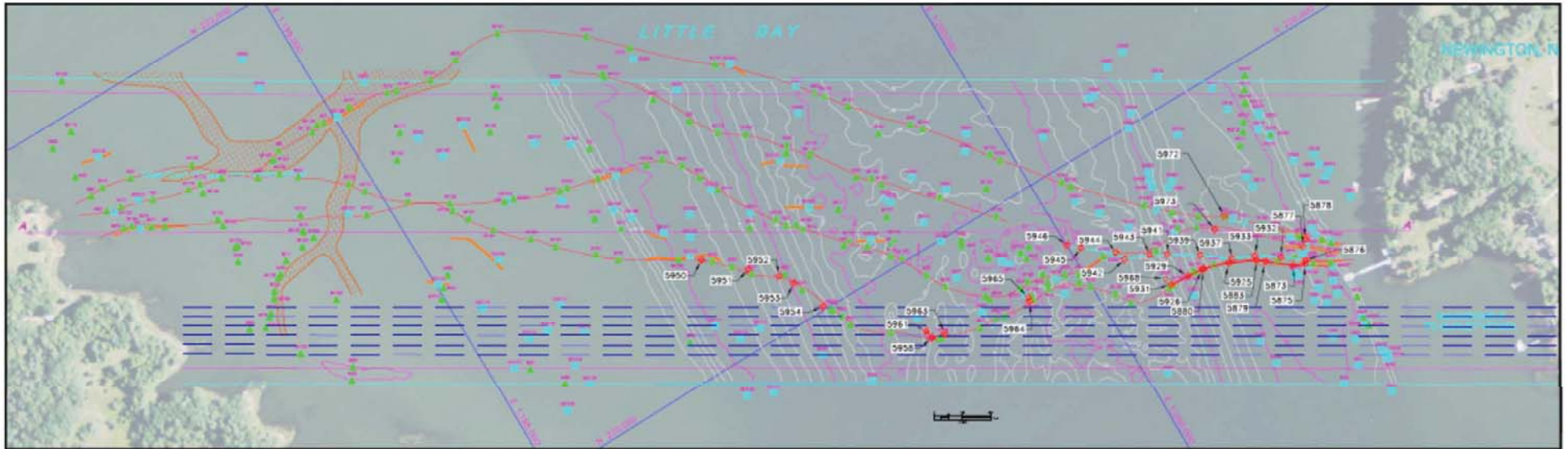


Figure 5.

**ATTACHMENT E.**  
**JETTING SLED DATA SHEET**



DUROCHER MARINE DIVISION  
958 NORTH HURON STREET | CHEBOYGAN MI 49721  
PHONE 231.627.5633 | FAX 231.627.2646

# Jetting Sled Data Sheet

## 3 Meter Blade

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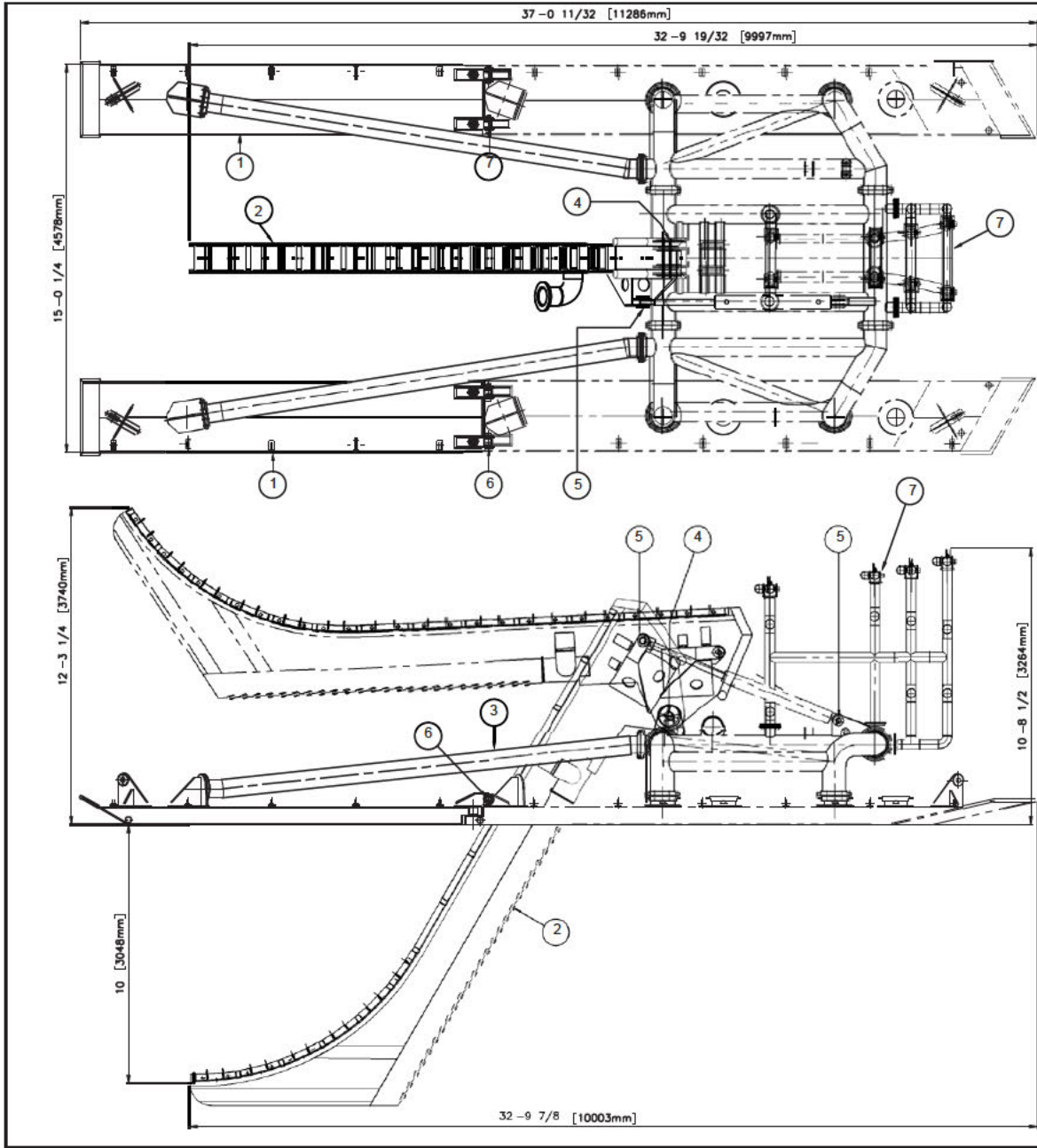
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**1      PHYSICAL**

**DIMENSIONS 3 Meter**

**Burial Mode**

Length overall	37' - 0-11/32"	(11.29 m)
Width	15' - 1/4"	(4.57 m)
Height (Share up)	10' - 8-1/2"	(3.27 m)
Weight in air (approx)	12 tons	(10,886 kg)



PARTS LIST FOR DRAWING No. JO373-120-001			
REF	DWG/SUPPLIER	DWG TITLE/DESCRIPTION	QTY
1	JO373-110-001	SK D CONSTRUCTION EXTENSION	1
2	JO373-120-004	JET TOOL ASSEMBLY	1
3	JO373-130-001	CROSS BEAM ASSEMBLY	1
4	JO266-130-001	JET TOOL PIN AND KEEP PLATE	1
5	JO266-150-002	RAMP PIN AND KEEP PLATE	2
6	JO266-150-004	SKID EXTENSION PIN & KEEP PLATE	2
7	JO266-140-001	BURIAL BELLMOUTH ASSY	1

- NOTES
1. ALL WELDS 5/16" BUTT OR FILLET EXCEPT WHERE OTHERWISE STATED. ALL WELDS TO BE CONTINUOUS.
  2. ALL MATERIAL ASTM A36 EXCEPT WHERE OTHERWISE STATED.
  3. CORRECT SEQUENCE WELDING TO BE OBSERVED TO AVOID DISTORTION OF SECTIONS DURING WELDING.
  4. GENERAL TOLERANCE EXCEPT WHERE OTHERWISE STATED  
±1/64" LESS THAN 20"  
±3/64" FROM 20" TO 40"  
±5/64" ABOVE 40"
  5. REMOVE ALL BURRS, SHARP EDGES AND WELD SPATTER BEFORE PAINTING.
  6. SHOTBLAST AND PRIME WITHIN 4 HOURS.
  7. PAINT TO BE TWO PART EPOXY WITH ZINC RICH PRIMER, COLOUR YELLOW.
  8. ALL MEASUREMENTS IN INCH.
  9. QTY 1 PER ASSY
  10. FOR ALL OTHER INFORMATION SEE DRAWING JO266-000-001

DO NOT SCALE : IF IN DOUBT, PLEASE ASK



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ISS	DATE	PURPOSE	BY	CHKD	APP
1	27/8/14	FOR MANUFACTURE	NTB	KSM	JDF

100 THE HUNDRED  
ROMSEY  
HAMPSHIRE  
SO51 8BY  
UNITED KINGDOM

**eta**  
The Submarine Cable Specialists

WEBSITE: [www.eta-ltd.com](http://www.eta-ltd.com) Tel: 44(0)1794 621216

CLIENT  
**DUROCHER MARINE**

PROJECT  
**3m SHALLOW WATER JETTING SLED**

TITLE  
**JETTING SLED  
GENERAL ARRANGEMENT**

SCALE **1:48** SHEET SIZE **A3**  
DRAWING No. **J0373-000-001 SHT.1 of 2** ISSUE **1**





Photo of cable jetting sled (left side-back)



Photo of cable jetting sled (right side-front)

## 2 PERFORMANCE SPECIFICATIONS

The Durocher Marine cable jetting sled has a burial tool capable of jetting a trench up to 11'. The plow stinger has the capability to trench basically from 0.0' to 10.0'. The stinger consists of a single leg jetting tube with an integral cable depressor down the back of the jetting tube. High volumes of water are directed down the main jetting tube, which exits through a configurable nozzle array down its leading edge.

The stinger has a series of 52 jetting blocks, each of which two jet positions allowing the nozzle orientation and size to be varied to suit different soil conditions.

A summary of the tools features are listed below;

Configuration	Single leg diver loaded jetting tool, with variable jetting nozzle array and integral enclosed bell mouth & depressor.	
Soil types	Sands & Clays up to 20 kPa	
Max water depth	132 feet	(40.0 m)
Soft soil - bearing capacity	2 kPa	
Jetting speed (max)	1650 ft/hr	(500 m/hr)
Max burial depth - 10' 0"	10' 0"	(3.05 m)
stinger Std trench width	12.75"	(325 mm)
Product diameter	3/8" to 8.5"	(10-220 mm)
Product MBR	4' 11"	(1500 mm)
Jetting Nozzles	3/4" BSP stainless steel blanking plugs, either closed or with 3/8" or 3/4" through holes.	
Water Pump requirement 10' (3m) Mode Supplied down 1 x 8" hose	Surface Supply (approx 300kw / 400hp) Water pump duty 1000m <sup>3</sup> /hr @ 11 Bar. (4300 US gal/min @ 360 feet head) Subsea Supply (approx 85kw / 110hp) Water pump duty 1000m <sup>3</sup> /hr @ 3 Bar. (4300 US gal/min @ 100 feet head)	
Water Pump requirement 16' 4" (5m) Mode Supplied down 2 x 8" hose	Surface Supply (approx 765kw / 1025hp) Water pump duty 2500m <sup>3</sup> /hr @ 11Bar. (11,000 US gal/min @ 360 feet head) Subsea Supply (approx 210kw / 280 hp) Water pump duty 2500m <sup>3</sup> /hr @ 3 Bar. (11,000 US gal/min @ 100 feet head)	
Max tow tension	25 tones (please see stability graphs, section 6.6)	

### **3 CONTROL SYSTEM**

The control system on Durocher Marine cable jetting sled consists of a topside unit (housed in two separate portable transit cases), an umbilical, a subsea breakout, a pod and a number of harnesses to connect to the surveillance and instrumentation sensors. An overall schematic of the control system is shown at the end of this section.

The control system provides the drivers, sensors and surveillance equipment required to ensure the safe and correct functioning of the sled. A summary of these features is given below:

Burial Depth	Controllable burial depth via one or two stinger ram(s). Both rams contain integral position sensors
Safety Features	Automatic stinger relieve function at high tow tensions, based on topsides relief valve setting (CCV supply) 3 x 110 volt LIM with 5 ms cut off.
Sensors	Sled pitch and roll sensors Pump pressure at the surface (sensor not supplied) Pump pressure subsea (sensor not supplied)
Surveillance	2 x mini monochrome CCD cameras, with topsides monitors 2 x 300 W lights with variable intensity control
Control Screen	Touch screen control panel & real time graphical display of vehicle status.

### **4 HYDRAULIC SYSTEM**

The Durocher Marine cable jetting sled uses a top-side hydraulic power pack to supply hydraulic flow/pressure to the stinger control rams which control the sleds variable jetting depth. The power pack is connected to the sled via a hydraulic umbilical (comprising supply and return hoses). A summary of the hydraulics system is given below:

Deployment rams	One or two subsea specification with spherical bearings both ends, fitted with integral ROTA linear transducers
Power pack	Gasoline driven hydraulic power pack
Control System	Directional control valve with speed control, relief and check valves, directly connected to the topsides control system

5 **JETTING SLED TRIALS PROCEDURE**

Out of water testing and in-water testing is planned prior to cable burial operations.

<b>Task Plan</b>	
<b>Jetting Sled Trials</b>	
<b>Item</b>	<b>Description</b>
1	Morning Action Plan (MAP) meeting with entire crew to discuss work plan
2	Divers complete Pre-Dive Checklist and test all dive gear
3	All power systems are powered down, electrical power off
4	Sled is restrained to barge deck
5	Connect an earthing lead
6	Perform visual inspection of entire sled (sensors, umbilical, pins, lifting points, etc.)
7	Perform visual inspection to insure all bolts and keepers are on cable door
8	Energize electrical system, confirm output to computer
9	Energize hydraulic system, test operation of hydraulic ram
10	Check all hydraulic connections for minor leaks
11	Stop position of jet tool is sitting on barge deck (never leave suspended)
12	Start water pump, pressurize system at engine idle only
13	Stop all power systems and turn electrical power off
14	Connect lifting gear to sled and slowly lift of barge deck
15	Check connection of sled pull wire, direct pull wire winch operator
16	Signal crane operator to set sled in water, manage umbilical and water supply hoses
17	Set sled on seabed while directing crane and winch operator
18	Assure all systems off, diver down crane rigging to inspect sled on seabed
19	Diver unhook crane and direct crane rigging to surface. Diver move to rear of sled.
20	Topside crew move barge approximately 50' away from sled on seabed
21	Confirm ALL STOP on everything, diver inspect sled on seabed
22	Alert diver, energize all sled systems and bring water pump to idle
23	Alert diver, slowly lower jet tool into seabed while diver monitors sled skids on seabed
24	Support crew confirm operation of sled control systems and data logging

25	Alert diver, topside winch slowly tighten sled pull wire, support crew monitor tensiometer
26	Diver alert topside when sled travel begins. Diver <b>ALWAYS behind sled</b> during forward travel
27	Continue sled travel while lowering jet tool to project burial depth
28	Whenever sled movement stops, bring jet tool water pump to idle position
29	Sled stops, raise jet tool to up position
30	Testing complete, diver position in center of sled
31	Crane operator lower rigging to diver
32	Diver connect rigging to sled, direct crane operator to tighten rigging
33	Diver leave bottom, return to deck of barge
34	Sled pull wire winch operator standby to manage pull wire slack
35	Topside crew standby to manage water supply hoses and umbilical
36	Crane operator directed by topside personnel to lift sled to surface and set on barge

**ATTACHMENT F.**  
**DIVER JET BURIAL PROCEDURE**

# Diver Jet Burial Procedure

*Durocher Marine (DM)* is providing the following descriptive / narrative information in support of the SRP 107 Submarine Cable Installation Project. The intent of this document is to provide a narrative regarding equipment and methodology employed by DM when performing diver retro-burial operations to bury submarine cable in a shallow water environment.

Diver hand jetting can be used in cases where a submarine cable is being installed and there is a section that cannot be buried using a jet plow system. Other instances could be where the cable transitions from the plow to the shore trench or the cable burial is prevented due to obstructions either on or in the sea bottom. Burial in these instances are commonly performed by a diver utilizing a hand-held jetting system.

This simple burial method utilizes water supplied at approximately 60 to 150 psi pressure from a barge mounted water jet pump, fed down a supply hose to feed the handheld diver burial nozzle or water-lift. The water supply hose is typically 2" to 3" in diameter.

The jet nozzle produces a strong jet stream with compensating ports opposing the main jet so that the nozzle has neutral forces in the water to help the diver control the direction of the flow while the water-lift uses the jet hose pressure to pick up and move the material.

(See typical jet nozzle & water-lift photos below)



**Desco Compensated Brass Jetting Nozzle**



**Field Engineered Lance Type**





**Compensated Brass Jetting Nozzle**



**Jet Eductor type Water-lift**



### **Burial by Diver with Jet Nozzle**

Specific to submarine cable burial, the diver operated jet nozzle method is the simplest and least invasive. It should be noted that the nozzle method is not a means of excavation. The water jet is simply aimed down under and around the submarine cable, causing the material under the cable to fluidize. This fluidization of the bottom soils allows the submarine cable to sink into the seabed. In denser or cohesive material, the burial process can take additional effort as the diver must work the water jet back and forth over the cable in sections to break up the dense bottom to allow the cable to sink into the seafloor.

Given the known sediment conditions on site, the minimum burial depth should be easily achieved. This providing that the underlying bedrock is below the targeted burial depths as indicated in the bid documents.

Diver hand jetting is also a useful tool for probing the river bottom and loosening obstructions such as trees, boulders, rocks and other debris so they can easily be moved from under the cable and/or out of the trench.

If the diver needs to make a trench and keep it open for any length of time the jet nozzle be used in conjunction with a water lift (see next).

### **Burial by Diver with Water-Lift**

The Contractor shall maintain a complete water lift system on the barge for use as needed on the project. The water lift will remove seabed material from under the submarine cable and discharge it on the sea floor away from the submarine cable. The water-lift can also be used to backfill the trench at completion of burial by redepositing the stock pile of discharged material back onto the cable by reversing the procedure.

The system is designed with a diver deployed water jet eductor utilizing a 30-degree bend near the intake end. At the center of the bend the high-pressure water jet hose is connected to an internal jet nozzle. The internal jet nozzle is aimed toward the discharge end of the water lift pipe. The water jet stream moves the water in the main pipe and creates a suction at the inlet. The nozzle suction is created by the venturri principle and the height of the lift attained depends on the size of the pipe and the output of the jet pump. This system can, when designed efficiently, move multiple cubic yards of material per hour and discharge it 20' to 30' away. The diver operated water-lift has been utilized in numerous cable and pipeline burial projects around the country.

**THE STATE OF NEW HAMPSHIRE  
BEFORE THE  
SITE EVALUATION COMMITTEE  
DOCKET NO. 2015-04**

**AMENDED PRE-FILED TESTIMONY OF LYNN FARRINGTON**

**APPLICATION OF PUBLIC SERVICE COMPANY OF NEW HAMPSHIRE  
D/B/A EVERSOURCE ENERGY  
FOR A CERTIFICATE OF SITE AND FACILITY FOR CONSTRUCTION OF A NEW  
115 kV TRANSMISSION LINE**

**THE SEACOAST RELIABILITY PROJECT**

**March 29, 2017**

1 **Qualifications**

2 **Q. Please state your name and business address.**

3 A. My name is Lynn Farrington and I am a licensed professional engineer (NH  
4 License #14125, specializing in ‘Civil-Highway,’) working in the transportation field. I am also  
5 a licensed professional traffic operations engineer (Certificate #3416 awarded by the  
6 Transportation Professionals Certification Board). I am currently employed by Louis Berger at  
7 482 Congress Street, Suite 401, Portland, Maine 04101.

8 **Q. Please describe your background, experience and qualifications.**

9 A. My background and qualifications were included in my direct pre-filed testimony  
10 filed with the NH SEC Application dated April 12, 2016 and have not changed since then.

11 **Purpose of Testimony**

12 **Q. What is the purpose of this amended testimony?**

13 A. The purpose of my testimony is to provide additional information to the SEC in  
14 support of the Amendment to the original Application dated April 12, 2016.

15 **Amended Project Description**

16 **Q. Have you reviewed the amended Project Description submitted to the SEC?**

17 A. Yes, I have.

18 **Q. Does the amended Project Description change anything in your previously  
19 filed testimony?**

20 A. No.

21 **Q. Do the conclusions in your pre-filed testimony of April 4, 2016 remain the  
22 same?**

23 A. Yes, they do.

**THE STATE OF NEW HAMPSHIRE  
BEFORE THE  
SITE EVALUATION COMMITTEE  
DOCKET NO. 2015-04**

**AMENDED PRE-FILED TESTIMONY OF DAVID RAPHAEL**

**APPLICATION OF PUBLIC SERVICE COMPANY OF NEW HAMPSHIRE  
D/B/A EVERSOURCE ENERGY  
FOR A CERTIFICATE OF SITE AND FACILITY FOR CONSTRUCTION OF A NEW  
115 kV TRANSMISSION LINE**

**THE SEACOAST RELIABILITY PROJECT**

**March 29, 2017**

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**Qualifications**

**Q. Please state your name and business address.**

A. My name is David Raphael, and I am a Professional Landscape Architect and Planner as well as Lecturer in the School of Natural Resources at the University of Vermont. I am the Principal and owner of LandWorks, a multi-disciplinary planning, design, and communications firm based in Middlebury, Vermont. My business address is 228 Maple Street, Suite 32, Middlebury, Vermont 05753.

**Q. Briefly summarize your educational background and work experience.**

A. My background and qualifications were included in my direct pre-filed testimony filed with the NH SEC Application dated April 12, 2016 and have not changed since then.

**Purpose of Testimony**

**Q. What is the purpose of this amended testimony?**

A. The purpose of my testimony is to provide additional information to the SEC in support of PSNH's Amendment to the original Application dated April 12, 2016.

**Amended Project Description**

**Q. Have you reviewed the amended Project Description submitted to the SEC?**

A. Yes, I have.

**Q. Does the amended Project Description change anything in your previously filed testimony?**

A. Yes. It changes my description and analysis for the Newington area, including several photosimulations. The additional underground segments represent a substantial avoidance and minimization measure as compared to the overhead route, which can be viewed as a net improvement over the original design. Taken together with the changes to the overhead configuration in both the Towns of Durham and Newington, the visual effect is further reduced from the previous design.

In addition, based on the revised Project design, I have produced an Addendum to the LandWorks Visual Assessment for the Seacoast Reliability Project, attached to the Amendment at Appendix 32(a).

1           **Q.     In light of these changes, do the conclusions in your pre-filed testimony of**  
2 **April 12, 2016 remain the same?**

3           A.     Yes, they do. It remains my opinion that the Project will be constructed without  
4 creating unacceptable visibility changes over existing conditions and consequent associated  
5 impacts. This Project will be reasonably compatible with existing conditions and will not create  
6 unreasonable adverse effects on aesthetics.

7           **Q.     Does this conclude your amended testimony?**

8           A.     Yes, it does.



**THE STATE OF NEW HAMPSHIRE  
BEFORE THE  
SITE EVALUATION COMMITTEE  
DOCKET NO. 2015-04**

**AMENDED PRE-FILED TESTIMONY OF CHERILYN E. WIDELL**

**APPLICATION OF PUBLIC SERVICE COMPANY OF NEW HAMPSHIRE  
D/B/A EVERSOURCE ENERGY  
FOR A CERTIFICATE OF SITE AND FACILITY FOR CONSTRUCTION OF A NEW  
115 kV TRANSMISSION LINE**

**THE SEACOAST RELIABILITY PROJECT**

**March 29, 2017**

**Qualifications**

**Q. Please state your name and business address.**

A. My name is Cherilyn E. Widell. My business address is 105 North Water Street, Chestertown, Maryland 21620.

**Q. Who is your current employer and what position do you hold?**

A. I am the founder and president of Widell Preservation Services, LLC.

**Q. What are your areas of responsibility in this position?**

A. My responsibilities include providing consulting services in historic preservation compliance, historic property preservation and redevelopment, federal and state rehabilitation tax credits, public/private funding strategies, historic research and natural and cultural resource management of protected areas for Federal and State agencies, property owners and non-governmental organizations.

**Q. Please describe your employment experience and educational background.**

A. My educational background and work experience were included in my direct pre-filed testimony filed with the NH SEC Application dated April 12, 2016 and have not changed since then.

**Purpose of Testimony**

**Q. What is the purpose of this amended testimony?**

A. The purpose of my testimony is to provide additional information to the SEC in support of the Amendment to the original Application dated April 12, 2016.

**Amended Project Description**

**Q. Have you reviewed the amended Project Description submitted to the SEC?**

A. Yes, I have.

**Q. Does the amended Project Description change anything in your previously filed testimony?**

A. Yes. As explained in the Application Amendment, changes to the Project design have further minimized or eliminated the effects of the Project on the Newington Center Historic District (“Historic District” or “District”) and the Pickering-Rowe House. The transition structure to the west will be visible within the District only by looking down the transmission right-of-way and from the public roadway abutting it (Nimble Hill Road). The transition

1 structure to the east will be located in a wooded area approximately 1,200 feet east of the district.  
2 Furthermore, as part of the Project, PSNH will remove the existing 34.5 kV distribution line that  
3 currently crosses the Historic District and travels across the Frink Farm. This change, in  
4 combination with the new underground design, virtually eliminates potential visual impact to the  
5 Historic District, and it means that the Project will not have an adverse effect on the District.

6 Because of the new underground design at the Frink Farm/Newington Historic District,  
7 the transmission line will also not be visible in significant views from the Pickering–Rowe  
8 House. Because the one overhead transmission structure that was to be located in the view from  
9 the Pickering-Rowe House toward the Newington Center Historic District is no longer part of the  
10 design, the new design eliminates any effects to this historic house.

11 **Q. In light of these changes, do the conclusions in your pre-filed testimony of**  
12 **April 4, 2016 remain the same?**

13 A. Yes, they do.

14 **Q. Does this conclude your amended testimony?**

15 A. Yes, it does.

**THE STATE OF NEW HAMPSHIRE  
BEFORE THE  
SITE EVALUATION COMMITTEE  
DOCKET NO. 2015-04**

**AMENDED PRE-FILED TESTIMONY OF VICTORIA BUNKER**

**APPLICATION OF PUBLIC SERVICE COMPANY OF NEW HAMPSHIRE  
D/B/A EVERSOURCE ENERGY  
FOR A CERTIFICATE OF SITE AND FACILITY FOR CONSTRUCTION OF A NEW  
115 kV TRANSMISSION LINE**

**THE SEACOAST RELIABILITY PROJECT**

**March 29, 2017**

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**Qualifications**

**Q. Please state your name and business address.**

A. My name is Victoria Bunker, PhD and my business address is 31 Africa Road, Alton, NH 03809.

**Q. Who is your current employer and what position do you hold?**

A. I am the President and Principal Investigator on all projects undertaken by Victoria Bunker, Inc., a business which specializes in New England archeology and cultural resources management.

**Q. What are your areas of responsibility in this position?**

A. I am responsible for completing phased archeological surveys throughout the State of New Hampshire, relative to Section 106 compliance at Phase I, II and III levels of study following NH Division of Historical Resources (“NHDHR”) standards and guidelines.

**Q. Please describe your employment experience and educational background.**

A. My educational background and work experience were included in my direct pre-filed testimony filed with the NH SEC Application dated April 12, 2016 and have not changed since then.

**Amended Project Description**

**Q. What is the purpose of this amended testimony?**

A. The purpose of my testimony is to provide additional information to the SEC in support of PSNH’s Amendment to the Application dated April 12, 2016.

**Q. Have you reviewed the amended Project Description submitted to the SEC?**

A. Yes.

**Q. Does the amended Project Description change anything in your previously filed testimony?**

A. Yes, but only to the extent of confirming that the new Flynn Pit and Newington Center Historic District-Hannah Lane residential neighborhood underground segments were included in the Phase I-A archeological survey and that the results of that survey apply equally to the redesigned route.

1           **Q.     Do you have any other changes you would like to make to your previously**  
2 **filed testimony?**

3           A.     Yes. On pages 2-4 of my pre-filed testimony dated April 12, 2016, I stated that  
4 Phase I-A archeological survey had been completed for the Project and explained what that  
5 entailed. Since that time, a Phase I-B archeological survey has also been completed for the entire  
6 Project including the new underground segments. The Phase I-B survey has confirmed the  
7 absence of any archeological sites for the underground portion of the amended route through  
8 Flynn Pit, Frink Farm and Hannah Lane residential neighborhood. The Phase I-B survey report  
9 was submitted to NHDHR on September 28, 2016.

10          **Q.     In light of these changes, do the conclusions in your pre-filed testimony of**  
11 **April 4, 2016 remain the same?**

12          A.     Yes.

13          **Q.     Does this conclude your amended testimony?**

14          A.     Yes, it does.

**THE STATE OF NEW HAMPSHIRE  
BEFORE THE  
SITE EVALUATION COMMITTEE  
DOCKET NO. 2015-04**

**AMENDED PRE-FILED DIRECT TESTIMONY OF SARAH D. ALLEN**

**APPLICATION OF PUBLIC SERVICE COMPANY OF NEW HAMPSHIRE  
D/B/A EVERSOURCE ENERGY  
FOR A CERTIFICATE OF SITE AND FACILITY FOR CONSTRUCTION OF A  
NEW 115 kV TRANSMISSION LINE**

**THE SEACOAST RELIABILITY PROJECT**

**March 29, 2017**



1 **Qualifications and Purpose of Testimony**

2 **Q. Please state your name and business address.**

3 A. My name is Sarah D. Allen. My business address is 25 Nashua Rd,  
4 Bedford, NH 03110

5 **Q. Who is your current employer and what position do you hold?**

6 A. I am employed by Normandeau Associates Inc. as a Senior Principal  
7 Wetland Scientist in the Wetland/Terrestrial Group. I am Normandeau's Project Manager  
8 for the Seacoast Reliability Project ("SRP").

9 **Q. Please describe your background, experience and qualifications.**

10 A. My background and qualifications were included in my direct pre-filed  
11 testimony filed with the NH SEC Application dated April 12, 2016 and have not changed  
12 since then.

13 **Q. What is the purpose of this amended testimony?**

14 A. The purpose of my testimony is to provide additional information to the  
15 SEC regarding the air and water resources, and wildlife habitat information in support of  
16 PSNH's Amendment to the original Application dated April 12, 2016. I also provide  
17 supplemental information that has become available since the original SEC filing on  
18 April 12, 2016.

19 **Q. Have you reviewed the amended Project design submitted to the SEC?**

20 A. Yes, I have.

21 **Q. Does the amended Project design change anything in your previously  
22 filed testimony?**

23 A. Yes. As described further below, the amended design modification  
24 resulted in changes in wetland impacts, and thus the in-lieu fee wetland mitigation  
25 estimates have been updated based on new impact numbers. My testimony also includes  
26 supplemental information on a small pond in the Flynn Pit which was reclassified as a  
27 vernal pool based on 2016 field information, and two potential permittee-responsible  
28 mitigation projects for the Towns of Durham and Newington to substitute for the in-lieu  
29 fee contribution if acceptable to the agencies. The amended and supplemental  
30 information is described in more detail below.

1           **Q.     Please describe any changes to natural resource impacts as a result of**  
2 **the Project design amendment.**

3           A.     Several changes to wetlands resulted from the proposed Project design  
4 changes. Overall, permanent wetland impacts declined by 28 square feet from the  
5 original design, and temporary impacts increased by 2,578 square feet. The decline in  
6 permanent impacts occurred at multiple locations as structures were shifted in response to  
7 municipal and resident requests. The two largest areas of change to temporary impacts  
8 were in Newington at the area commonly referred to as the Flynn Pit, the Newington  
9 Center Historic District and the Hannah Lane residential neighborhood. In the Flynn Pit,  
10 temporary impacts declined by 2,087 square feet after the Town approved a new right-  
11 of-way to allow the Project to go underground around a small pond and the associated  
12 wetland. At the location of the newly proposed underground segment across the  
13 Newington Center Historic District and Hannah Lane residential neighborhood,  
14 temporary impacts increased by 18,013 square feet because of burial of the cable and  
15 associated work roads across seven wetlands in the corridor. Most other changes resulted  
16 in a decline in temporary impacts as engineering and construction requirements were  
17 modified in response to design changes.

18           Cable burial across the Frink Farm also resulted in an additional 84 square feet of  
19 temporary impact to a small perennial stream resulting from a stream diversion needed to  
20 install the underground duct bank.

21           At the Flynn Pit, the small pond was reclassified as a vernal pool based on 2016  
22 field observations (discussed below). The new underground cable route around the  
23 vernal pool and its associated wetland avoids impacts to the vernal pool but results in an  
24 impact to the vernal pool envelope immediately adjacent to the pool. The envelope is  
25 defined by the US Army Corps of Engineers as a 100-foot band immediately adjacent to  
26 the high water mark of the pool to provide shade to the vernal pool and peripheral habitat  
27 for amphibians metamorphosing to terrestrial conditions. The proposed underground  
28 cable will result in temporary impacts to 7,377 square feet in the vernal pool envelope, of  
29 which approximately 2,950 square feet (0.07 acres) will be temporary and allowed to  
30 recover, and 4,427 square feet (0.10 acres) will be maintained as permanent right-of-way.

1           **Q.     Please describe the principal functions and values of the impacted**  
 2 **wetland resources under the amended Project design.**

3           A. A qualitative assessment of 13 wetland functions and values using the USACE  
 4 Highway Methodology found that, while multiple functions were provided to some  
 5 degree by most wetlands, the principal functions were the distinguishing features among  
 6 the wetland types. The most common principal functions include: floodflow alteration,  
 7 fish and shellfish habitat, production export, sediment/toxicant/pathogen retention, and  
 8 wildlife habitat.

9           The functional value of the water body in the Flynn Pit is considered moderate  
 10 because its vernal pool functions are limited by its mostly permanent hydrology, and its  
 11 permanent pond functions are limited because it occasionally dries up.

12           **Q.     Please describe the effects of the amendment on the proposed in-lieu**  
 13 **fee for the SRP.**

14           A. Although wetland impacts generally declined as a result of the amended  
 15 design, the updated values for the 2016 Aquatic Resource Mitigation equalized values  
 16 increased for most of the towns. This resulted in an increase of \$8,479 in the revised cost  
 17 estimate for in-lieu fee mitigation, as shown by municipality in the following table:

<b>Municipality</b>	<b>Original Compensatory Mitigation Cost</b>	<b>Amended Compensatory Mitigation Cost</b>	<b>Difference between Original and Amended</b>
Madbury	\$6,488.92	\$6,501.15	\$12.23
Durham	\$213,547.82	\$224,217.15	\$10,669.33
Newington	\$81,747.24	\$79,152.49	(\$2,594.75)
Portsmouth	\$8,187.14	\$8,579.60	\$392.46
<b>Total</b>	<b>\$309,971.11</b>	<b>\$318,450.38</b>	<b>\$8,479.27</b>

18           **Q.     In your opinion, will this Project as amended have an unreasonable**  
 19 **adverse effect on air and water quality and the natural environment?**

20           A. No, the Project will not have an unreasonable adverse effect on air and  
 21 water quality and the natural environment. I also rely on the assessments and pre-filed  
 22 testimony of my colleague, Ann Pembroke, at Normandeau Associates on marine  
 23 resources and water quality. The Project has carefully considered air quality, water  
 24 quality and natural resource issues and minimized impacts where feasible and reasonable.



1           In 2016, we observed additional vernal pool indicators, namely, fairy shrimp and  
2 blue spotted egg masses, along with indicators of permanent hydrology, such as second-  
3 year green frog tadpoles and leeches. No fish have been observed to date. While the  
4 pond has held water throughout the summer in previous years, it dried up in August of  
5 2016, which has been classified as Extreme Drought in coastal NH. This water body  
6 appears to function as both a permanent pond and a vernal pool, supporting primary  
7 indicators of vernal pools (fairy shrimp, wood frogs, spotted salamanders and blue  
8 spotted salamanders), and permanent pond species (green frog larvae and leeches). The  
9 Applicant now considers the pond a vernal pool for regulatory purposes, but recognizes  
10 its dual functionality as both a vernal pool and a permanent pond. The functional value  
11 of the pond is only moderate because its vernal pool functions are limited by its mostly  
12 permanent hydrology, and its permanent pond functions are limited because it  
13 occasionally dries up.

14           **Q.     Please describe any supplemental information regarding**  
15 **compensatory wetland mitigation for the SRP.**

16           A.     Since the SRP SEC permit application was submitted on April 12, 2016,  
17 the Towns of Durham and Newington have developed permittee-responsible mitigation  
18 projects, summarized below. Both concepts have merit for compensation for different  
19 aspects of wetland resource impacts by the SRP if the regulatory agencies concur.

20           ***Durham - Wagon Hill Farm***

21           The Town of Durham has proposed a shoreline stabilization project to reduce the  
22 amount of erosion from the Wagon Hill Farm shoreline bordering the Great Bay Estuary  
23 and the Oyster River and restore salt marsh that has already eroded. Wagon Hill Farm is  
24 Town-owned conservation land consisting of 139 acres with 1,100 feet of tidal frontage  
25 on the Little Bay, Oyster River and Smith Creek. The project has two primary objectives:  
26 1) design and build a living shoreline that has both structural and biological elements to  
27 minimize erosion, and 2) re-establish the degraded salt marsh to further protect the  
28 shoreline. Preliminary estimates suggest that approximately 10,000 square feet of salt  
29 marsh, plus approximately 1,100 linear feet of adjacent shoreline could be restored.

30           The Wagon Hill Farm shoreline stabilization project provides the opportunity for  
31 the SRP to compensate for unavoidable wetland impacts in Durham by restoring

1 deteriorated or fully eroded salt marsh, and reducing the loss of shoreline habitats and the  
2 associated sediment loading into critical estuarine habitats. The Applicant proposes to  
3 contribute to the construction, monitoring, and maintenance of this project. The total  
4 cost for construction, 5 years of monitoring, and maintenance is currently estimated as  
5 \$375,000, although final costs will vary depending on the final design. The costs for  
6 construction, monitoring and maintenance will be funded through a mix of money from  
7 the Lois Brown Trust, the Town of Durham general fund, and the SRP compensatory  
8 mitigation contribution. The Lois Brown Trust has up to \$100,000 available for this  
9 project. The Town of Durham voted to approve approximately \$84,000 for this project as  
10 part of the 2016 annual budget, pending regulatory permit approval for the PSNH  
11 contribution. PSNH proposes to contribute the dollars calculated for the In-Lieu Fee  
12 contribution for wetland impacts in Durham towards construction costs. Under the  
13 current amended proposal, the value of that contribution is approximately \$224,000,  
14 although that may change during final design and the SEC permitting progress.

15 ***Newington Conservation Easement***

16 The Newington Conservation Commission (NCC) is pursuing a 10- acre  
17 conservation easement on a 13-acre parcel on Old Post Road (Map 17 Lot 15) that  
18 borders an existing conservation parcel and encompasses a section of the Knights Brook  
19 Prime wetland. PSNH is working with the Town of Newington to develop a permittee-  
20 responsible compensatory mitigation project that would offset the wetland functional  
21 impacts of the Seacoast Reliability Project, and meet the town's goal of protecting this  
22 valuable parcel for wetland and wildlife habitat. The parcel is adjacent to, or in close  
23 proximity to, existing protected lands along the Knights Brook corridor totaling  
24 approximately 100 acres, including the Frink Farm. A Letter of Intent was signed  
25 between the landowner and the NCC, dated September 1, 2016, to commit to the  
26 purchase of the conservation easement.

27 The Newington Conservation Easement project provides the opportunity for the  
28 Project to compensate Newington for unavoidable permanent impacts caused by SRP  
29 structures in freshwater wetlands (approximately 362 square feet), up to 1,786 square feet  
30 of permanent impact from concrete mattresses on tidal flats and rocky shore, and  
31 conversion of forested wetlands and stream buffers as a result of tree removal within the



1 SRP project corridor. The 2016 appraisal value of the conservation easement is \$260,000.  
2 PSNH proposes to contribute the dollars calculated for the In-Lieu Fee contribution for  
3 wetland impacts in Newington towards the purchase of the easement. Under the current  
4 amended proposal, the value of that contribution is approximately \$79,000, although that  
5 may change during final design and the SEC permitting progress. The NCC has  
6 committed \$100,000 from their conservation fund, and will request the remaining monies  
7 (estimated as \$81,000) to be raised at through a special warrant article at the 2017 Town  
8 Meeting.

9 ***In-Lieu Fee Reversion***

10 PSNH will continue to work with the applicable parties to develop a mitigation  
11 package that will be acceptable to NHDES and USACE. In the event that a town  
12 proposal does not come to fruition, or develop within an acceptable schedule for the  
13 agencies, PSNH agrees that the SRP compensatory mitigation funds will revert to the  
14 State In-Lieu Fee program to be dispersed by DES under the general Aquatic Resource  
15 Mitigation Fund grant program for the Salmon Falls-Piscataqua Rivers Service Area.

16 **Q. Does this conclude your amended pre-filed testimony?**

17 **A. Yes.**

**THE STATE OF NEW HAMPSHIRE  
BEFORE THE  
SITE EVALUATION COMMITTEE  
DOCKET NO. 2015-04**

**AMENDED PRE-FILED TESTIMONY OF ANN E. PEMBROKE**

**APPLICATION OF PUBLIC SERVICE COMPANY OF NEW HAMPSHIRE  
D/B/A EVERSOURCE ENERGY  
FOR A CERTIFICATE OF SITE AND FACILITY FOR CONSTRUCTION OF A NEW  
115 kV TRANSMISSION LINE**

**THE SEACOAST RELIABILITY PROJECT**

**March 29, 2017**

**Qualifications and Purpose of Testimony**

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**Q. Please state your name and business address.**

A. My name is Ann E. Pembroke. My business address is 25 Nashua Rd., Bedford, NH 03110.

**Q. Who is your current employer and what position do you hold?**

A. My current employer is Normandeau Associates, an environmental consulting firm. I am Vice President and Technical Director of the Marine Group.

**Q. Briefly summarize your educational background and work experience.**

A. My educational background and work experience were included in my direct pre-filed testimony filed with the NH SEC Application dated April 12, 2016 and have not changed since then.

**Q. What is the purpose of this amended testimony?**

A. The purpose of my testimony is to provide additional information to the SEC in support of PSNH's Amendment to the original Application dated April 12, 2016.

**Q. Have you reviewed the amended Project Description submitted to the SEC?**

A. Yes, I have.

**Q. Does the amended Project Description change anything in your previously filed testimony?**

A. No, it does not. The amended Project design does not include any change to the submarine design across Little Bay.

**Q. Do you have anything to add to your testimony?**

A. Yes, PSNH commissioned Normandeau to characterize sediment within the underwater cable route in across Little Bay. The methods and results of the study have been provided to the SEC in a report entitled "Characterization of Sediment Quality Along Little Bay Crossing", dated December 1, 2016. The study concluded that there is no potential for ecological effects from constituents of potential concern in the sediments that will be disturbed during cable installation, including metals, PAHs, PCBs, dioxins and PFOA/PFOS.

**Q. In light of these changes and new information, do the conclusions in your pre-filed testimony of April 12, 2016 remain the same?**

A. Yes, they do.

1           **Q.    Does this conclude your amended testimony?**

2           A.    Yes, it does.

**THE STATE OF NEW HAMPSHIRE  
BEFORE THE  
SITE EVALUATION COMMITTEE  
DOCKET NO. 2015-04**

**AMENDED PRE-FILED TESTIMONY OF WILLIAM H. BAILEY**

**APPLICATION OF PUBLIC SERVICE COMPANY OF NEW HAMPSHIRE  
D/B/A EVERSOURCE ENERGY  
FOR A CERTIFICATE OF SITE AND FACILITY FOR CONSTRUCTION OF A NEW  
115 kV TRANSMISSION LINE**

**THE SEACOAST RELIABILITY PROJECT**

**March 29, 2017**

**Qualifications**

1  
2 **Q. Please state your name and business address.**

3 A. My name is William H. Bailey. I am employed by Exponent, Inc. (“Exponent”), a  
4 scientific and engineering firm, located in the Maryland Science and Technology Center at  
5 17000 Science Drive, Suite 200, Bowie, Maryland, 20715.

6 **Q. What is your position at Exponent?**

7 A. I am a Principal Scientist in the Center for Health Sciences.

8 **Q. Please describe your background, experience and qualifications.**

9 A. My background and qualifications were included in my direct pre-filed testimony  
10 filed with the NH SEC Application dated April 12, 2016 and have not changed since then.

**Purpose of Testimony**

11  
12 **Q. What is the purpose of this supplemental testimony?**

13 A. The purpose of my testimony is to provide additional information to the SEC in  
14 support of PSNH’s Amendment to the original Application dated April 12, 2016.

**Amended Project Description**

15  
16 **Q. Have you reviewed the amended Project Description submitted to the SEC?**

17 A. Yes, I have. I have also reviewed the *Electric and Magnetic Fields Summary*,  
18 *Seacoast Reliability Project, Amended Calculations* prepared by Eversource Energy and  
19 submitted along with the Application Amendment as Appendix 41(a).

20 **Q. Does the amended Project Description change anything in your previously**  
21 **filed testimony?**

22 A. While the range of electric and magnetic field levels associated with Project  
23 operation that I evaluated and summarized in my pre-filed testimony are not changed by the  
24 proposed modifications to the original design in the Application, these modifications are  
25 calculated to lead to small increases and decreases in levels of electric and magnetic fields at the  
26 edges of right-of-way of those modified sections of the route. The amended calculations are  
27 provided in the *Electric and Magnetic Fields Summary Seacoast Reliability Project, Amended*  
28 *Calculations*, Appendix 41(a).

29 Among these sections, the most notable change—the undergrounding of just over 0.5  
30 additional miles of the Project transmission line in the areas of the Flynn Pit Town Forest, Darius  
31 Frink Farm, and the Hannah Lane neighborhood—will result in lower post-project levels of both

1 electric and magnetic fields. Altogether, the calculated levels of electric and magnetic fields  
2 associated with the operation of some segments of the proposed Project are similar to the field  
3 levels associated with unmodified line sections and also are not markedly different from the  
4 existing field levels along the route.

5 **Q. In consideration of these changes, do the conclusions in your pre-filed**  
6 **testimony of April 4, 2016 remain the same?**

7 A. Yes, they do.

8 **Q. Does this conclude your amended testimony?**

9 A. Yes, it does.



**THE STATE OF NEW HAMPSHIRE  
BEFORE THE  
SITE EVALUATION COMMITTEE  
DOCKET NO. 2015-04**

**AMENDED PRE-FILED TESTIMONY OF ROBERT W. VARNEY**

**APPLICATION OF PUBLIC SERVICE COMPANY OF NEW HAMPSHIRE  
D/B/A EVERSOURCE ENERGY  
FOR A CERTIFICATE OF SITE AND FACILITY FOR CONSTRUCTION OF A NEW  
115 kV TRANSMISSION LINE**

**THE SEACOAST RELIABILITY PROJECT**

**March 29, 2017**

**Qualifications**

**Q. Please state your name and business address.**

A. My name is Robert W. Varney and my business address is 25 Nashua Road, Bedford, NH 03110.

**Q. Who is your current employer and what position do you hold?**

A. I am President of Normandeau Associates, Inc.

**Q. Please describe your background, experience and qualifications.**

A. My background and qualifications were included in my direct pre-filed testimony filed with the NH SEC Application dated April 12, 2016 and have not changed since then.

**Purpose of Testimony**

**Q. What is the purpose of this supplemental testimony?**

A. The purpose of my testimony is to provide additional information to the SEC in support of PSNH's Amendment to the original Application dated April 12, 2016.

**Amended Project Description**

**Q. Have you reviewed the amended Project Description submitted to the SEC?**

A. Yes, I have.

**Q. Does the amended Project Description change anything in your previously filed testimony?**

A. Yes. My previously filed testimony included a Project description that has changed. Since filing the original application, the Applicant has continued to work with the Town of Newington and local property owners to address concerns. As anticipated in the original Application, PSNH now proposes to construct an additional 0.5 miles of the Project underground. Pursuant to the Amendment, additional segments of the Project will be sited underground in the areas of the Flynn Pit Town Forest, Newington Center Historic District, Frink Farm, and the Hannah Lane residential neighborhood.

Other minor design modifications include adjusting individual structure locations and configurations at the request of landowners on and adjacent to the ROW. These revisions do not change existing land uses adjacent to the corridor and maintain the existing land use pattern in Newington and Durham.

1           **Q.     In consideration of these changes, do the conclusions in your pre-filed**  
2 **testimony of April 4, 2016 remain the same?**

3           A.     Yes, they do. The Project will not have an adverse impact on local land use,  
4 tourism and recreation, or community facilities and services; nor will the Project unduly interfere  
5 with the orderly development of the region.

6           **Q.     Does this conclude your amended testimony?**

7           A.     Yes, it does.

**THE STATE OF NEW HAMPSHIRE  
BEFORE THE  
SITE EVALUATION COMMITTEE  
DOCKET NO. 2015-04**

**AMENDED PRE-FILED TESTIMONY OF JAMES CHALMERS**

**APPLICATION OF PUBLIC SERVICE COMPANY OF NEW HAMPSHIRE  
D/B/A EVERSOURCE ENERGY  
FOR A CERTIFICATE OF SITE AND FACILITY FOR CONSTRUCTION OF A NEW  
115 kV TRANSMISSION LINE**

**THE SEACOAST RELIABILITY PROJECT**

**March 29, 2017**

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**Qualifications and Purpose of Testimony**

**Q. Please state your name, title, and business address.**

A. My name is James Chalmers. I am the Principal of Chalmers & Associates, LLC whose business address is 616 Park Lane, Billings, MT 59102.

**Q. Please describe your background, experience and qualifications.**

A. My background and qualifications were included in my direct pre-filed testimony filed with the NH SEC Application dated April 12, 2016 and have not changed since then.

**Purpose of Testimony**

**Q. What is the purpose of this amended testimony?**

A. The purpose of my testimony is to provide additional information to the SEC in support of PSNH's Amendment to the original Application dated April 12, 2016.

**Amended Project Description**

**Q. Have you reviewed the amended Project Description submitted to the SEC?**

A. Yes, I have.

**Q. Does the amended Project Description change anything in your previously filed testimony?**

A. Yes. My previously filed testimony stated that there are 19 potentially affected properties based on proximity to overhead HVTL. The amended Project reduces this number to 14 due to undergrounding the HVTL in the Hannah Lane residential neighborhood in Newington.

**Q. In consideration of these changes, do the conclusions in your pre-filed testimony of April 4, 2016 remain the same?**

A. Yes, they do.

**THE STATE OF NEW HAMPSHIRE  
BEFORE THE  
SITE EVALUATION COMMITTEE**

**DOCKET NO. 2015-04**

**AMENDED PRE-FILED DIRECT TESTIMONY OF LISA K. SHAPIRO**

**APPLICATION OF PUBLIC SERVICE COMPANY OF NEW HAMPSHIRE  
D/B/A EVERSOURCE ENERGY  
FOR A CERTIFICATE OF SITE AND FACILITY FOR CONSTRUCTION OF A NEW  
115 kV TRANSMISSION LINE**

**THE SEACOAST RELIABILITY PROJECT**

**March 29, 2017**

1 **Qualifications and Purpose of Testimony**

2 **Q. Please state your name, title and business address for the record.**

3 A. My name is Lisa K. Shapiro and my business address is 214 North Main Street,  
4 Concord, NH 03301. I am Chief Economist at Gallagher, Callahan & Gartrell, P.C.

5 **Q. Please briefly summarize your relevant background and employment**  
6 **experience.**

7 A. I hold a Ph.D. in Economics from Johns Hopkins University and have  
8 approximately 20 years of experience in analyzing New Hampshire property taxes as part of my  
9 job. My doctoral dissertation was on property taxes and voting behavior with a case study of  
10 New Hampshire. I was the lead author on the seminal study on the then-proposed new statewide  
11 property tax enacted in New Hampshire. I also prepared the analysis of the estimated property  
12 taxes paid by the proposed Portland Natural Gas Transmission System. I have prepared property  
13 tax analyses for a variety of private and institutional organizations. I have consulted for utilities,  
14 merchant generators, and manufactures to assist with property tax analysis, including testifying  
15 and representation before the New Hampshire Legislature on legislative proposals regarding  
16 property taxes.

17 I have authored a number of economic impact studies, reports, and presentations on the  
18 economic and fiscal impacts of infrastructure investments and public policies. I have provided  
19 expert economics testimony before the New Hampshire Public Utilities Commission, and I have  
20 also testified before the New Hampshire legislature on the economic and policy impacts of  
21 proposed legislation concerning electric industry restructuring, the Renewable Portfolio Standard  
22 (“RPS”), the Regional Greenhouse Gas Initiative (“RGGI”), pollution control tax exemptions,  
23 utility taxes, and other business and tax proposals.

24 I have also served on the boards of the New Hampshire Retirement System, the Federal  
25 Reserve Bank of Boston’s New England Public Policy Center Advisory Board, Josiah Bartlett  
26 Center for Public Policy, and was a member of Governor Shaheen’s New Hampshire  
27 Commission on Education Funding. For further information, please see my CV, attached hereto  
28 as Attachment A.

29





1 Actual taxes paid by SRP would depend on the total cost and market value of the SRP  
2 property in each community, government spending, other sources of revenue, and the tax base,  
3 after construction.

4 In order to develop an estimated range for the SRP first year annual tax payment post-  
5 construction, simulations were run using different assumptions on tax and growth rates, and the  
6 taxable value of SRP in each community.

7 **Q. Please provide an overview of the costs of the project within each of the**  
8 **proposed host communities?**

9 A. Approximately 90 percent of the total Project costs are allocated to Durham and  
10 Newington. For the other two proposed host communities, about \$3.5 million in Project cost is in  
11 Madbury and about \$4.5 million in Portsmouth. Appendix 44, State and Local Tax Revenue  
12 Data, shows the estimated Project allocated cost in each community, and as compared to the  
13 most recent (2015) town valuation.

14 **Q. Can you please summarize the estimated SRP local property tax payments**  
15 **for the first year post-construction?**

16 A. Actual taxes paid will depend on the value of the SRP property in the community,  
17 local spending, other sources of revenue, and the tax base. Revised Appendix 44(a), State and  
18 Local Tax Revenue Data, reports the estimated range of SRP first year local property tax  
19 payments. Ranges are based on different simulations using current and actual tax rates and  
20 spending levels, different growth rate assumptions, and a discounted simulation on SRP property  
21 value in a community to estimate a lower range of payment to provide a higher degree of  
22 confidence. Details on the specific assumptions and results for the nine different simulations run  
23 to develop the range are reported in Appendix 44, State and Local Tax Revenue Data.

24 **Q. Can you please explain what local property taxes are referred to when**  
25 **estimating the SRP local property tax payments?**

26 A. Local property taxes combine the municipal or city property tax with the local  
27 education property taxes.

28

1           **Q.     Are the estimated SRP first year local property tax payments to the four**  
2 **Seacoast communities offset by any increase in local expenditures?**

3           A.     I am not aware of any increased expenditures on local services due to the addition  
4 of approximately \$84 million in taxable base in the four Seacoast communities. The Project is  
5 not expected to cause any direct increase in the number of students, nor increased need for public  
6 safety protection services, nor other infrastructure investments or expenses for roads, water,  
7 sewer or fire protection. Thus, it is not expected that the SRP estimated property tax payments  
8 are offset by any direct increased demand for and expenditures on local services.

9           **Q.     Does the addition of the approximately \$84 million in taxable property in the**  
10 **proposed host communities provide fiscal benefit to other communities?**

11          A.     Yes, through tax base sharing. Durham and Madbury are in a cooperative school  
12 district with a third community, Lee. Because the costs for education are shared in part based on  
13 the total equalized property value in each community, the tax benefit (through tax payments and  
14 reduction of existing property owner's share of local expenditures) of the SRP property in  
15 Durham and Madbury will in part be shared with Lee. Similarly, communities throughout  
16 Strafford and Rockingham Counties and across the State will benefit fiscally.

17          **Q.     Please summarize the estimated SRP property tax payments in the first year**  
18 **after construction to the county and state governments.**

19          A.     The Project is proposed to be located in two different counties—Strafford and  
20 Rockingham. SRP tax payments to Strafford County are estimated at approximately between  
21 \$122,000 and \$135,000 and to Rockingham from between \$36,000 to \$40,000. County budgets  
22 to be raised from property taxes are allocated to each community in a county based on the total  
23 equalized value of property in that community. Because of this shared responsibility for county  
24 budgets, all communities within each of the two counties share in the benefit from the new SRP  
25 taxable property county tax payments.

26          Utility property also pays the state utility education tax directly to the state. Utility  
27 property does not pay the state property tax at the community level, but pays the state directly at  
28 a higher fixed rate of \$6.60 per thousand of assessed value. The estimated first year utility  
29 education property tax SRP payment is estimated at about \$500,000 to \$612,000. The state uses  
30 these revenues to distribute back to communities throughout the state for state aid to education.



1 Environmental Services, to estimate the economic benefits of enacting legislation to join the  
2 Regional Greenhouse Gas Initiative (“RGGI”), and by the New Hampshire Economic and Labor  
3 Market Information Bureau (“ELMI”) to estimate the economic impacts from closures of large  
4 pulp and paper mills in the North Country, construction of a new federal prison in Berlin, and a  
5 potential closure of the Portsmouth Naval Shipyard. The REMI model simulates the dynamic,  
6 interactive effects over time and across industries that result from a change in the economy, such  
7 as a large investment in an energy infrastructure project. The model used in this study was a  
8 twenty-three sector New Hampshire-specific REMI model.

9 **Q. Did you model different scenarios using the REMI model?**

10 A. Yes, I did. I modeled base case scenarios using several different policy variables that  
11 can be used to account for in-state expenditures in the areas of construction; professional and  
12 technical services; power and communication structures; and equipment products. The results of  
13 the base case scenarios provide the basis for the ranges of results reported here. I also looked at  
14 sensitivity scenarios that assumed that some of the workers involved in the construction of the  
15 proposed Project would be paid at higher rates than workers in the power and communications  
16 structures sector. Higher rates of pay would have the effect of reducing the estimated number of  
17 jobs that will result from a fixed construction budget. Some of the electrical line workers who  
18 work on the proposed Project may experience higher pay because, according to the US Bureau of  
19 Labor Statistics, these types of workers can encounter serious hazards on the job, including  
20 working with high-voltage electricity, often at great heights; the work can be physically  
21 demanding; if needed, some work can occur during irregular hours (evenings, weekends, and  
22 holidays); and to become proficient, most line installers and repairers require technical  
23 instruction and long-term on-the-job training.

24 **Q. What types of economic impacts is the Seacoast Reliability Project expected**  
25 **to have in New Hampshire?**

26 A. The Project will create economic benefits locally and statewide by increasing  
27 jobs, economic output (sales), gross state product (“GSP”), and personal income during the  
28 construction phase of the proposed project, 2015 through 2019. The Project will also add  
29 additional taxable property in the four host communities, and SRP will pay property taxes

1 locally, and to two counties and the State over the life of the Project. The estimated benefits  
2 associated with the construction of the proposed Project are explained below.

3 **Q. How much will be spent during the construction phase of the proposed**  
4 **Seacoast Reliability Project and what types of goods and services will be purchased?**

5 A. The estimated cost of constructing the proposed Project between 2015 and 2019 is  
6 approximately \$66 million. Additional Project costs for financing, other indirect expenses, the  
7 remaining contingences, and expenses incurred prior to 2015 and after 2019, bring the total  
8 Project cost estimate to approximately \$84 million. Of this total, an estimated \$19.1 million will  
9 be spent on New Hampshire workers and businesses. Construction of a large energy facility  
10 typically utilizes a mix of in-state as well as out-of-state vendors and workers including those in  
11 specialized fields. Expenditures will be made on local goods and services related to civil  
12 engineering, project management, site work, general construction, crane services, electrical  
13 services, steel work, welding, and other high-value construction-related work.

14 **Q. What is the estimated number of direct construction jobs associated with the**  
15 **construction of the proposed Project?**

16 A. The REMI model estimates that the direct construction work force will be  
17 approximately 31 workers or fewer in the non-peak years of construction (2015, 2016, and 2018)  
18 and 24 to 52 construction workers during the peak year of construction, 2017. PSNH has  
19 indicated it will work to maximize the use of construction-related workers from New Hampshire  
20 to the extent they are available. To the extent workers do not live in the area and come here to  
21 work, demand could increase for lodging, food and sundries. Those purchases are not estimated  
22 nor included in the model.

23 **Q. What does the REMI model estimate for the total number of New Hampshire**  
24 **jobs, broken out by direct, indirect, and induced, resulting from the construction of the**  
25 **proposed Project?**

26 A. Based on the input data that \$19.1 million will be spent in New Hampshire during  
27 the years 2015 through 2019, the REMI model estimates that the annual average total number of  
28 New Hampshire jobs during the SRP construction period is between 30 and 46 depending on the  
29 assumptions and modeling specifics. The peak number of total jobs in 2017 is estimated to be  
30 between 54 and 97, depending on the assumptions and modeling specifics. These estimated

1 employment impacts reflect direct New Hampshire employment in occupations tied directly to  
2 the construction of the Project, as well as indirect and induced in-state employment through the  
3 multiplier effect. Indirect and induced jobs reflect New Hampshire jobs at companies supplying  
4 goods and services to the proposed Project and its workforce, as well as jobs resulting from  
5 spending in the local economy by direct and indirect workers employed due to the Project. In  
6 general, a little more than half of the estimated jobs are considered direct jobs, and a little less  
7 than half are indirect and induced jobs.

8 **Q. What does the REMI model estimate for the annual average total number of**  
9 **New Hampshire jobs, broken out by key industries?**

10 A. The REMI model estimates that the annual average total number of New  
11 Hampshire jobs (direct, indirect, and induced) in the construction industry will range from 13 to  
12 24 , with a peak of approximately 28 to 58 in 2017, the peak year of construction. The annual  
13 average total number of New Hampshire jobs in the professional and technical services industry  
14 will range from 6 to 7, with a peak of approximately 7 to 9 in 2017. The annual average total  
15 number of New Hampshire jobs in the retail trade industry will range from 2 to 4, with a peak of  
16 approximately 3 to 7 in 2017. And the annual average total number of New Hampshire jobs in all  
17 other industries (for example, manufacturing, wholesale trade, finance and real estate) will range  
18 from 7 to 10, with a peak of approximately 13 to 20 in 2017.

19 **Q. What estimates does the REMI model produce for economic output (sales)**  
20 **and Gross State Product as a result of Project construction?**

21 A. Economic output, or sales, captures all of the intermediate goods purchased as  
22 well as all of the final goods and services that are captured in Gross State Product. Based on the  
23 assumption that \$19.1 million will be spent during the four-year period 2015 through 2019, the  
24 REMI model estimates New Hampshire's average annual sales to increase by about \$6.7 million  
25 to \$7.1 million per year and average annual Gross State Product to increase by about \$4.3 million  
26 to \$5.0 million per year during the four-year period. In 2017, the peak year of construction, sales  
27 will increase by \$13.9 million to \$14 million and GSP will increase by \$8.8 million to \$9.8  
28 million. On a cumulative basis over the construction phase, the state's economic output will be  
29 an estimated \$26.9 million to \$28.3 million higher and GSP an estimated \$17.3 million to \$19.9  
30 million higher than they would be in the absence of constructing the proposed Project. To the



1 extent that less than \$19.1 million is spent locally, or there are greater leakages from New  
2 Hampshire for a project built on the seacoast than there are on average statewide, these estimates  
3 would be somewhat reduced. To the extent that project expenditures in New Hampshire are  
4 greater than \$19.1 million, the REMI estimates for economic impacts would likely also be  
5 somewhat higher.

6 **Q. What estimates does the REMI model produce for personal income as a**  
7 **result of Project construction?**

8 A. The estimated employment impacts and economic activity associated with  
9 construction of the proposed Project will in turn lead to greater personal income for New  
10 Hampshire workers. Based on the REMI model, and as a result of the direct, indirect, and  
11 induced economic activity, personal income in New Hampshire is estimated to increase by a total  
12 of \$8.1 million to \$12.3 million on a cumulative basis over the construction period, averaging an  
13 annual increase of about \$2.0 million to \$3.1 million during the construction period 2015-2019.  
14 Personal income is estimated to peak in 2017 within the range of \$3.5 million to \$6.1 million.

15 **Q. Please summarize the results of your analysis.**

16 A. The results of simulation analyses estimate that in the first year of operation, the  
17 Project will pay between \$1.6 to \$2.2 million in total property taxes. This overall estimate can be  
18 broken down into the following categories:

19 \* \$982,000 to \$1.4 million to the four local communities

20 \* \$158,000 to \$175,000 to the two counties

21 \* \$500,000 to \$612,000 to the State for redistribution to local school districts through  
22 state aid.

23 The Project will also pay property taxes during the construction based on what is  
24 completed each year and will continue to pay property taxes throughout the life of the Project.

25 PSNH estimates that of the approximately \$84 million total budget, approximately \$19.1  
26 million is expected to be spent directly on materials and services supplied by New Hampshire  
27 companies and workers. Using the standard basic REMI economic model for New Hampshire,  
28 the economic impact of the construction of the SRP project on New Hampshire is estimated to  
29 support 54 to 97 total New Hampshire jobs during the peak year of construction, and about a \$27  
30 million to \$28 million cumulative increase in New Hampshire's economic output.

31

1           **Q.     In light of these changes, do the conclusions in your pre-filed testimony of**  
2 **April 12, 2016 remain the same?**

3           A.     Yes, they do.

4           **Q.     Does that conclude your amended testimony?**

5           A.     Yes.