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VIA ELECTRONIC MAIL AND HAND DELIVERY

September 19, 2017

New Hampshire Site Evaluation Committee
Pamela G. Monroe, Administrator
21 South Fruit Street, Suite 10
Concord, NH 03301

Re: SEC Docket No. 2015-04: Public Service Company of New Hampshire d/b/a Eversource Energy for a New 115k Transmission Line from Madbury Substation to Portsmouth Substation
Applicant's Response to NHDES Status Letter of August 1, 2017

Dear Ms. Monroe:

Enclosed for filing in the above-referenced docket, the Applicant submits its response and accompanying documents to the New Hampshire Department of Environmental Services (NHDES) status letter of August 1, 2017. To respond further to the August 1, 2017 letter, the Applicant is also providing updates to the following documents previously submitted to NHDES and the Site Evaluation Committee (SEC): the environmental maps, the engineering plans, the NHDES Wetlands Permit Application, Little Bay impact assessment, best management practices for construction, and the Little Bay environmental monitoring plan. The attached Essential Fish Habitat (EFH) Assessment report also describes the EFH species and habitats likely to occur in Little Bay, and the potential effects of the submarine cable installation on those habitats.

The Applicant has made its best effort to provide a comprehensive and complete response to the NHDES questions while also remaining mindful of the fact that there is an SEC process occurring here under which the Applicant has various obligations and due process rights. In that process, opposing parties have taken positions in their pre-filed testimony. The Applicant will respond to those parties in due course and pursuant to a scheduling order issued by the SEC. Requiring the Applicant to provide full responses to assertions in that testimony prior to such deadlines and outside the SEC process would raise substantial procedural concerns for the Applicant.

The Applicant is submitting one paper copy of each of these documents to the SEC. Due to the size of the documents, the Applicant is also providing the filing on a thumb drive to the SEC for posting to the Committee's website. The Applicant has submitted two copies of all of the above-referenced documents to NHDES and the Applicant will provide an electronic copy of these documents to all of the parties on the SEC Distribution List.

Please contact me directly should you have any questions.

Very truly yours,

Barry Needleman

BN:amd
Enclosure

Cc: SEC Distribution List

EVERSOURCE ENERGY

SEACOAST RELIABILITY PROJECT

RESPONSE TO NHDES "ISSUES OF CONCERN" FROM THEIR SEC LETTER DATED AUGUST 1, 2017.

September 15, 2017

Introduction

Public Service Company of New Hampshire d/b/a Eversource Energy ("Eversource" or the "Applicant") is providing this response to your letter dated August 1, 2017, in which the New Hampshire Department of Environmental Services ("NHDES") Wetlands Bureau and Watershed Management Bureau requested additional information from Eversource in support of its application of a Certificate of Site and Facility for the Seacoast Reliability Project (SRP) before the New Hampshire Site Evaluation Committee ("NHSEC"). Our response provides supplemental information that was requested by the Agency and responds to each specific comment. Our responses follow the outline of your August 1 letter.

Wetlands Bureau

The NHDES Wetlands Bureau has reviewed materials submitted by the applicant and interested parties. The issues of concern include:

NHDES Wetlands Comment 1. Receipt of technical comments on 7/31/2017 from the Counsel for the Public's expert ESS Group, Inc. relative to sediment plume impacts resulting from the jet plowing to install the cable crossing of Little Bay, which the applicant has not addressed.

Response: A summary of our responses to key comments from Counsel for the Public's (CFP) testimony is provided below. Many of these issues are addressed in more detail in the responses for Wetlands Comment 8 and Watershed Comments 1-3.

Comment	Eversource Response
Data Gaps (page 4)	
Update permits and natural resource impact reports	Eversource has been coordinating with DES Wetlands and the Corps to ensure the information they need is provided for all environmental permit applications and technical documents. See Documents 2, 3, 5 and 8 for the revised plans, applications and narratives related to DES permitting.
Sediment Dispersion Model (page 5)	
Water lift removes more sediment than hand jetting	Water lifts will not be used in this project. It will be hand jetting only.

Comment	Eversource Response
Decommissioning (page 6)	
If requested by the SEC, submit a decommissioning plan	See page 33 of Document 6 in the June 30, 2017 Supplement for an explanation of Eversource's opinion on a decommissioning plan.
Water Quality Monitoring (page 6)	
-Require water quality monitoring of chemical constituents 500' from jetplow	See Revised Environmental Monitoring Plan in Document 9. Eversource will sample copper, arsenic and nitrogen, the only possible constituents of concern at "sentry stations" recommended by DES.
Sample total suspended solids and turbidity to validate correlation	Eversource will be collecting TSS periodically at the monitoring stations.
Hourly monitoring should continue as scheduled while additional 15-min turbidity monitoring is occurring in the event of an exceedance.	The Environmental Monitoring Plan has been revised to state that specifically
Compare monitoring results with sediment dispersion model.	Data will be available from the sampling stations to spot check turbidity levels with the modeled TSS predictions.
Benthic Infauna Community Monitoring (page 7)	
Repeat pre-construction benthic sampling just prior to installation, collecting 3 replicates at each station.	Eversource has revised the Environmental Monitoring Plan to reflect that change
Select impact and non-impact stations in advance of construction.	The purpose of selecting stations after the as-built condition has been mapped is to identify those areas that appear most heavily impacted compared to controls. Eversource would prefer this approach but will defer to DES.
Existing Cable Removal Plan (page 8)	
Outfit the cable removal vessel with a floating absorbent or containment boom	Durocher will have containment booms and absorbents on board in the event of a spill or sheen. Because the vessel will be moving, they would prefer not to deploy unless needed, as determined by an on-board environmental monitor.

NHDES Wetlands Comment 2. Receipt of comments on 7/31/17 from property owner Keith Frizzell relative to the effect of the project on Town of Newington designated prime wetlands located on the Frizzell property, which the applicant has not addressed.

Response: The impact of the SRP on prime wetland (NW34) is quantified and discussed in the original NHDES Wetland Permit Application (April 12, 2016) and Document 2 of the PSNH Response to NHDES Wetlands Bureau November 10, 2016 Progress Report (January 11, 2017).

NHDES Wetlands Comment 3. Receipt of comments on 7/31/17 from the NH Natural Heritage Bureau which include edits to the applicant's "Seacoast Reliability Project Avoidance and Minimization: Best Management Practices and Construction Plan" dated 6/30/2017, are not yet incorporated into that plan by the applicant, nor has the applicant provided NHDES with written concurrence from NH Fish and Game Department on the plan as requested.

Response: Comments from the NH Natural Heritage Bureau and NH Fish and Game Department have been incorporated into the Best Management Practices and Construction Plan, see Document 4. Ms. Cheri Patterson from NH Fish and Game verbally told Normandeau that she approves the plan (personal communication, August 25, 2017), and that she would be sending an email to that effect to NHDES.

NHDES Wetlands Comment 4. Receipt of comments on 7/30/2017 from commercial aquaculturist Jason Baker, Fat Dog Shellfish Co., LLC, relative to the predicted overlap of the sediment plume on his enterprise in Little Bay, which the applicant has not addressed.

Response: Many of Mr. Baker's concerns are related to the risk of sedimentation and contamination of his harvestable oysters during the construction period. Eversource has requested additional information from Mr. Baker to better understand the specifics of his concerns, but the results of the hydrodynamic model and sediment contaminant testing indicate no adverse impacts to his or other oyster farms in Little Bay. To confirm this assertion, the water quality monitoring proposed by the SRP will be used to assess the real time water quality conditions. Based on discussions with DES, the water quality monitoring plan has been further refined to include monitoring at the edge of the mixing zone and "sentry stations" closer to the construction zone to assess conditions relative to the plume predicted by the model. SRP will also monitor total and dissolved copper, arsenic, total and ammonia nitrogen, and fecal coliform; DES plans to independently monitor fecal coliform in the water column during construction.

Mr. Baker suggested that Eversource perform two types of monitoring to assess impacts of the project on oyster aquaculture: proxy monitoring and farm monitoring. The only difference between the two, as described by Mr. Baker, is that the proxy monitoring would require placement of oysters in a location near his facility and the farm monitoring would take place on his facility. Eversource has agreed to add additional "sentry" stations to the water quality monitoring plan, as suggested by DES, that would enable the Environmental Monitor to institute adaptive management protocols in the event that concentrations of suspended sediment as measured by turbidity appear to be higher than predicted in the sediment dispersion model. This would effectively prevent suspended sediment loads higher than predicted by the model from reaching Mr. Baker's facility.

NHDES Wetlands Comment 5. Receipt of technical comments on 7/28/2017 from the Town of Durham experts, GEI, Woods Hole Group, and Dr. Steve Jones, UNH, relative to the sediment plume impacts on Little Bay from the proposed jet plowing for cable crossing, which the applicant has not addressed.

Response: The majority of comments provided by the Town of Durham and UNH are addressed in our responses for NHDES Wetlands Comment 8 and Watershed Comments 1-3 in this letter.

NHDES Wetlands Comment 6. Receipt of questions on 7/28/2017 raised by Dr. Leonard Lord, Rockingham County Conservation District (easement holder for the Frink Farm), relative to PFOC and PFOA contamination and methodologies associated with the applicant's "Soils and Groundwater Management plan", which have not been addressed by the applicant.

Response: Eversource assumes this comment is referring to the quoted sections of the Direct Pre-filed Testimony of Helen H. Frink (undated). Eversource has reached out to Dr. Lord and the Frink family to meet and discuss their concerns about soil management during construction. Prior to construction, the Draft SRP Soil and Water Management Plan will be finalized and submitted to DES for final approval.

NHDES Wetlands Comment 7. Receipt of comments on 7/24/2017 from the applicant in response to the data requests generated at the 7/11/2017 SEC technical session, which provide some conflicting information to that included in other submissions to NHDES.

Response: To our knowledge, the concerns of the Wetlands Bureau are addressed in NHDES Wetlands Comments 1-6 and 8.

NHDES Wetlands Comment 8. On 7/28/2017 NHDES wetlands staff met with the applicant and their consultants to review application items still outstanding, which the applicant must provide to NHDES, including:

a. A "worst case scenario" plan for encountering jet plow obstruction or refusal necessitating mattress placement in excess of that currently being discussed, which accounts for appropriate impact evaluation by NHDES and other resource agencies;

Response: Eversource understands the phrase “worst case scenario” to relate to the need for concrete mattresses in all areas where field data indicates the minimum depth of 3.5 feet may not be achieved. These specific areas are shown in the revised engineering plans in Document 2 and the Environmental Maps in Document 3. This latest design revision shows a conservative estimate of the extent of concrete mattresses, and their footprint, based on site specific near-shore sediment depths. Concrete mattresses will be required where ledge, rock or other refusal prohibits burial of the cable to the minimum 3.5-foot depth. Subsurface sediment profiling by OSI indicates no ledge in the channel, but Durocher probes found some points of resistance. Concrete mattresses are shown in those locations; however Durocher has indicated that they expect to be able to achieve the needed depths in those locations. This results in an increase in permanent marine impacts of 3,345 square feet, from 5,336 to 8,681 square feet. These impacts are described and quantified in the Revised Little Bay Impact Assessment report in Document 5.

b. Review of the applicant's Supplement materials received on 6/30/2017 finds that the applicant has not yet submitted revised Little Bay cable crossing profile plans reflecting the new jet plow depth to a proposed 3.5' -5' for NHDES to review;

Response: The 70% Design for the submarine engineering plans is provided in Document 2, and shows the proposed cable depths of 3.5 and 5 feet in the tidal flats and channel, respectively.

c. Similarly, review of the 6/30/2017 Supplement found that revised plans reflecting the new extent of the placement of concrete mattresses associated with the shallower installation depth of the cable crossing as currently proposed have not been submitted to NHDES for review.

Response: See Eversource response to 8a.

d. Review found jet plow depths that were presented in the Amendment Volume 1 and Amendment Volume 2 received on 3/29/2017 reflect a jet plow depth of 8' with overages to 10' at several stations. There is concern that there will be similar overages for the represented 3.5 '-5' revised depth, based on technical session testimony that referred to target depths ranging from 4.67' to 6.6', none of which have been documented in a plan for review and approval. A written discussion of the definition of "target" depths with respect to the jet-plowing and how over-dredging will be limited is required;

Response: See Eversource response to 8a and Document 2 for an updated 70% design that shows the revised target depth of 5 feet in the channel. The 3.5-foot depth in the tidal flat remains unchanged. A description of target depth and the contractor's ability to control burial depth to avoid overburial is provided in the Revised Little Bay Impact Assessment Report (Document 5).

e. Review of the applicant's 3/29/2017 and 6/30/2017 materials finds that if pile driving to stabilize the barge and the subsequent pulling of those piles each time the barge is moved is proposed, it has not been specifically accounted for in the description of impacts by the applicant or reviewed by NHDES.

Response: No piles or pile driving is proposed for the cable installation. The submarine contractor, Durocher Marine, will be using spuds (Figure 1), which are the typical structures used to hold a barge in position when needed. A barge has two spuds between 24"-36" in diameter, which are raised and lowered by a wire rope connected to a deck winch. Spuds are expected to be utilized at the beginning and end of each cable lay while the cable is being floated to shore, and during the three to four anchor changes anticipated for each crossing. Depending on the substrate composition, spuds typically penetrate the bottom several feet. The footprint of the spuds will be largely within the area of temporary impact for the cable installation, with the possible exception of the anchor changes on the third cable lay which will fall slightly outside of the 30' wide area of temporary impacts. Because the mid-water barge laydown area is somewhat oversized, the additional 72 square feet of impact from the anchor-change spuds is covered.

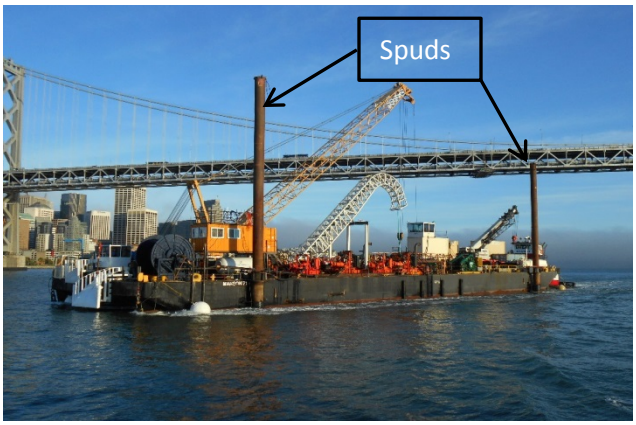

Figure 1. Example of spuds on a barge.

f. A request to waive Env-Wt 304.11(b), Dredging Projects, which limits dredging in tidal waters to the period between November 15 and March 15, has not been received by NHDES to support the schedule submitted by the applicant which proposes work outside this time of year restriction period. A request to waive the dredge window must be supported in writing by the fisheries natural resource agencies, specifically NH Fish and Game Marine Fisheries, and NOAA National Marine Fisheries, and the Army Corps of Engineers.

Response: Eversource respectfully requests a waiver from Env-Wt 304.11 (b), which limits dredging in tidal waters to the period between November 15 and March 15 (see Document 6). Ms. Cheri Patterson from NH Fish and Game Department (NHFG) has commented on the Best Management Practices for Construction document, which addresses time-of-year restrictions for Little Bay construction, and stated she has no concerns for the work (email dated August 25, 2017: Document 10). Mr. Michael Johnson (NOAA Fisheries) has requested that the Essential Fish Habitat report be revised to include impacts to EFH that are currently included in other documents. This revised report was provided on September 7. The Army Corps of Engineers and NOAA Fisheries have yet to comment on the timing of the project relative to fish species in Little Bay.

g. Review of materials presented in Amendment Volume 1 and Amendment Volume 2 received on 3/29 /2017 finds key features associated with wetlands jurisdiction in tidal wetlands and tidal surface waters, and which is necessary to determine and evaluate impact properly were not shown on the plans. The plans need to show mean lower low water, mean low water, mean high water, highest observable tide line, and 100' landward limit of the upland tidal buffer zone.

Response: Mean lower low water, a site specific tidal datum, highest observable tide line, and the 100’ limit of the tidal buffer zone are shown on the Revised Environmental Maps (Document 4, Sheets 18-20). An explanation of the derivation of the site specific tidal datum is provided in Appendix 2 of the Revised Little Bay Impact Assessment Report, Document 5.

The plans also need to account for removal of the either or both of the existing brick cable houses if that is proposed to occur.

Response: The Department of Historic Resources (DHR) has designated the two cable houses and the existing submarine cables as a Historic District. The eastern cable house will remain as is, as it is

out of the construction zone. DHR has determined that the project will have an adverse effect on the western cable house and has requested that it be moved and preserved for the future. Please see the proposed cable house removal plan currently under review by the DHR (Document 7). This plan proposes to stabilize and move the cable house on the west shore temporarily out of the construction zone. It proposes to relocate and restore the cable house in a new location after construction in the area is complete. The new location will be out of the tidal zone, at approximately 12 feet elevation (NAVD88) and approximately 15 feet northwest of its current location. The original rock and cement foundation will be removed and approximately 200 square feet will be restored to high intertidal zone. As discussed in our meeting, Eversource requests that submittal of the details of the relocation, restoration and associated permitting be delayed until after DHR approval of the plan.

h. An updated square footage of requested impacts by jurisdictional area, and corresponding changes to proposed compensatory mitigation as appropriate.

Response: Please see revised impact tables in the Revised Little Bay Impact Assessment Report (Document 5), and associated revisions to the Wetland Permit Application (Document 8).

Watershed Management Bureau

The following information is needed by the NHDES Watershed Management Bureau to better understand the potential impacts of the proposed submarine cable crossing across Little Bay on surface water quality, and to determine appropriate project operation and monitoring conditions:

NHDES Watershed Comment 1. A response from the Applicant to the following concerns raised in the Pre-filed Direct Testimony of Joseph, J. Famely, Matthew F. Shultz, Stephen H. Jones and Michael F. Dacey on behalf of the Durham and the University of New Hampshire which was sent to the SEC via a letter dated July 24, 2017 by Orr and Reno:

a1) Identification of potential contaminants that could desorb from sediment particles and analyses to determine which of these contaminants could potentially exceed New Hampshire surface water quality criteria (p.5, line 33 through p. 9, line 3; and p. 9 line 35 through p. 12, line 26.).

Response: Please see Document 2 of the supplemental material submitted June 30, 2017, Supplement to Characterization of Sediment Quality Along Little Bay Crossing. Appendix A of that document provides an analysis of potential water column impacts from disturbed sediments indicating that only copper has any potential to exceed the NH Acute Marine Water Quality Standards at the expected sediment load, and then only if 100% of the copper bound to sediments went into solution as is conservatively assumed by the RIM water quality impact model. The literature indicates that the partitioning of copper between solid and dissolved forms is on the order of 0.02%, not 100%, therefore exceedances of copper would not occur.

DES has requested water quality monitoring at pre-determined stations to assess total and dissolved copper, arsenic, and total and ammonia nitrogen during jet plowing and hand jetting. See Revised Environmental Monitoring Plan (Document 9). The addition of "sentry stations" per recommendation of DES will allow the on-board monitors to respond to any exceedances prior to them reaching the mixing zone boundary. If an exceedance occurs, the response steps for Eversource

are identified in the monitoring plan, including slowing or halting the jet plow to allow the plume to disperse.

a2) This includes questions and concerns regarding the sediment sampling and compositing methods used in these analyses (p. 5, line 33 through p.7, line 2),

Response: Eversource has worked diligently to characterize the sediments within the cable route and the percentage that could be mobilized by the jet plow and hand jetting techniques. Within the cable route, Eversource sampled 4-foot increments as there was little evidence of distinct vertical stratification. Eversource followed up with additional 2-foot depth samples co-located with previous sampling locations (the approximate upper half of the sediment depths for the cable burial) to further demonstrate the absence of distinct vertical stratification of sediment components. The Project also relied on comparisons with EPA's repeat sampling and toxicity testing of shallow (6-inch) grab samples in the vicinity of the cable route to demonstrate that the observed concentrations are relatively homogeneous over the wider area. All of these samples indicate that the results of the sediment contaminant testing are quite similar across the depths of concern as well as over the larger area, suggesting minimal stratification and mostly homogeneous low concentrations of potential contaminants in sediments.

While we concur with WHG there are few white papers that evaluate the percentage of sediments mobilized during jet plowing, we have worked with experienced hydrodynamic modelers (RPS has performed dozens of dredging and jet plowing sediment dispersion analyses) and marine contractors (Caldwell Marine and Durocher Marine are both highly reputed and experienced) to develop the model inputs, including the percentage of the trench volume that could go into suspension. Both RPS and Durocher Marine have expressed that 25% is likely conservative with jet plowing, and they expect the percentage to be lower. Also see the sensitivity analysis for trench volume loss rate in Sections 3.3.6.and 3.4.2 of the Revised Modeling Sediment Dispersion from Cable Burial for Seacoast Reliability Project (Document 1 of the June 30, 2017 Supplement).

The accuracy and validity of the model will be evaluated by real-time monitoring of turbidity, with periodic collection of total suspended solids (TSS) to verify the contribution of TSS to turbidity. See Revised Environmental Monitoring Plan (Document 9). The addition of "sentry stations" per recommendation of DES will allow the on-board monitors to respond to any exceedances prior to them reaching the mixing zone boundary. If an exceedance occurs, the response steps for Eversource are identified in the monitoring plan, including slowing or halting the jet plow to allow the plume to disperse.

a3) the methodology used and how it was used (p. 7,line 3 through p. 9, line 2, and p. 9, line 35 through p. 11, line 12),

Response: Please see our response to Watershed 1a. The water quality analysis requested is provided in Document 2 of the material submitted June 30, 2017, Supplement to Characterization of Sediment Quality Along Little Bay Crossing. Appendix A of that document provides the analysis of modeled potential water column impacts from disturbed sediments noted above.

As explained in the report titled "Characterization of Sediment Quality Along Little Bay Crossing", dated December 1, 2016, and its supplement "Supplement to Characterization of Sediment Quality Along Little Bay Crossing", dated June 30, 2017, the evaluation of potential

ecological and water quality impacts from the sediment disturbance followed the RIM protocols for the evaluation of dredged materials. This guidance was considered the most appropriate for use for the particular situation of this project, even though this project is not strictly speaking a dredge spoil disposal project. Other ecological risk frameworks, although potentially applicable, are generally not adapted for prospective risk assessment and are therefore less useful. The analysis therefore follows Tier 1 and 2 of the RIM guidance adjusted to the specifics of the proposed project. Because nothing in the Tier 1 and Tier 2 analyses indicated that the potential for adverse impacts are likely, there was no need to proceed to higher tiers of analysis.

a4) the revised Water Monitoring Plan including, but not limited to, proposed oyster mitigation (p. 11, lines 14 through 19),

Response: The results of the EPA's National Coastal Condition Assessment monitoring, which includes bioassays for representative organisms, considers the sediments of upper Little Bay to be "good", their highest rating. The Project's site-specific sediment tests at 4-foot increments and 2-foot increments returned similar sediment chemistry results to EPA, therefore we can extrapolate the "good" rating to the SRP cable area. At DES's request, Eversource will expand the real-time water quality monitoring during jet plowing and hand jetting to include copper, arsenic, nitrogen and bacteria to demonstrate compliance with the NH Water Quality Standards.

a5) potential water quality impacts due to the potential release of nitrogen (p. 11, line 20 through 33), arsenic (p.11, line 34 through p. 12, line 5) and bacteria (p. 12, line 6 through 26) into the water column.

Response: Our responses from our June 30, 2017supplement address potential releases of nitrogen, arsenic and bacteria. See Document 6 of the Supplement, pages 28 and 29 for the discussion of the low potential for contribution to existing water quality impairments from sediment-associated nitrogen and bacteria. The short duration of impacts, the small volumes of disturbed sediment, and the relatively unimpacted nature of the affected sediment result in minimal contributions to the existing water quality conditions in Little Bay, relative to inputs from other anthropogenic sources in the Great Bay estuary. See Document 2 in the June 30, 2017 supplement, Section 3.3, for further discussion of arsenic.

At DES's request, Eversource will expand the real-time water quality monitoring during jet plowing and hand jetting to include total and dissolved copper, arsenic, total and ammonia nitrogen and fecal coliform to demonstrate compliance with the NH Water Quality Standards (Document 9). Further, Eversource has met with Chris Nash (DES Shellfish Coordinator) who will be also sampling bacteria in the vicinity of the project during cable installation.

b1. Concerns raised with regards to sediment dispersion modeling (p. 12, line 27 through p. 17, line 5).This includes modeling the effects of wind on the sediment plume (p. 12, line 29 through p. 14, line 2),

Response: On behalf of Eversource, it is RPS's opinion that the wind effects on the sediment dispersion and deposition associated with the project would be minimal. The main points leading to that opinion are as follows:

- Examination of measurements taken in September 2015 by a UNH researcher have shown that winds are not an important factor in the circulation of the Great Bay Estuary System.

- The winds in the region are typically weak
    - winds are calm or variable 14% of the time,
    - Half of the time the wind speed is less than 6.7 mph (3 m/s), 75% of the time the wind is less than 8.9 mph (4 m/s), 90% of the time the wind is less than 13.4 mph (6 m/s), and 95% of the time the wind is less than 15.7 mph (7 m/s).
- Most winds come from the west
    - Analysis of the wind rose (Figure 2 below) shows that 37% of all wind originates from the western quadrant. The east quadrant constitutes only 18% while 23% originates from both the north and south quadrants.
- The region is protected and the land shelters the estuary
    - Upper Little Bay is a small section of the Great Bay Estuary System, approximately 0.7 mi (1.1 km) wide in the East-West direction and 2.2 mi (3.5 km) long in the North-South direction. It lies in a drowned river valley with land elevations rising on either side thus providing some shelter from the winds.
- The winds acting on the surface that may cause a surface current would be attenuated with depth; the sediment modeling showed that the excess suspended sediment concentrations were typically at the bottom of the water column.
    - Due to the protected nature of Upper Little Bay described above the wind speeds discussed above would be reduced at the water surface.
- The wind generates a surface current speed of about 3% of the wind as a general empirical rule. The near bottom current is further reduced due to the bottom friction acting on the water. Looking at the shallow tidal flats, the speed reduction for the lower third of the water column ranges between 50% and 60% at low and high tide, respectively. It is unlikely that the construction would coincide with extreme winds
    - The maximum wind conditions that are suitable for cable burial and monitoring are up to 25 mph (11 m/s) for the typical vessels used. Thus burial operations will not be performed during wind conditions that would significantly affect the behavior of the sediment plume.

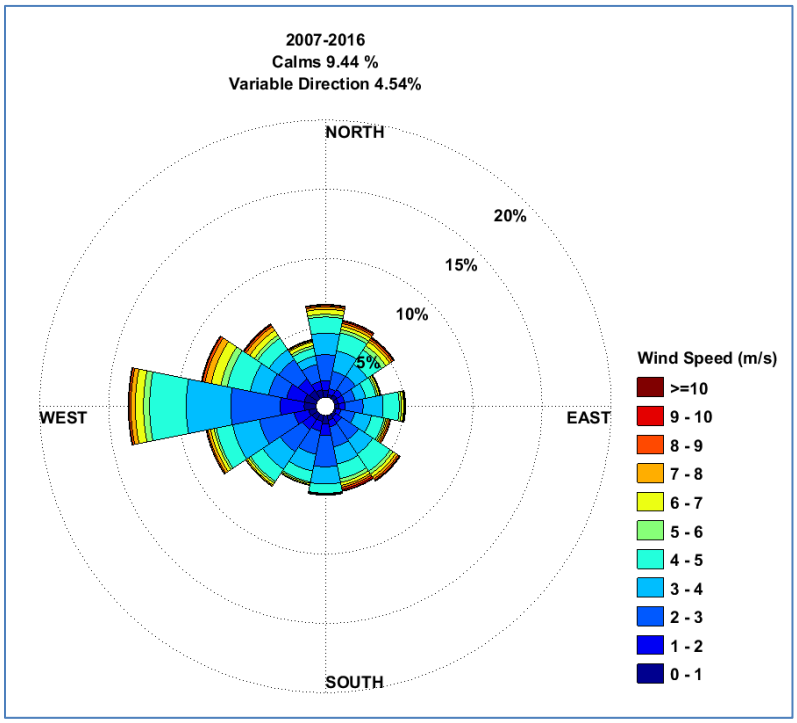

Figure 2. The wind rose for the September-October periods from 2007 through 2016 at Pease International Tradeport National Weather Service website.

b2. a "worst-case" scenario (p. 14, line 5 through p. 15, line 4),

Response: The analyses performed for the sediment dispersion modeling explored the reasonable "worst case" operational conditions during which the cable would be installed. The modeling approach evaluated expected conditions and a sensitivity study including higher and lower than expected parameter values in order to investigate the sensitivity and get insight in to what effect the worse than expected inputs have on model predictions. This is a typical protocol followed by RPS and other modelers conducting similar studies. In order to get insight in to what third parties have done to assess worst case for similar activities three different publicly available reports were reviewed.

One example directly related to the "worst case" analysis is described in a 2013 report by Woods Hole Group: *Sediment Transport Analysis for the Virginia Offshore Wind Technology Advancement Project*. The report identified five parameters that were varied separately to constitute a sensitivity analysis. The potential resuspension of deposited sediments was expressly not analyzed. Their definition of "worst" case was the use of the maximum volume rate of sediment that could be mobilized into the water column. However none of the five parameters were varied together to presumably give a multivariable "worst" case.

Another report S*ediment Dispersion and Deposition Modeling Study for Vermont Green Line Submarine Cable Route* prepared by Hodge.WaterResources (2016) for a study in Lake Champlain. This study did not include a sensitivity assessment or a stacked worst case scenario.

A third report Modeling of *Sediment Dispersion during Installation of the Submarine Cable for the Poseidon Project* (ESS Group and Hodge.WaterResources, 2013) which evaluated cable installation in NY and NJ coastal waters was reviewed. This study did not include a sensitivity analysis or a stacked worst case scenario.

Based on review of these studies it is felt that the RPS approach was either similar to, or more comprehensive than others in terms of the range of conditions analyzed.

b3. validation of the model and the potential to conduct a pilot study (p. 15, line 5 through p. 16, line 8), and resuspension of sediment (p. 16, line 11 through p. 17, line 5).

Response: The model outputs have been used to define the limits of the mixing zone and the locations of the sentry stations (Document 9). The proposed environmental monitoring plan specifies hourly sampling of turbidity at multiple depths at specified stations; periodic samples for dissolved copper, arsenic and nitrogen; and turbidity monitoring at the sentry stations to serve as indicators of the accuracy of the model. Long-term turbidity data loggers will be deployed at the three oyster aquaculture sites closest to the project to monitor near-bottom turbidity levels starting before the jetplow operation and continuing until a week beyond the third cable lay. The data loggers will add additional turbidity data for assessing the jet plowing, and the potential resuspension of sediments after the jet plow runs. All of this data will serve to compare the conditions observed during and after the cable installation with those predicted by the model.

c. Concerns raised regarding the potential water quality impacts of sediment suspension and deposition associated with removal of the existing cables (p. 17, line 7 through 18).

Response: Please see Page 9 in our Response to Comments CFP-ESS 16 (Document 6 in the June 30, 2017 Supplement). We have found no examples of sediment modeling for cable removal or the pre-lay grapnel run (PLGR) in the literature, which we would need to develop the appropriate inputs for sediment dispersion modeling. However, based on the shorter length of cable to be removed (2600 vs 4900 feet), the smaller diameter of the existing cables (2-3 inches vs 5.2 inches) and the shallower depths of the cable (surface to 24inches), the removal of the existing cable is anticipated to generate less than 10% of a single pass of the installation. It is our understanding that ESS's position is that the methods proposed are consistent with what they have seen in other projects, and would expect sediment disturbance and suspended sediments from the removal to be negligible (ESS Technical Review Report, July 28, 2017, page 21).

Similarly, the PLGR uses a 3 foot-long, 2 inch-wide blade, pulled through the sediment with no water pressure and no cable laid behind. As described by Woods Hole Group in their February 28, 2017 letter (Schultz, page 7), such a mechanical blade typically generates between 2% and 15% of the trench volume into suspension. Assuming an average of 7%, the calculated percent of sediments going into suspension from the PLGR represents approximately 3-4% of the volume predicted for each jet plowed cable installation. It is our understanding that, ESS's opinion is that a PLGR is standard practice, reduces the potential for delays or the need for increased jetting pressure, and that the impacts are minor (ESS Technical Review Report, July 28, 2017, page 21).

NHDES Watershed Comment 2. An evaluation (including modeling) of methods that could be employed to reduce the spatial impact of sediment plumes (and related impacts on surface water quality and resources) due to jet plowing. This includes, but is not limited to, jet plowing fewer hours per day when velocities in Little Bay are lowest (e.g., jet plow approximately 2 hours per day around high slack tide) and taking more than one day to complete each cable crossing.

Response: The sediment dispersion modeling process is very complex, factoring in tidal amplitude, current velocities and direction, sediment texture and interstitial water, jet plow speed, trench volume, and percent fluidization of the sediment. RPS modeled the sensitivities of all those factors in Document 1 of the June 30, 2017 Supplement, and used as its "base case" a reasonably conservative model that presents the maximum extent of the sediment plume. The goal of this particular base case was to identify the sensitive natural resources that could be affected, but it is anticipated that the actual sediment plume will be considerably less than depicted.

Construction and material constraints limit the installation options for the project. The cable manufacturer, LS Cable, has expressed concerns about prolonged planned stoppages, because the lead sheath that protects the outside of the cable is subject to wear if it sits in one place on the jet plow rollers. Such wear may not be visible for many years but could shorten the life of the cable. Additionally, weather changes could result in more challenging conditions for the cable installation, again putting the cable at risk.

Similarly, Durocher Marine is reluctant to commit to prolonged planned stoppages due to the added risks of adverse weather, the technical challenges of holding position with a partially spooled cable, and maintaining low enough levels of positive water pressure during the stoppage to minimize turbidity but to not clog or let the plow blade get stuck.

There are also environmental and social concerns associated with restricting duration of jet plowing. It will be necessary to continuously eject water through the jets in order to prevent clogging resulting in a constant, albeit low level, suspension of sediments into the water column. In addition, restarting of the jet plow may require a burst of pressure higher than that needed for continuous passage; this would result in release of additional turbidity. Navigation would be impeded during the entire time that the barge is anchored in one place. The anchor cables extend as much as 2000 feet fore and aft from the barge, likely blocking some or all of the channel for the duration, depending on the location of the barge when the operation is shut down. This could impede not only recreational and commercial boaters but also the oil spill response team for as much as four to six days. While the barge remains stationary, it must be lit at night and the generator used to pump water through the jet plow must run continuously.

NHDES Watershed Comment 3. Modeling to determine the spatial impact of sediment plumes (and potential impacts on surface water quality and resources) due to resuspension of sediment when the turbidity curtains are removed and how to reduce the spatial impact of the plumes (such as by timing sediment curtain removal during periods of low velocity and removing only a portion of each sediment curtain at a time and allowing the system to equilibrate for a few days before removing the remaining portion).

Response: Discussion with RPS suggests that modeling the removal of the silt curtain after completion of the hand jetting would be challenging, mostly because the inputs for the model would be difficult to define with any accuracy. The sedimentation model is only as accurate as its inputs, and the conditions of sediment during and immediately after the hand jetting would be difficult to characterize. Turbidity monitoring during and immediately after completion of hand jetting will be used as an alternative to document the extent and concentrations of turbidity relative to the modeled estimates.

Eversource agrees that managing the siltation curtains during the hand jetting will be an important component for minimizing resuspension of the sediments. Management may include keeping the siltation curtain in place for at least several tide cycles after completion of hand jetting to allow sediments to consolidate, removing the siltation curtains at slack high tide, and removing them gradually to limit a sudden release of sediments. The Environmental Monitor will work with the contractors to determine the best approach on both shores.

NHDES Watershed Comment 4. Comments from the fishery agencies (NH Fish and Game Department and the National Marine Fisheries Services) regarding the proposed submarine cable crossing under Little Bay including the proposed timing of the project and if measures should be taken (such as installation of a screen on the intake pipe) to minimize impingement and entrainment of aquatic organisms due to withdrawal of estuarine water through the jet plow intake pipe.

Response: Ms. Cheri Patterson from NH Fish and Game Department (NHFG) has commented on the Best Management Practices for Construction document, which addresses time-of-year restrictions for Little Bay construction, and stated she has no concerns for the work (email dated August 25, 2017, Document 10). Mr. Michael Johnson (NOAA Fisheries) has requested some revisions to the Essential Fish Habitat report, and has yet to comment on the timing of the project relative to fish species in Little Bay.

The original impact assessment describes the relatively minor volume of the water needed for pumping is, relative to Little Bay, – on the order of 0.2% of upper Little Bay for the three cables combined (Natural Resources Impact Assessment, Appendix 34, Section 5.5). While early lifestages of a number of molluscan shellfish, crustacean and fish species may be present during installation and may be subject to entrainment, egg and larval abundances of these species are typically lower during September and October than during other parts of the year (Jury et al. 1994), therefore minimizing impacts. Durocher Marine uses a ¼-inch screen to prevent large debris from getting pulled into the pump. A finer screening system is not feasible for this project, as it is large in size and needs a minimum of 5 feet of water depth to operate. There is insufficient water depth on the tidal flats for a portion of the crossing, and Durocher is concerned of the risk of cavitation adversely affecting the pumps feeding the water jets.

Literature Cited

ESS Group and Hodge.WaterResources. 2013. Modeling of Sediment Dispersion during Installation of the Submarine Cable for the Poseidon Project. Prepared for Poseidon Transmission 1, LLC.

Hodge.WaterResources. 2016 Sediment Dispersion and Deposition Modeling Study for Vermont Green Line Submarine Cable Route. Prepared for TRC Environmental Corporation. Prepared by Hodge.WaterResources LLC, Brighton, MA.

Jury, S.H., J.D. Field, S.L. Stone, D.M. Nelson, and M.E. Monaco. 1994. Distribution and abundance of fishes and invertebrates in North Atlantic estuaries. ELMR Rep. No. 13. NOAA/NOS Strategic Environmental Assessments Division, Silver Spring MD. 221 p.

Woods Hole Group. 2013. Sediment Transport Analysis for the Virginia Offshore Wind Technology Advancement Project. Prepared for Tetra Tech, Inc. Prepared by Woods Hole Group, Inc, East Falmouth, MA.

ES VER: 11/2015

F107 PLAN AND PROFILE LEGEND:

- FENCE
- STONEWALL
- LIMITS OF WET
- EDGE OF WET DELINEATION
- TOPOGRAPHICAL CONTOURS WITH 10' INTERVALS
- TOPOGRAPHICAL CONTOURS WITH 2' INTERVALS
- UNDERGROUND WATER LINE
- UNDERGROUND GAS LINE
- RIGHT OF WAY LINE
- RAILROAD RIGHT OF WAY LINE
- DENOTES TAX MAP BOUNDARY LINE
- DENOTES LINE COUNTERPOISE
- BUILDINGS
- FEE PROPERTY
- FOS1 — FIBER OPTIC SPLICE LOCATION
- #1(#2) — F107 STRUCTURE (CONSTRUCTION STR NO. (PERMIT STR NO.))
- #1(#2) — F107 STRUCTURE IN WET (CONSTRUCTION STR NO. (PERMIT STR NO.))
- #1(#2) — F107 STRUCTURE WITH CONCRETE FOUNDATION (CONSTRUCTION STR NO. (PERMIT STR NO.))
- #1(#2) — F107 STRUCTURE WITH CONCRETE FOUNDATION IN WET (CONSTRUCTION STR NO. (PERMIT STR NO.))

MADBURY S/S
F107 FOS1 STUB
F107 FOS2 STR 2
F107 FOS3 STR 22
F107 FOS4 STR 23
F107 FOS5 STR 31
F107 FOS6 STR 48
F107 FOS7 STR 66

Durham
Spruce Hole
Corners
Randall Cem
Durham Cem
Demeritt Cem
Gluke Cem
Griffiths Cem
Jenkins Cem
Hampshire-Main Campus
Univ of New

Beech Hill
Demeritt Hill
Reservoir Hill

Durham Reservoir
Oyster River Reservoir
Oyster River
Littleholt Cr.
Beards Cr.
Johnson Cr.
Gerrish Brook
Hoyt Pond
Johnson Creek
Colleet Brook
Reservoir Brook
La Roche Brook
Woodman Brook
Beaudette Brook
Royalls Cove

TURTLE POND RD
RANDALL RD
SHERBURNE RD
TECHNOLOGY DR
RT-155A
GARRITY RD
MAST RD
N RD
SPINNEY LN
BEECH HILL RD
MADBURY RD
EVANS RD
PERKINS RD
PUDDING HILL RD
GARRISON LN
DURHAM RD
MESERVE RD
FRESHET RD
BACK RIVER LN
GARRISON RD
RIVERDALE AVE
SPRUCE LN
SPRUCE LN EXT
PISCATAQUA RD
DREW RD
BUNKER LN
JENKINS RD
OLD GARRISON RD
BAYVIEW RD
WATSON RD
BACK RIVER RD
CEDARPOINT RD
SHEARWATER ST
RIVERVIEW RD
MAIN ST
EDGEWOOD RD
STRAFFORD AVE
GARRISON AVE
ACADEMIC WAY
MCDANIEL DR
COE DR
DOVER RD
EMERSON RD
BUCKS HILL RD
SUMAC LN
CANNEY RD
BAGDAD RD
WOODRIDGE RD
MILL RD
GARDEN LN
ORCHARD DR
MILL POND RD
NEWMARKET RD
PACKERS FALLS RD
GRIFFITHS DR
BAY RD
PINECREST LN
DENBOW RD
SANDY BROOK DR
DEER MEADOW RD
ACKERS FALLS RD

10 20 40 60 70

MATCH LINE SEE F10743101 (2 OF 2)

LEGEND:

- F107 LINE
- 10 — F107 CONSTRUCTION STRUCTURE NUMBER REFERENCE MILESHEETS FOR CORRESPONDING PERMITTING STRUCTURE NUMBERS
- INDICATES APPROXIMATE LIMITS OF SUBSTATION
- FOS1 — INDICATES FIBER OPTIC SPLICE LOCATION

1000 500 0 1000 2000 3000
GRAPHIC SCALE
1" = 1000'

NO.	ISSUED FOR	SEC AMENDMENT	DES	CHK	APV	DATE
D	ISSUED FOR	SEC AMENDMENT	SCF	KMS	APJ	8/30/17
C	ISSUED FOR	BID W/# T127681	SCF	KMS	APJ	6/29/17
B	ISSUED FOR	100% REVIEW W/# T127681	SCF	KMS	APJ	4/27/17
A	ISSUED FOR	PDR REVIEW W/# T127681	SCF	KMS	APJ	1/20/16

EVERSOURCE ENERGY

T D

MADBURY S/S TO PORTSMOUTH S/S
115kV TRANSMISSION LINE
KEYSHEET

DATE: 07/29/16
SCALE: 1"=1000'

DES: EDR | CHK: KMS
DRW: SCF | APR: APJ

TOWN: MADBURY, DURHAM, NEWINGTON, PORTSMOUTH

TRANSMISSION LINE: F107

MILE NO:

DISCIPLINE/SHT NO.

SHEET 1 OF 2

F10743101

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MATCH LINE SEE F10743101 (1 OF 2)

LEGEND:

- F107 LINE
- 10 — F107 CONSTRUCTION STRUCTURE NUMBER
  REFERENCE MILESHEETS FOR CORRESPONDING PERMITTING STRUCTURE NUMBERS
- INDICATES APPROXIMATE LIMITS OF SUBSTATION
- FOS1 — INDICATES FIBER OPTIC SPLICE LOCATION

GRAPHIC SCALE
1" = 1000'

D	ISSUED FOR SEC AMENDMENT	8/30/17	SCF	APJ
C	ISSUED FOR BID W/# T12766A1	6/29/17	SCF	KMS
B	ISSUED FOR 100% REVIEW W/# T12766A1	4/27/17	SCF	APJ
A	ISSUED FOR 90% REVIEW W/# T12766A1	1/30/17	SCF	APJ
NO		DATE	DRWN	CHKD

EVERSOURCE ENERGY

MADBURY S/S TO PORTSMOUTH S/S
115kV TRANSMISSION LINE
KEYSHEET

DATE: 07/26/16
SCALE: 1"=1000'

DES: EDR | CHK: KMS
DRW: SCF | APR: APJ
TOWN: MADBURY, DURHAM, NEWINGTON, PORTSMOUTH
TRANSMISSION LINE: F107
MILE NO:
DISCIPLINE/SHT NO.
SHEET 2 OF 2
F10743101

ES VER: 11/2015

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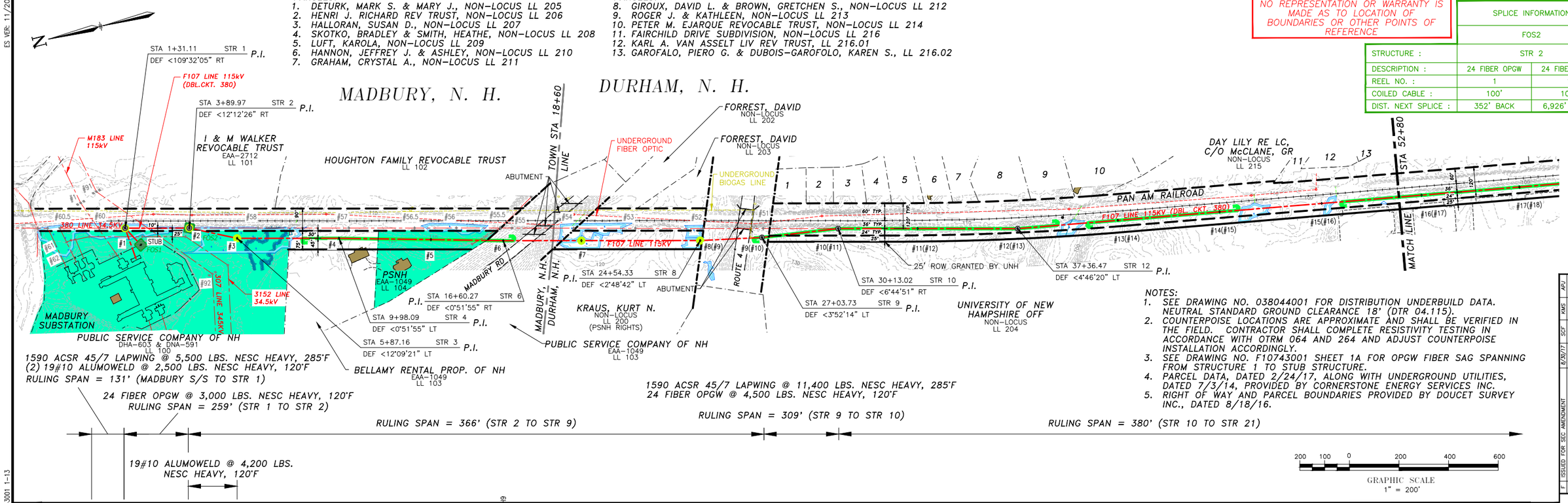
ES VER: 11/2015

PARCELS:
1. DETURK, MARK S. & MARY J., NON-LOCUS LL 205
2. HENRI J. RICHARD REV TRUST, NON-LOCUS LL 206
3. HALLORAN, SUSAN D., NON-LOCUS LL 207
4. SKOTKO, BRADLEY & SMITH, HEATHE, NON-LOCUS LL 208
5. LUFT, KAROLA, NON-LOCUS LL 209
6. HANNON, JEFFREY J. & ASHLEY, NON-LOCUS LL 210
7. GRAHAM, CRYSTAL A., NON-LOCUS LL 211

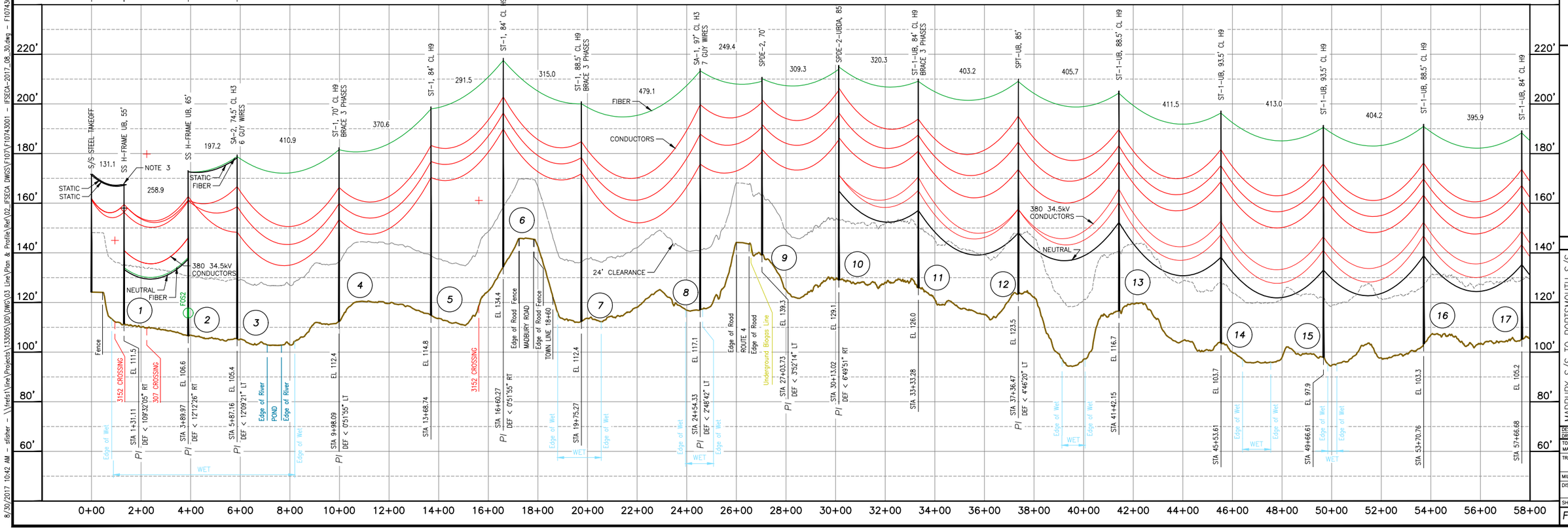
PARCELS:
8. GIROUX, DAVID L. & BROWN, GRETCHEN S., NON-LOCUS LL 212
9. ROGER J. & KATHLEEN, NON-LOCUS LL 213
10. PETER M. EJARQUE REVOCABLE TRUST, NON-LOCUS LL 214
11. FAIRCHILD DRIVE SUBDIVISION, NON-LOCUS LL 216
12. KARL A. VAN ASSELT LIV REV TRUST, LL 216.01
13. GAROFALO, PIERO G. & DUBOIS-GAROFOLO, KAREN S., LL 216.02

THIS PLAN FOR REFERENCE ONLY. NO REPRESENTATION OR WARRANTY IS MADE AS TO LOCATION OF BOUNDARIES OR OTHER POINTS OF REFERENCE

SPLICE INFORMATION		
	FOS2	
STRUCTURE :	STR 2	
DESCRIPTION :	24 FIBER OPGW	24 FIBER OPGW
REEL NO. :	1	1
COILED CABLE :	100'	100'
DIST. NEXT SPLICE :	352' BACK	6,926' AHEAD



NOTES:
1. SEE DRAWING NO. 038044001 FOR DISTRIBUTION UNDERBUILD DATA. NEUTRAL STANDARD GROUND CLEARANCE 18' (DTR 04.115).
2. COUNTERPOISE LOCATIONS ARE APPROXIMATE AND SHALL BE VERIFIED IN THE FIELD. CONTRACTOR SHALL COMPLETE RESISTIVITY TESTING IN ACCORDANCE WITH OTRM 064 AND 264 AND ADJUST COUNTERPOISE INSTALLATION ACCORDINGLY.
3. SEE DRAWING NO. F10743001 SHEET 1A FOR OPGW FIBER SAG SPANNING FROM STRUCTURE 1 TO STUB STRUCTURE.
4. PARCEL DATA, DATED 2/24/17, ALONG WITH UNDERGROUND UTILITIES, DATED 7/3/14, PROVIDED BY CORNERSTONE ENERGY SERVICES INC.
5. RIGHT OF WAY AND PARCEL BOUNDARIES PROVIDED BY DOUCET SURVEY INC., DATED 8/18/16.



NO.	REVISION	DRWN	CHKD	APPRV.	DATE
F	ISSUED FOR SEC AMENDMENT	SCF	KMS	APJ	8/30/17
E	ISSUED FOR BID WO# T127641	SCF	KMS	APJ	6/29/17
D	ISSUED FOR 100% REVIEW WO# T127641	SCF	KMS	APJ	4/27/17
C	ISSUED FOR SEC AMENDMENT	SCF	KMS	APJ	03/15/17
B	ISSUED FOR 90% REVIEW WO# T127641	SCF	KMS	APJ	01/10/17
A	ISSUED FOR REVIEW	SCF	KMS	APJ	12/08/16

FIBER OPTIC CABLE: 24 FIBER OPGW (SHIELD WIRE)
CONDUCTOR: 1590 ACSR 45/7 LAPWING (115kV)
GROUND OR NEUTRAL: 19#10 ALUMOWELD

EVERSOURCE ENERGY

T F

MADBURY S/S TO PORTSMOUTH S/S
115kV TRANSMISSION LINE
MILE SHEET

DATE: 08/03/2016
SCALE: H: 1"=200', V: 1"=20'
DES: EDR CHK: KMS
DRW: SCF APR: APJ
TOWN: MADBURY, DURHAM
TRANSMISSION LINE: F107
MILE NO: 1
DISCIPLINE/SHT NO.
SHEET 1 OF 13
F10743001

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ES VER: 11/2015

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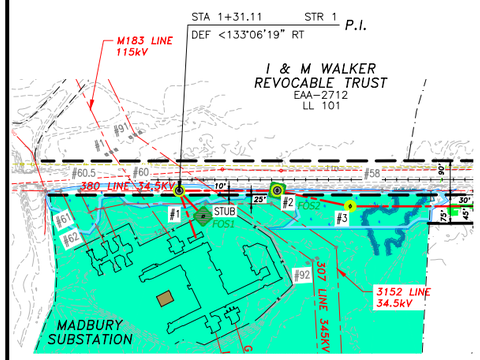
SPLICE INFORMATION		
	FOS1	
STRUCTURE :	STUB	
DESCRIPTION :	ADSS TO CH	24 FIBER OPGW
REEL NO. :	ADSS 1	1
COILED CABLE :	0'	100'
DIST. NEXT SPLICE :	450' BACK	352' AHEAD

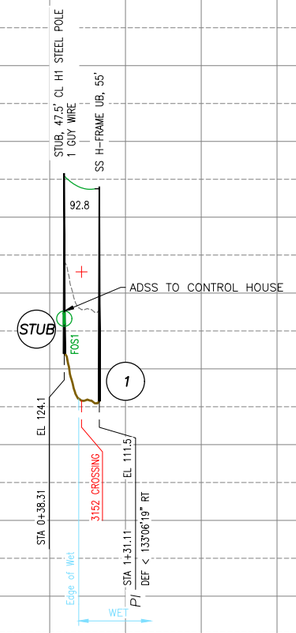
MADBURY, N. H.



PUBLIC SERVICE COMPANY OF NH
DHA-603 & DNA-591
LL 100

24 FIBER OPGW @ 1,000 LBS.
NESC HEAVY, 120°F

GRAPHIC SCALE
200 100 0 200 400 600
1" = 200'



NO.	REVISION	DATE	DRWN	CHKD	APPRV.
E	ISSUED FOR SEC AMENDMENT	8/30/17	SCF	KMS	APJ
D	ISSUED FOR BID WO# T127641	6/29/17	SCF	KMS	APJ
C	ISSUED FOR 100% REVIEW WO# T127641	4/27/17	SCF	KMS	APJ
B	ISSUED FOR SEC AMENDMENT WO# T127641	07/10/17	SCF	KMS	APJ
A	ISSUED FOR 100% REVIEW WO# T127641	11/30/16	SCF	KMS	APJ

FIBER OPTIC CABLE 24 FIBER OPGW (SHIELD WIRE)
CONDUCTOR
CONDUCTOR
GROUND OR NEUTRAL

EVERSOURCE ENERGY

T E

MADBURY S/S TO PORTSMOUTH S/S
115kV TRANSMISSION LINE
MILE SHEET

DATE: 08/03/2016
SCALE: H 1"=200', V 1"=20'

DES: EDR CHK: KMS
DRW: SCF APR: APJ
TOWN: MADBURY, DURHAM
TRANSMISSION LINE: F107
MILE NO: 1
DISCIPLINE/SHT NO.
SHEET 1A OF 13
F10743001

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ES VER: 11/2015

DURHAM, N. H.

NOTES:
1. SEE DRAWING NO. 038044001 FOR DISTRIBUTION UNDERBUILD DATA. NEUTRAL STANDARD GROUND CLEARANCE 18' (DTR 04.115).
2. SEE DRAWING NO. F10743002 FOR UNDERGROUND PORTION.
3. COUNTERPOISE LOCATIONS ARE APPROXIMATE AND SHALL BE VERIFIED IN THE FIELD. CONTRACTOR SHALL COMPLETE RESISTIVITY TESTING IN ACCORDANCE WITH OTRM 064 AND 264 AND ADJUST COUNTERPOISE INSTALLATION ACCORDINGLY.
4. UNDERGROUND POWER CABLE TO BE INSTALLED AND TERMINATED BY CABLE SUPPLIER. OVERHEAD LINE CONTRACTOR SHALL INSTALL CONNECTION FROM OVERHEAD LINE TO UNDERGROUND TERMINATION. UNDERGROUND FIBER CABLE TO BE INSTALLED BY UNDERGROUND CABLE SUPPLIER. OVERHEAD LINE CONTRACTOR RESPONSIBLE FOR SPLICING UNDERGROUND FIBER OPTIC CABLE TO ABOVE GROUND CABLE.
5. PARCEL DATA, DATED 2/24/17, ALONG WITH UNDERGROUND UTILITIES, DATED 7/3/14, PROVIDED BY CORNERSTONE ENERGY SERVICES INC.
6. RIGHT OF WAY AND PARCEL BOUNDARIES PROVIDED BY DOUCET SURVEY INC., DATED 8/18/16.

THIS PLAN FOR REFERENCE ONLY. NO REPRESENTATION OR WARRANTY IS MADE AS TO LOCATION OF BOUNDARIES OR OTHER POINTS OF REFERENCE

SPLICE INFORMATION	FOS3	
STRUCTURE :	STR 22	
DESCRIPTION :	24 FIBER OPGW	24 F UG FIBER OPTIC CABLE
REEL NO. :	1	UG
COILED CABLE :	100'	100'
DIST. NEXT SPLICE :	6,926' BACK	2,090' AHEAD

SPLICE INFORMATION	FOS4	
STRUCTURE :	STR 23	
DESCRIPTION :	24 F UG FIBER OPTIC CABLE	24 FIBER OPGW
REEL NO. :	UG	1
COILED CABLE :	100'	100'
DIST. NEXT SPLICE :	2,090' BACK	2,438' AHEAD

200 100 0 200 400 600
GRAPHIC SCALE
1" = 200'

FAIRCHILD DRIVE SUBDIVISION NON-LOCUS LL 216
TOWN OF DURHAM FDA-402 LL 218
DURHAM SEWER LINE
UNDERGROUND UNH WATER LINE
UNIVERSITY OF NEW HAMPSHIRE OFF NON-LOCUS LL 217
UNIVERSITY OF NEW HAMPSHIRE OFF NON-LOCUS LL 220
TOWN OF DURHAM FDA-402 LL 219
UNIVERSITY OF NEW HAMPSHIRE OFF LL 221.01
PAN AM RAILROAD
380 LINE 34.5kV
F107 LINE 115kV (DBL. CKT. 380)
STA 52+80
STA 105+60
MATCH LINE
GABLES WAY
P.I. STA 71+44.38 STR 21 DEF <19°57'31" RT
FOS3
UNH CIRCUIT 16
380X1 TAP
MAIN ST
PARKING LOT
COVOLOS RD
UNDERGROUND F107 LINE 115kV SEE NOTE 2
WATERWORKS RD
F107 LINE 115kV
FOS4
SOUTH DR
P.I. STA 104+15.80 STR 26 DEF <9°05'51" RT
P.I. STA 97+37.57 STR 24 DEF <5°13'51" RT
OYSTER RIVER
UNIVERSITY OF NEW HAMPSHIRE OFF NON-LOCUS LL 204
UNIVERSITY OF NEW HAMPSHIRE OFF EAA-10529 & EAA-10530 LL 221

1590 ACSR 45/7 LAPWING @ 11,400 LBS. NESC HEAVY, 285'F
24 FIBER OPGW @ 4,500 LBS. NESC HEAVY, 120'F

19#10 ALUMOWELD @ 4,200 LBS. NESC HEAVY, 120'F

RULING SPAN = 380' (STR 10 TO STR 21)
RULING SPAN = 170' (STR 21 TO STR 22)
RULING SPAN = 331' (STR 23 TO STR 24)
RULING SPAN = 392' (STR 24 TO STR 28)

ST-1-UB, 88.5' CL H9 — 404.2
ST-1-UB, 84' CL H9 — 395.9
ST-1-UB, 84' CL H9 — 325.7
ST-1-UB, 84' CL H9 — 356.9
ST-1-UB, 84' CL H9 — 362.4
ST-1-UB, 84' CL H9 — 332.6
SPDE-DAUB, 90' — 170.6
SPDE-RISER, 80'
SEE NOTE 2
SPDE-RISER, 80'
SPDE-DAUB, 95' — 331.6
ST-1-UB, 84' CL H9 BRACE 3 PHASES — 380.4
SA-2-UB, 83.5' CL H3 S 6OUT WIRES — 297.8
ST-1-UB, 93.5' CL H9 BRACE 3 PHASES — 268.4
495.1
FIBER
CONDUCTORS
STATIC FIBER
380 34.5kV CONDUCTORS
NEUTRAL
24' CLEARANCE
Edge of Wet
WET
UG Water Line
Sewer Line
Underground Water Line
Edge of Parking
PARKING LOT
DISTR CROSSING
Edge Of PARKING LOT

STA 53+70.76 EL 103.3
STA 57+66.68 EL 105.2
STA 60+92.38 EL 92.6
STA 64+49.31 EL 85.3
STA 68+11.75 EL 77.6
STA 71+44.38 DEF < 19°57'31" RT EL 77.8
STA 73+15.00 EL 81.0
STA 94+05.44 EL 58.6
STA 97+37.01 DEF < 5°13'51" RT EL 59.3
STA 101+17.41 EL 76.8
STA 104+15.24 DEF < 9°05'51" RT EL 83.8
STA 106+83.65 EL 66.7

16 17 18 19 20 21 22 23 24 25 26 27

50+00 52+00 54+00 56+00 58+00 60+00 62+00 64+00 66+00 68+00 70+00 72+00 74+00 76+00 78+00 80+00 82+00 84+00 86+00 88+00 90+00 92+00 94+00 96+00 98+00 100+00 102+00 104+00 106+00 108+00 110+00

NO.	REVISION	DRWN	APPRV.	DATE
F	ISSUED FOR SEC AMENDMENT	SCF	KMS	8/30/17
E	ISSUED FOR BID WO# T127641	SCF	KMS	6/29/17
D	ISSUED FOR 100% REVIEW WO# T127641	SCF	KMS	4/27/17
C	ISSUED FOR SEC AMENDMENT	SCF	KMS	03/15/17
B	ISSUED FOR 90% REVIEW WO# T127641	SCF	KMS	01/10/17
A	ISSUED FOR 30% REVIEW WO# T127641	SCF	KMS	11/7/16

FIBER OPTIC CABLE	24 FIBER OPGW (SHIELD WIRE)
CONDUCTOR	1590 ACSR 45/7 LAPWING (115kV)
GROUND OR NEUTRAL	19#10 ALUMOWELD

EVERSOURCE ENERGY

MADBURY S/S TO PORTSMOUTH S/S
115kV TRANSMISSION LINE
MILE SHEET

DATE: 09/03/2016
SCALE: H: 1"=200', V: 1"=20'
DES: EDR CHK: KMS
DRW: SCF APR: APJ
TOWN: DURHAM
TRANSMISSION LINE: F107
MILE NO: 2
DISCIPLINE/SHT NO.
SHEET 2 OF 13
F10743001

8/30/2017 10:42 AM – sfisher – \\Vefs1\Vine\Projects\133065\020\DWG\03 Line\Plan & Profile\Rev\A\02_PSECA_DWGS\F107\F10743001 – PSECA-2017_08_30.dwg – F10743001 2-13

ES VER: 11/2015

THIS PLAN FOR REFERENCE ONLY. NO REPRESENTATION OR WARRANTY IS MADE AS TO LOCATION OF BOUNDARIES OR OTHER POINTS OF REFERENCE

SPLICE INFORMATION		
	FOS5	
STRUCTURE :	STR 31	
DESCRIPTION :	24 FIBER OPGW	24 FIBER OPGW
REEL NO. :	1	2
COILED CABLE :	100'	100'
DIST. NEXT SPLICE :	2,438' BACK	6,903' AHEAD

DURHAM, N. H.

N

P.I. STA 120+20.60 STR 32 DEF <52°14'07" RT

TENPAS, TIMOTHY LL 226.01

TOWN OF DURHAM EAN-265 LL 224

PUBLIC SERVICE OF NEW HAMPSHIRE DDN-8, DDN-9, DDN-10 LL 233

PEACE, SUSAN EAN-265 LL 226

UNIVERSITY OF NEW HAMPSHIRE EAA-10530 LL 222

UNIVERSITY OF NEW HAMPSHIRE LL 221.01

UNIVERSITY OF NEW HAMPSHIRE EAN-266 LL 227

TOWN OF DURHAM D-E2903 LL 228

DURHAM S/S (PROPOSED TO BE REMOVED BY OTHERS)

MILL RD

F107 LINE 115kV (DBL. CKT. 380)

SCHLIE, PAUL & ROBYN EAN-533 LL 229

JUSTICE, DAVID G. NON-LOCUS LL 230

UNIVERSITY OF NEW HAMPSHIRE EAN-539 LL 231

P.I. STA 157+91.35 STR 41 DEF <9°37'27" LT

STA 158+40

P.I. STA 116+64.86 STR 30 DEF <66°06'24" RT

P.I. STA 114+35.22 STR 29 DEF <55°57'12" LT

STA 105+60

PAN AM RAILROAD

FOS5

380 LINE 34.5kV
F107 LINE 115kV
380 LINE 34.5kV

OYSTER RIVER

PUBLIC SERVICE OF NEW HAMPSHIRE DDN-11 LL 225

P.I. STA 118+44.27 STR 31 DEF <50°34'22" LT

UNIVERSITY OF NEW HAMPSHIRE LL 221.07

P.I. STA 141+40.44 STR 37 DEF <9°45'13" LT

JAMES O. HORRIGAN FAMILY TRUST LL 221.08

MATCH LINE

P.I. STA 111+79.26 STR 28 DEF <16°15'49" LT

MATCH LINE

GRAPHIC SCALE 1" = 200'

1590 ACSR 45/7 LAPWING @ 11,400 LBS. NESC HEAVY, 285'F
24 FIBER OPGW @ 4,500 LBS. NESC HEAVY, 120'F

RULING SPAN = 392' (STR 24 TO STR 28)

RULING SPAN = 256' (STR 28 TO STR 29)

RULING SPAN = 230' (STR 29 TO STR 30)

RULING SPAN = 179' (STR 30 TO STR 31)

RULING SPAN = 176' (STR 31 TO STR 32)

RULING SPAN = 442' (STR 32 TO STR 48)

SA-2-UB, 83.5' CL H3 5 GUY WIRES | ST-1-UB, 93.5' CL H9 BRACE 3 PHASES | SPDE-DAUB, 90' | SPDE-DAUB, 100' | SPDE-DAUB, 80' | SPDE-DAUB, 100' | ST-1-UB, 93.5' CL H9 | ST-1-UB, 88.5' CL H9 | SA-2-UB, 83.5' CL H3 5 GUY WIRES | ST-1-UB, 98' CL H9 | ST-1-UB, 93.5' CL H9 BRACE 3 PHASES | SA-2-UB, 79' CL H3 5 GUY WIRES

297.8 | 268.4 | 495.1 | 256.0 | 229.6 | 179.4 | 176.3 | 377.5 | 408.1 | 517.0 | 387.4 | 429.8 | 427.5 | 515.3 | 418.1 | 290.0 | 449.7

FIBER
CONDUCTORS
380 STR.
380 STR.
380 34.5kV CONDUCTORS
NEUTRAL
24' CLEARANCE
380 34.5kV CONDUCTORS
FOS5

26 27 28 29 30 31 32 33 34 35 36 37 38 39 40 41

Underground Water Line
STA 104+15.24 DEF < 9°05'51" RT EL 83.8
EL 66.7
STA 106+83.65
Edge of Wet
Edge of River
OYSTER RIVER
Edge of River
STA 111+78.70 DEF < 16°15'49" LT EL 34.2
STA 114+34.66 DEF < 55°57'12" LT EL 64.1
PAN AM RAILROAD
STA 116+64.30 DEF < 66°06'24" RT EL 68.8
Edge of Road
DIRT ROAD
STA 118+43.71 DEF < 50°34'22" LT EL 77.9
Edge of Road EL 73.3
STA 120+20.04 DEF < 52°14'07" RT
Fence
Edge of Road
MILL ROAD
Edge of Road
Fence
DIST. CROSSING
STA 123+97.57 EL 83.9
STA 128+05.66 EL 83.1
STA 133+22.61 EL 81.2
STONE WALL EL 87.3
STA 137+10.04
STA 141+39.88 DEF < 9°45'13" LT EL 99.7
STA 145+67.43 EL 92.9
STA 150+82.75 EL 75.8
STA 155+00.83 EL 70.3
STA 157+90.79 DEF < 9°37'27" LT EL 83.5
WET

180' 160' 140' 120' 100' 80' 60' 40' 20' 0'

102+00 104+00 106+00 108+00 110+00 112+00 114+00 116+00 118+00 120+00 122+00 124+00 126+00 128+00 130+00 132+00 134+00 136+00 138+00 140+00 142+00 144+00 146+00 148+00 150+00 152+00 154+00 156+00 158+00 160+00 162+00

NOTES:
1. SEE DRAWING NO. 038044001 FOR DISTRIBUTION UNDERBUILD DATA. NEUTRAL STANDARD GROUND CLEARANCE 18' (DTR 04.115).
2. COUNTERPOISE LOCATIONS ARE APPROXIMATE AND SHALL BE VERIFIED IN THE FIELD. CONTRACTOR SHALL COMPLETE RESISTIVITY TESTING IN ACCORDANCE WITH OTRM 064 AND 264 AND ADJUST COUNTERPOISE INSTALLATION ACCORDINGLY.
3. PARCEL DATA, DATED 2/24/17, ALONG WITH UNDERGROUND UTILITIES, DATED 7/3/14, PROVIDED BY CORNERSTONE ENERGY SERVICES INC.
4. RIGHT OF WAY AND PARCEL BOUNDARIES PROVIDED BY DOUCET SURVEY INC., DATED 8/18/16.

NO.	DESCRIPTION	DATE	DRWN	CHKD	APPRV.
E	ISSUED FOR SEC AMENDMENT	8/30/17	SCF	KMS	APJ
D	ISSUED FOR BID WO# 1127641	6/29/17	SCF	KMS	APJ
C	ISSUED FOR 100% REVIEW WO# 1127641	4/27/17	SCF	KMS	APJ
B	ISSUED FOR SEC AMENDMENT WO# 1127641	07/10/17	SCF	KMS	APJ
A	ISSUED FOR 100% REVIEW WO# 1127641	03/31/16	SCF	CHKD	APJ

FIBER OPTIC CABLE: 24 FIBER OPGW (SHIELD WIRE)
CONDUCTOR: 1590 ACSR 45/7 LAPWING (115kV)
GROUND OR NEUTRAL:

EVERSOURCE ENERGY

T E

MADBURY S/S TO PORTSMOUTH S/S
115kV TRANSMISSION LINE
MILE SHEET

DATE:06/03/2016

SCALE: H 1"=200', V 1"=20'

DES: EDR CHK:KMS
DRW: SCF APR: APJ

TOWN: DURHAM
TRANSMISSION LINE: F107
MILE NO: 3
DISCIPLINE/SHT NO.
SHEET 3 OF 13
F10743001

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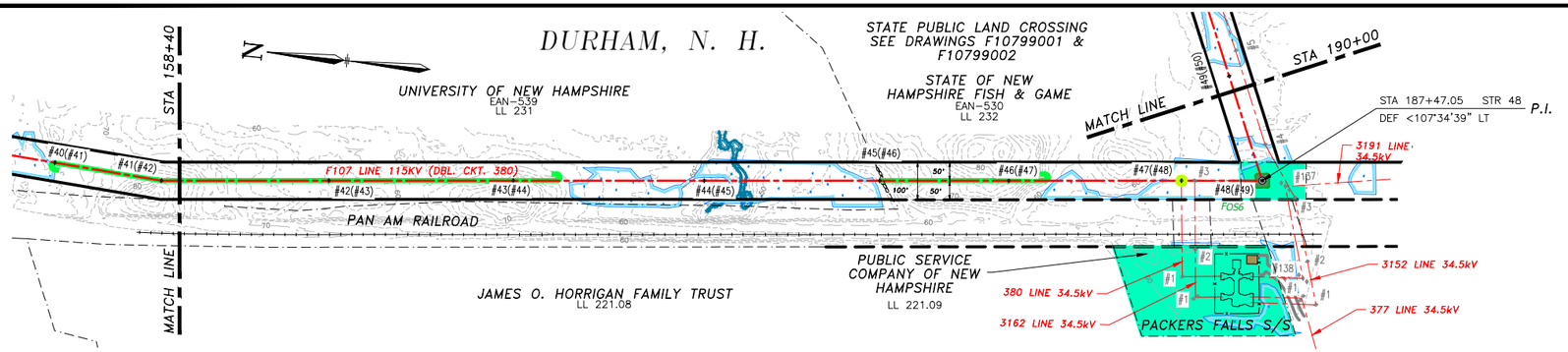
ES VER: 11/2015

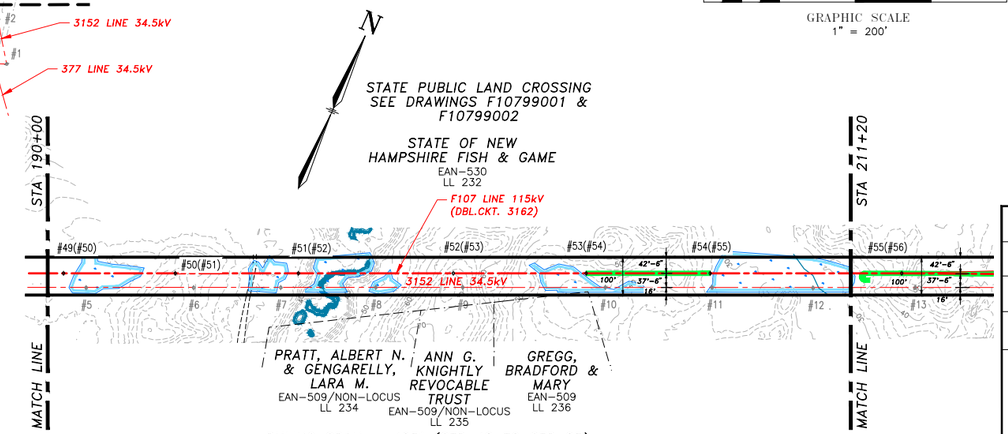
THIS PLAN FOR REFERENCE ONLY. NO REPRESENTATION OR WARRANTY IS MADE AS TO LOCATION OF BOUNDARIES OR OTHER POINTS OF REFERENCE

SPLICE INFORMATION		
	FOS6	
STRUCTURE :	STR 48	
DESCRIPTION :	24 FIBER OPGW	24 FIBER OPGW
REEL NO. :	2	2
COILED CABLE :	100'	100'
DIST. NEXT SPLICE :	6,903' BACK	6,429' AHEAD



200 100 0 200 400 600

GRAPHIC SCALE
1" = 200'

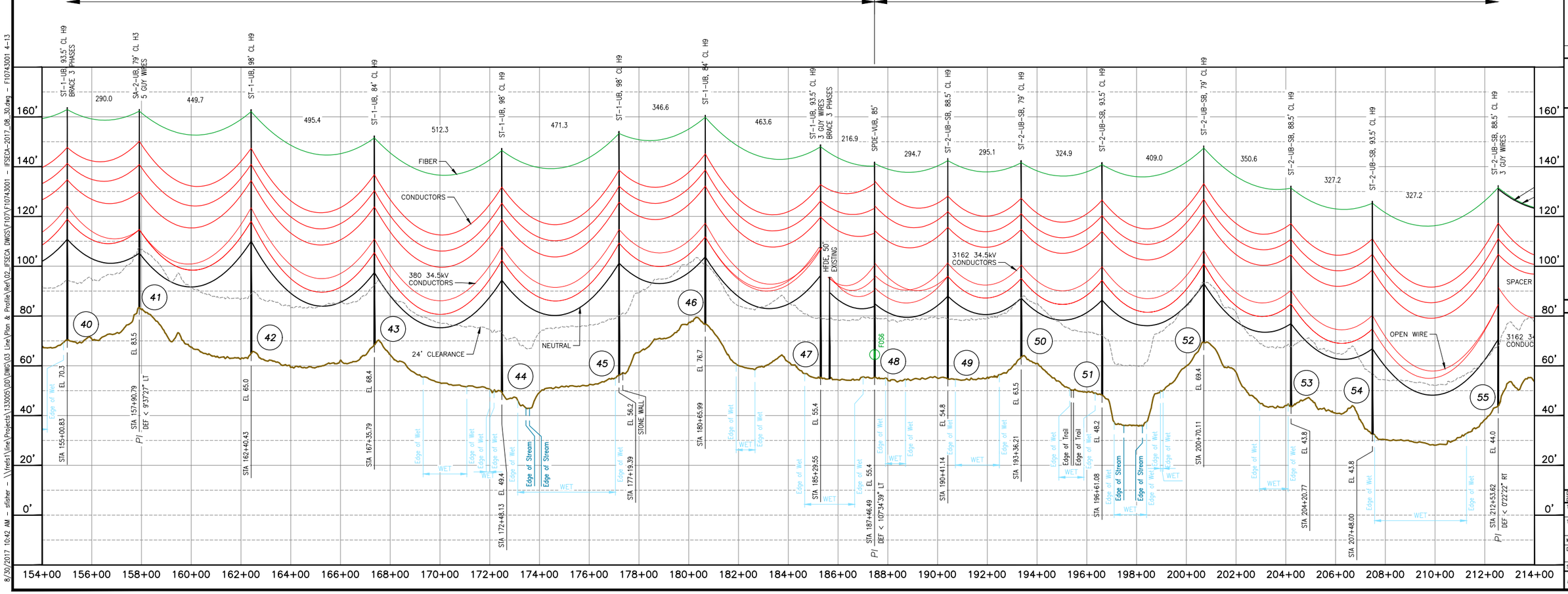


NOTES:
1. *SEE DRAWING NO. 038044001 FOR DISTRIBUTION UNDERBUILD DATA. NEUTRAL STANDARD GROUND CLEARANCE 18'; (DTR 04.115).*
2. *SEE DRAWING NO. 316244001 FOR DISTRIBUTION UNDERBUILD DATA. NEUTRAL STANDARD GROUND CLEARANCE 18'; (DTR 04.115).*
3. *COUNTERPOISE LOCATIONS ARE APPROXIMATE AND SHALL BE VERIFIED IN THE FIELD. CONTRACTOR SHALL COMPLETE RESISTIVITY TESTING IN ACCORDANCE WITH OTRM 064 AND 264 AND ADJUST COUNTERPOISE INSTALLATION ACCORDINGLY.*
4. *PARCEL DATA, DATED 2/24/17, ALONG WITH UNDERGROUND UTILITIES, DATED 7/3/14, PROVIDED BY CORNERSTONE ENERGY SERVICES INC.*
5. *RIGHT OF WAY AND PARCEL BOUNDARIES PROVIDED BY DOUCET SURVEY INC., DATED 8/18/16.*

1590 ACSR 45/7 LAPWING @ 11,400 LBS. NESC HEAVY, 285'F
24 FIBER OPGW @ 4,500 LBS. NESC HEAVY, 120'F

RULING SPAN = 442' (STR 32 TO STR 48)

RULING SPAN = 405' (STR 48 TO STR 85)



NO.	REVISION	DRWN	APPRV.	DATE
E	ISSUED FOR SEC AMENDMENT	SCF	KMS	8/30/17
D	ISSUED FOR BID WO# T127641	SCF	KMS	8/29/17
C	ISSUED FOR 100% REVIEW WO# T127641	SCF	KMS	4/27/17
B	ISSUED FOR SEC AMENDMENT WO# T127641	SCF	KMS	07/10/17
A	ISSUED FOR 100% REVIEW WO# T127641	SCF	KMS	06/30/16

FIBER OPTIC CABLE: 24 FIBER OPGW (SHIELD WIRE)
CONDUCTOR: 1590 ACSR 45/7 LAPWING (115kV)
GROUND OR NEUTRAL:

EVERSOURCE ENERGY

T E

MADBURY S/S TO PORTSMOUTH S/S
115kV TRANSMISSION LINE
MILE SHEET

DATE:08/03/2016

SCALE: H 1"=200', V 1"=20'

DES: EDR CHK:KMS
DRN: SCF APR: APJ
TOWN: DURHAM
TRANSMISSION LINE: F107
MILE NO: 4
DISCIPLINE/SHT NO.
SHEET 4 OF 13
F10743001

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ES VER: 11/2015

DURHAM, N. H.

THIS PLAN FOR REFERENCE ONLY. NO REPRESENTATION OR WARRANTY IS MADE AS TO LOCATION OF BOUNDARIES OR OTHER POINTS OF REFERENCE

SPLICE INFORMATION		
	FOS7	
STRUCTURE :	STR 66	
DESCRIPTION :	24 FIBER OPGW	24 FIBER OPGW
REEL NO. :	2	3
COILED CABLE :	100'	100'
DIST. NEXT SPLICE :	6,429' BACK	14,142' AHEAD

GRAPHIC SCALE
1" = 200'
200 100 0 200 400 600

STATE OF NEW HAMPSHIRE, FISH & GAME EAN–530 LL 232
STA 212+54.18 STR 55 P.I.
DEF <0°22'22" RT
3162 LINE 34.5kV
F107 LINE 115kV
MORIARTY, HEIRS OF BERTHA; C/O EAN–512 LL 237
STATE OF NEW HAMPSHIRE, FISH & GAME EAN–512 LL 238
STA 224+84.59 STR 58 P.I.
DEF <15°19'58" RT
STA 231+41.87 STR 60 P.I.
DEF <2°28'42" RT
PROPOSED SINGLE DISTRIBUTION PHASE TAP
STA 234+88.62 STR 61 P.I.
DEF <2°32'25" LT
STA 239+29.31 STR 62 P.I.
DEF <1°39'19" LT
STA 242+46.99 STR 63 P.I.
DEF <1°43'02" RT
STA 216+35.63 STR 56 P.I.
DEF <0°22'17" LT
STATE PUBLIC LAND CROSSING SEE DRAWINGS F10799001 & F10799002
GARY L. LANSINGER REVOCABLE TRUST DE2903 LL 241
GARY L. LONSINGER REVOCABLE TRUST EAN–517 LL 243
OAKES, GEORGE E. & JULIE P. EAN–517 LL 245
DISTRIBUTION TO BE REMOVED
DISTRIBUTION TO BE REMOVED
LANZER, BRADLEY N. & TONI L. D–E2903 LL 258
BENNETT RD
ROUTE 108/NEWMARKET RD
STATE OF NEW HAMPSHIRE, FISH & GAME LL 520
LONGMARSH RD
ANDERSON, MARK I. & DIANE R. EAN–508 LL 239
SILVA, SEANA M. & VICTOR J. DE2903 LL 242
ANDREWS, MATTHEW C. & LINDA SPRING LL 240.01
TIMBER BROOK LN
GANTZ, BENJAMIN L. & ALEXANDRA EAN–520 LL 240
CALLANDER, PRESTON & RACHEL EAN–517 LL 244
PATRICIA M. FERREL REV LIVING EAN–517 LL 246
BORNSTEIN, STEVEN P. EAN–506 LL 247
CUTTS RD
BIENIEK, RICHARD D. & MARGARET T. EAN–506 LL 249
FROST DR
FITZHENRY, ROBERT & MICHELLE EAN–506 LL 256
DAVID & JANICE KATES FAMILY TRUST D–E2903 LL 257
SANDY BROOK DR
STA 264+00
MATCH LINE
STA 211+20
MATCH LINE
F107 LINE 115kV (DBL. CKT. 3162)
F107 LINE 115kV

PARCELS:
1. CHOUINARD, SAMUEL C., EAN–506 LL 248
2. MCDONOUGH, TIMOTHY P. & ERIN J., LL 248.01
3. KRAUS JR., JOHN D.; KRAUS, JANI, EAN–506 LL 250
4. RUSSELL, BRIAN & WATTS, CHRISTI, LL 250.01
5. FRANCES T. TILLOCK REV TRUST, LL 254.06
6. RAPPOLT, ERIK J. & PAULA M., EAN–506 LL 254
7. ZHOU, ZAIXING & ZHAO, BAORONG, EAN–506 LL 255
8. JENKINS, SCOTT M. & LORIE ANN, LL 254.01

NOTES:
1. SEE DRAWING NO. 316244001 FOR DISTRIBUTION UNDERBUILD DATA. NEUTRAL STANDARD GROUND CLEARANCE 18' (DTR 04.115).
2. COUNTERPOISE LOCATIONS ARE APPROXIMATE AND SHALL BE VERIFIED IN THE FIELD. CONTRACTOR SHALL COMPLETE RESISTIVITY TESTING IN ACCORDANCE WITH OTRM 064 AND 264 AND ADJUST COUNTERPOISE INSTALLATION ACCORDINGLY.
3. PARCEL DATA, DATED 2/24/17, ALONG WITH UNDERGROUND UTILITIES, DATED 7/3/14, PROVIDED BY CORNERSTONE ENERGY SERVICES INC.
4. RIGHT OF WAY AND PARCEL BOUNDARIES PROVIDED BY DOUCET SURVEY INC., DATED 8/18/16.

1590 ACSR 45/7 LAPWING @ 11,400 LBS. NESC HEAVY, 285'F
24 FIBER OPGW @ 4,500 LBS. NESC HEAVY, 120'F
RULING SPAN = 405' (STR 48 TO STR 85)
19#10 ALUMOWELD @ 4,200 LBS. NESC HEAVY, 120'F

24 FIBER OPGW (SHIELD WIRE)	1590 ACSR 45/7 LAPWING (115kV)		
FIBER OPTIC CABLE			
CONDUCTOR			
GROUND OR NEUTRAL	19#10 ALUMOWELD		

NO.	DESCRIPTION	DATE	DRWN	APPRV.
E	ISSUED FOR SEC AMENDMENT	8/30/17	SCF	APJ
D	ISSUED FOR BID WO# 1127641	8/29/17	SCF	APJ
C	ISSUED FOR 100% REVIEW WO# 1127641	4/27/17	SCF	APJ
B	ISSUED FOR SEC AMENDMENT WO# 1127641	07/10/16	SCF	APJ
A	ISSUED FOR 30% REVIEW WO# 1127641	11/10/16	SCF	APJ

EVERSOURCE ENERGY

T E

MADBURY S/S TO PORTSMOUTH S/S
115kV TRANSMISSION LINE
MILE SHEET

DATE:06/03/2016
SCALE: H 1=200', V 1=20'
DES: EDR CHK:KMS
DRW: SCF APR: APJ
TOWN: DURHAM
TRANSMISSION LINE: F107
MILE NO: 5
DISCIPLINE/SHT NO.
SHEET 5 OF 13
F10743001

8/30/2017 10:42 AM – sfisher – \\fnfs1\line\Projects\330050\DWG\03_Line\Plan & Profile\Ver\02_IFSECA DWGS\F107\F10743001 – IFSECA-2017_08_30.dwg – F10743001 5–13

ST-2-UB-SB, 88.5' CL H9, 3 GUY WIRES
SRAX-UB, 74.5' CL H1
SRAX-UB, 65.5' CL H1
TYPE C, 50'
SRAX-UB, 79' CL H1, BRACE 3 PHASES
ST-2-SB, 70' CL H9, 2 GUY WIRES
ST-2-SB, 79' CL H9
ST-1-UB, 88.5' CL H9, 1 GUY WIRE BRACE 3 PHASES
ST-1-UB, 84' CL H9
ST-1-UB, 98' CL H9
ST-1-UB, 103' CL H9
505.6 327.2 381.5 STATIC FIBER 634.2 214.7 264.4 392.9 357.5 440.7 317.7 291.3 235.7 402.0 463.9 486.7 489.6 275.8
OPEN WIRE
SPACER CABLE
3162 34.5kV CONDUCTORS
CONDUCTORS
24" CLEARANCE
NEUTRAL
FOS7
3162 STR.
DISTR CROSSING (TO BE REMOVED)
DISTR CROSSING
Edge of Road
Edge of Driveway
Edge of Stream
Edge of Wet
WET
STONE WALL
ROUTE 108/NEWMARKET RD
TIMBER BROOKE LN
CUTTS ROAD
FROST DRIVE
SANDY BROOK DR
STA 212+53.62 DEF < 0°22'22" RT EL 44.0
STA 216+35.07 DEF < 0°22'17" LT EL 54.5
STA 222+69.22 EL 59.4
STA 224+84.03 DEF < 15°19'58" RT EL 78.7
STA 227+48.41 EL 50.3
STA 231+41.31 DEF < 2°28'42" RT EL 31.7
STA 234+88.06 DEF < 2°32'25" LT EL 41.2
STA 239+28.75 DEF < 1°39'19" LT EL 46.6
STA 242+46.43 DEF < 1°43'02" RT EL 58.6
STA 245+37.77 EL 84.2
STA 247+73.43 EL 86.0
STA 251+75.38 EL 80.8
STA 256+39.26 EL 68.0
STA 261+25.96 EL 45.9
STA 266+15.60 EL 46.3
55 56 57 58 59 60 61 62 63 64 65 66 67 68 69
160' 140' 120' 100' 80' 60' 40' 20' 0'
208+00 210+00 212+00 214+00 216+00 218+00 220+00 222+00 224+00 226+00 228+00 230+00 232+00 234+00 236+00 238+00 240+00 242+00 244+00 246+00 248+00 250+00 252+00 254+00 256+00 258+00 260+00 262+00 264+00 266+00 268+00

ES VER: 11/2015

THIS PLAN FOR REFERENCE ONLY. NO REPRESENTATION OR WARRANTY IS MADE AS TO LOCATION OF BOUNDARIES OR OTHER POINTS OF REFERENCE

N

NOTES:
1. SEE DRAWING NO. 316244001 FOR DISTRIBUTION UNDERBUILD DATA. NEUTRAL STANDARD GROUND CLEARANCE 18' (DTR 04.115).
2. COUNTERPOISE LOCATIONS ARE APPROXIMATE AND SHALL BE VERIFIED IN THE FIELD. CONTRACTOR SHALL COMPLETE RESISTIVITY TESTING IN ACCORDANCE WITH OTRM 064 AND 264 AND ADJUST COUNTERPOISE INSTALLATION ACCORDINGLY.
3. PARCEL DATA, DATED 2/24/17, ALONG WITH UNDERGROUND UTILITIES, DATED 7/3/14, PROVIDED BY CORNERSTONE ENERGY SERVICES INC.
4. RIGHT OF WAY AND PARCEL BOUNDARIES PROVIDED BY DOUCET SURVEY INC., DATED 8/18/16.

DURHAM, N. H.

200 100 0 200 400 600
GRAPHIC SCALE
1" = 200'

STA 264+00 — MATCH LINE

LANZER, BRADLEY M. & TONI L. D-E2903 LL 258
SANDY BROOK DR
LEITZ, STEVEN J. & BETHANY C. EAN-514 LL 260
SANDY BROOK DRIVE COMMON AREA EAN-532, EAN-514, D-E2903 LL 259
BLISS, STUART P. & SUSAN K. D-E2903 LL 261
STATE OF NEW HAMPSHIRE, FISH & GAME EAN-503 LL 263
F107 LINE 115kV (DBL. CKT. 3162)
TOWN OF DURHAM EAN-526 LL 264
HARRIS, NANCY K. M. EAN-526 LL 265
DEVEY, WAYNE A. RUTH EAN-526 LL 266
NATURE CONSERVANCY EAN-436 & EAN-439 LL 267
STA 316+80 — MATCH LINE

#69(#70) #70(#71) #71(#72) #72(#73) #73(#74) #74(#75) #75(#76) #76(#77) #77(#78) #78(#79) #79(#80) #80(#81) #81(#82) #82(#83) #83(#84)
50' 100' 50'

DAVID & JANICE KATES FAMILY TRUST D-E2903 LL 257
SANDY BROOK DR
LUTZE, MANUELA LL 262.01
ACKERMAN, TIMOTHY R. & STAFANIE EAN-532 LL 262
STATE PUBLIC LAND CROSSING
SEE DRAWINGS F10799003 & F10799004
TOWN OF DURHAM EAN-523 LL 281
NATURE CONSERVANCY EAN-436, EAN-437, EAN 439 LL 268

RULING SPAN = 405' (STR 48 TO STR 85)

1590 ACSR 45/7 LAPWING @ 11,400 LBS. NESC HEAVY, 285'F
24 FIBER OPGW @ 4,500 LBS. NESC HEAVY, 120'F

ST-1-UB, 103' CL H9 | 489.6 | 69 | EL 46.3 | STA 266+15.60
ST-1-UB, 98' CL H9 | 275.8 | 70 | EL 49.3 | STA 268+91.44
ST-1-UB, 98' CL H9 | 359.1 | 71 | EL 52.9 | STA 272+50.52
ST-1-UB, 98' CL H9 | 329.9 | 72 | EL 76.0 | STA 275+80.41
ST-1-UB, 88.5' CL H9 | 303.5 | 73 | EL 83.0 | STA 278+83.91
ST-1-UB, 93.5' CL H9 | 355.0 | 74 | EL 80.5 | STA 282+38.95
ST-1-UB, 84' CL H9 | 413.8 | 75 | EL 70.6 | STA 286+52.78
ST-1-UB, 84' CL H9 | 414.6 | 76 | EL 79.0 | STA 290+67.40
ST-1-UB, 84' CL H9 | 369.2 | 77 | EL 78.4 | STA 294+36.56
ST-1-UB, 84' CL H9 | 376.1 | 78 | EL 58.9 | STA 298+12.70
ST-1-UB, 103' CL H9 | 400.6 | 79 | EL 62.4 | STA 302+13.28
ST-1-UB, 103' CL H9 | 419.3 | 80 | EL 81.4 | STA 306+32.60
ST-1-UB, 93.5' CL H9 | 410.1 | 81 | EL 68.1 | STA 310+42.74
ST-1-UB, 98' CL H9 | 405.4 | 82 | EL 44.6 | STA 314+48.16
ST-1-UB, 103' CL H9 | 398.0 | 83 | EL 48.9 | STA 318+46.16
ST-1-UB, 93.5' CL H9 | 416.8

FIBER
CONDUCTORS
3162 34.5kV CONDUCTORS
NEUTRAL
24' CLEARANCE

Edge of Wet, WET, Edge of Road, SANDY BROOK DR, DISTR CROSSING

160' 140' 120' 100' 80' 60' 40' 20' 0'

262+00 264+00 266+00 268+00 270+00 272+00 274+00 276+00 278+00 280+00 282+00 284+00 286+00 288+00 290+00 292+00 294+00 296+00 298+00 300+00 302+00 304+00 306+00 308+00 310+00 312+00 314+00 316+00 318+00 320+00 322+00

NO.	REVISION	DATE	DRAWN	CHKD	APPRV.
E	ISSUED FOR SEC AMENDMENT	8/30/17	SCF	KMS	APJ
D	ISSUED FOR BID WO# T127641	6/12/17	SCF	KMS	APJ
C	ISSUED FOR 100E REVIEW WO# T127641	4/27/17	SCF	KMS	APJ
B	ISSUED FOR SEC AMENDMENT	07/10/17	SCF	KMS	APJ
A	ISSUED FOR 100% REVIEW WO# T127641	11/7/16	SCF	KMS	APJ

FIBER OPTIC CABLE: 24 FIBER OPGW (SHIELD WIRE)
CONDUCTOR: 1590 ACSR 45/7 LAPWING (115kV)
GROUND OR NEUTRAL:

EVERSOURCE ENERGY

T E

MADBURY S/S TO PORTSMOUTH S/S
115kV TRANSMISSION LINE
MILE SHEET

DATE:08/03/2016
SCALE: H 1=200', V 1=20'

DES: EDR CHK:KMS
DRN: SCF APR: APJ
TOWN: DURHAM
TRANSMISSION LINE: F107
MILE NO: 6
DISCIPLINE/SHT NO.
SHEET 6 OF 13
F10743001

8/30/2017 10:42 AM – sfisher – \\fnfs1\Line\Projects\133095\00\DWG\03_Line\Plan & Profile\Ref\02_PSECA_DWGS\F107\F10743001 – PSECA-2017_08_30.dwg – F10743001 6-13

ES VER: 11/2015

DURHAM, N. H.

THIS PLAN FOR REFERENCE ONLY. NO REPRESENTATION OR WARRANTY IS MADE AS TO LOCATION OF BOUNDARIES OR OTHER POINTS OF REFERENCE

NOTES:
1. SEE DRAWING NO. 316244001 FOR DISTRIBUTION UNDERBUILD DATA. NEUTRAL STANDARD GROUND CLEARANCE 18' (DTR 04.115).
2. COUNTERPOISE LOCATIONS ARE APPROXIMATE AND SHALL BE VERIFIED IN THE FIELD. CONTRACTOR SHALL COMPLETE RESISTIVITY TESTING IN ACCORDANCE WITH OTRM 064 AND 264 AND ADJUST COUNTERPOISE INSTALLATION ACCORDINGLY.
3. PARCEL DATA, DATED 2/24/17, ALONG WITH UNDERGROUND UTILITIES, DATED 7/3/14, PROVIDED BY CORNERSTONE ENERGY SERVICES INC.
4. RIGHT OF WAY AND PARCEL BOUNDARIES PROVIDED BY DOUCET SURVEY INC., DATED 8/18/16.

GRAPHIC SCALE
0 0 200 400 600
1" = 200'

NATURE CONSERVANCY
EAN–436 & EAN–439
LL 267

NANCY P. SANDBERG TRUST
EAN–438
LL 269

STA 327+42.08 STR 85 P.I.
DEF <57°33'45" RT

F107 LINE 115kV (DBL. CKT. 3162)

NATURE CONSERVANCY
EAN–436, EAN–437, EAN–439
LL 268

STA 316+80

MATCH LINE

#82(#83) #83(#84) #84(#85) #85(#86) #86(#87) #87(#88) #88(#89) #89(#90) #90(#91) #91(#93) #92(#94) #93(#95) #94(#96)

UNDERGROUND FSW

PRIVATE WATER LINE LOCATION IS SHOWN IN ITS APPROXIMATE LOCATION. CONTRACTOR SHALL ACCURATELY LOCATE THE WATER LINE AND AVOID OR PROTECT IT FROM DAMAGE.

LONGMARSH RD

HEALD McCOSKER, DONNA M.
EAN–521
LL 271

PARKER REV TRUST, ABBIE D.
EAN–521
LL 272

STA 344+28.21 STR 89 P.I.
DEF <1°06'35" LT

3162 LINE 34.5kV

STA 349+44.59 STR 90 P.I.
DEF <1°06'35" RT

F107 LINE 115kV

MOORE SR., KENNETH E.
EAN–515
LL 278

SMITH, NICHOLAS J. & NICOLE S.
EAN–522
LL 273

GSOTTSCHNEIDER FAMILY REVOCABLE
EAN–518
LL 274

DURHAM POINT RD

STA 369+60

JANE K. McDONOUGH REV TRUST
LL 279.02

HOFFMAN, MICHAEL & CHERYL
EAN–518/NON–LOCUS
LL 275

MATCH LINE

PARCELS:
1. COVATIS, NICHOLAS & RIVARD, AMY, EAN–521 LL 270
2. CARDWELL, STEPHEN L. & DEBORAH, LL 270.01
3. MACISSO, JOHN V. & JESSICA L., LL 273.01
4. GANS, LAWRENCE S. & DARRAGN, AN, EAN–519 LL 276

1590 ACSR 45/7 LAPWING @ 11,400 LBS. NESC HEAVY, 285'F
24 FIBER OPGW @ 4,500 LBS. NESC HEAVY, 120'F

RULING SPAN = 405' (STR 48 TO STR 85)

RULING SPAN = 518' (STR 85 TO STR 98)

ST–1–UB, 103' CL H9 | 398.0 | ST–1–UB, 93.5' CL H9 | 416.8 | ST–1–UB, 93.5' CL H9 | 478.5 | SPDE–DAUB, 95' | 450.1 | ST–1–UB, 98' CL H9 | 473.3 | ST–1–UB, 103' CL H9 | 313.3 | ST–1–UB, 103' CL H9 | 516.4 | ST–2–UB–SB, 88.5' CL H9 2 GUY WIRES | 676.1 | ST–2–SB, 84' CL H9 | 494.1 | ST–2–SB, 79' CL H9 | 450.7 | ST–2–SB, 93.5' CL H9 | 493.8 | ST–2–SB, 93.5' CL H9 | 508.7

449.4 FIBER
CONDUCTORS
3162 34.5kV CONDUCTORS
24' CLEARANCE
NEUTRAL

160' 140' 120' 100' 80' 60' 40' 20' 0'

EL 44.6 | STA 314+48.16 | EL 48.9 | STA 318+46.16 | EL 43.8 | STA 322+62.98 | EL 54.1 | STA 327+41.52 DEF < 57°33'45" RT | EL 74.0 | STA 336+64.92 | EL 83.6 | STA 341+14.32 | EL 65.6 | STA 344+27.65 DEF < 1°06'35" LT | EL 60.8 | STA 349+44.03 DEF < 1°06'35" RT | EL 57.8 | STA 356+20.11 | EL 73.7 | STA 361+14.23 | EL 50.9 | STA 365+64.92 | EL 42.0 | STA 370+58.71 DEF < 1°07'35" RT

82 83 84 85 86 87 88 89 90 91 92 93 94

UG Water Line | DISTR CROSSING | Edge of Road | LONGMARSH RD | UG FSW | DURHAM POINT RD | Edge of Wet | WET

314+00 316+00 318+00 320+00 322+00 324+00 326+00 328+00 330+00 332+00 334+00 336+00 338+00 340+00 342+00 344+00 346+00 348+00 350+00 352+00 354+00 356+00 358+00 360+00 362+00 364+00 366+00 368+00 370+00 372+00 374+00

NO.	REVISION	DRWN	APPRV.	DATE
F	ISSUED FOR SEC. AMENDMENT	KMS	APJ	8/30/17
E	ADDED PRIVATE WATER LINE, WO# T127641	KMS	APJ	7/26/17
D	ISSUED FOR BID WO# T127641	KMS	APJ	6/29/17
C	ISSUED FOR 100% REVIEW WO# T127641	KMS	APJ	4/27/17
B	ISSUED FOR SEC. AMENDMENT	KMS	APJ	07/10/17
A	ISSUED FOR 100% REVIEW WO# T127641	KMS	APJ	11/08/16

FIBER OPTIC CABLE: 24 FIBER OPGW (SHIELD WIRE)
CONDUCTOR: 1590 ACSR 45/7 LAPWING (115kV)
GROUND OR NEUTRAL:

EVERSOURCE ENERGY

T F

MADBURY S/S TO PORTSMOUTH S/S
115kV TRANSMISSION LINE
MILE SHEET

DATE: 08/03/2016
SCALE: H: 1"=200', V: 1"=20'

DES: EDR | CHK: KMS
DRW: SCF | APR: APJ

TOWN: DURHAM
TRANSMISSION LINE: F107
MILE NO: 7
DISCIPLINE/SHT NO.
SHEET 7 OF 13
F10743001

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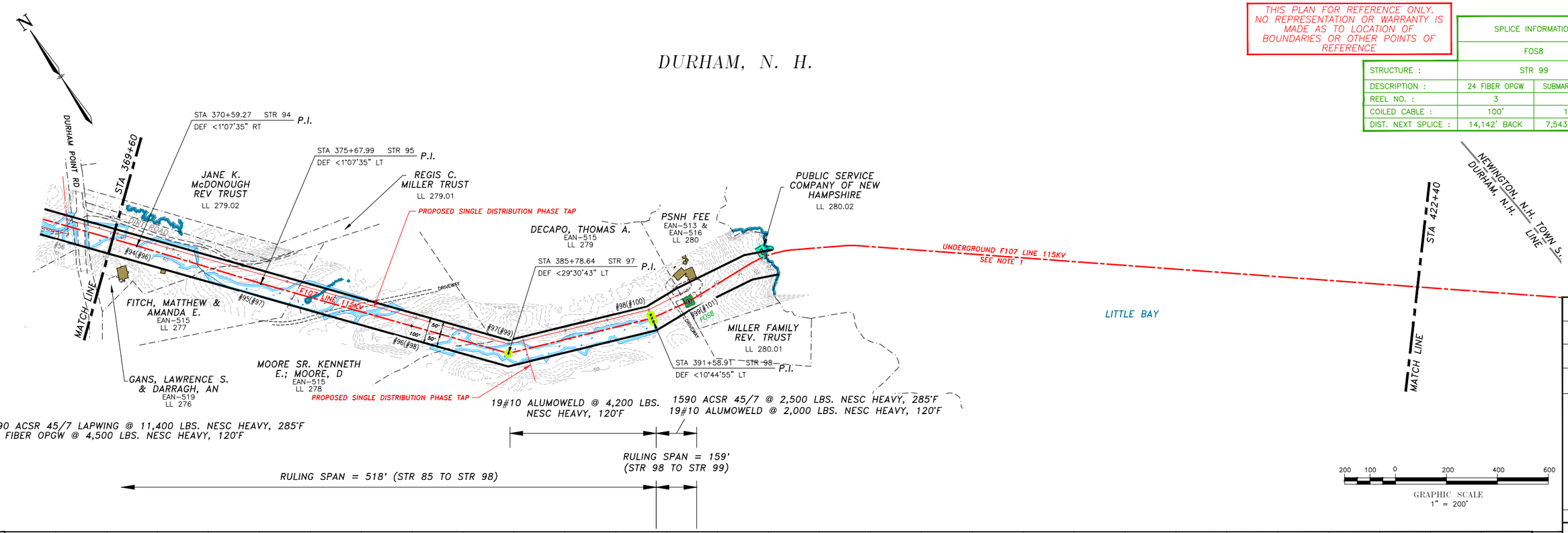
ES VER: 11/2015

DURHAM, N. H.

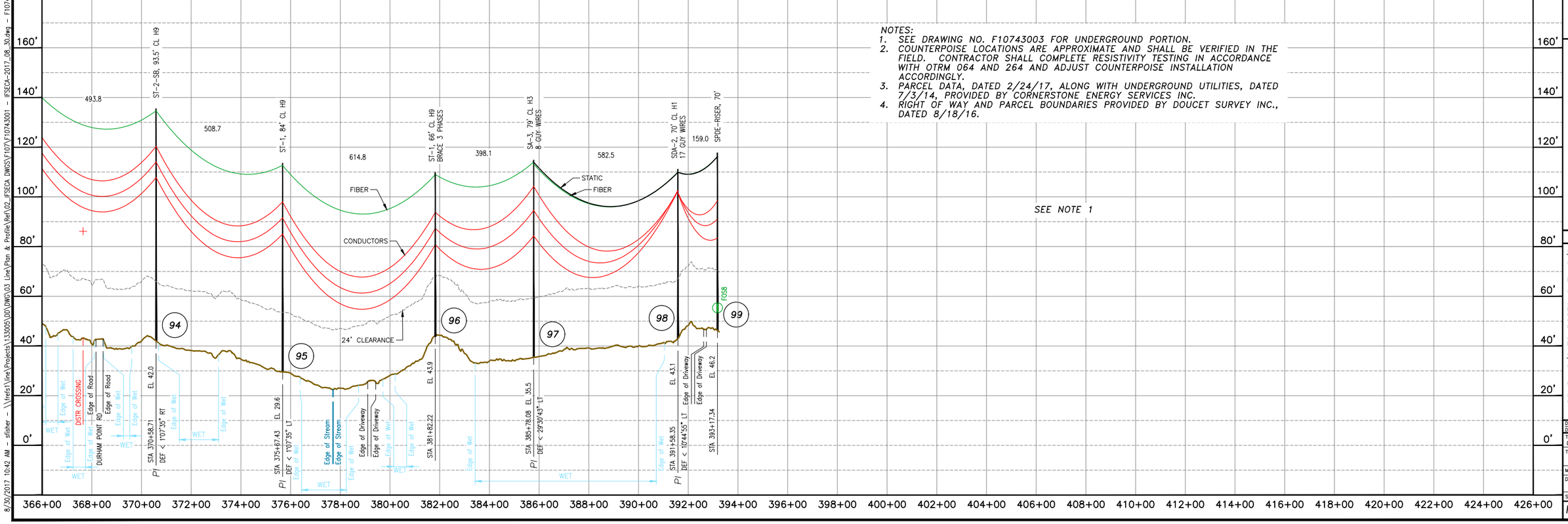
THIS PLAN FOR REFERENCE ONLY. NO REPRESENTATION OR WARRANTY IS MADE AS TO LOCATION OF BOUNDARIES OR OTHER POINTS OF REFERENCE

SPLICE INFORMATION		
FOS8		
STRUCTURE :	STR 99	
DESCRIPTION :	24 FIBER OPGW	SUBMARINE FIBER
REEL NO. :	3	–
COILED CABLE :	100'	100'
DIST. NEXT SPLICE :	14,142' BACK	7,543' AHEAD



NO.	REVISION	DATE	DRWN	APPRV.
E	ISSUED FOR SEC AMENDMENT	8/30/17	SCF	APJ
D	ISSUED FOR BID WO# T127641	8/29/17	SCF	KMS
C	ISSUED FOR 100% REVIEW WO# T127641	4/27/17	SCF	KMS
B	ISSUED FOR SEC AMENDMENT	07/10/17	SCF	APJ
A	ISSUED FOR 100% REVIEW WO# T127641	06/07/16	SCF	KMS

FIBER OPTIC CABLE	24 FIBER OPGW (SHIELD WIRE)
CONDUCTOR	1590 ACSR 45/7 LAPWING (115kV)
CONDUCTOR	
GROUND OR NEUTRAL	19#10 ALUMOWELD



NOTES:
1. SEE DRAWING NO. F10743003 FOR UNDERGROUND PORTION.
2. COUNTERPOISE LOCATIONS ARE APPROXIMATE AND SHALL BE VERIFIED IN THE FIELD. CONTRACTOR SHALL COMPLETE RESISTIVITY TESTING IN ACCORDANCE WITH OTRM 064 AND 264 AND ADJUST COUNTERPOISE INSTALLATION ACCORDINGLY.
3. PARCEL DATA, DATED 2/24/17, ALONG WITH UNDERGROUND UTILITIES, DATED 7/3/14, PROVIDED BY CORNERSTONE ENERGY SERVICES INC.
4. RIGHT OF WAY AND PARCEL BOUNDARIES PROVIDED BY DOUCET SURVEY INC., DATED 8/18/16.

EVERSOURCE ENERGY

T E

MADBURY S/S TO PORTSMOUTH S/S
115kV TRANSMISSION LINE
MILE SHEET

DATE:08/03/2016

SCALE: H 1"=200', V 1"=20'

DES: EDR CHK:KMS
DRW: SCF APR:APJ

TOWN: DURHAM
TRANSMISSION LINE: F107
MILE NO: 8
DISCIPLINE/SHT NO.
SHEET 8 OF 13
F10743001

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ES VER: 11/2015

THIS PLAN FOR REFERENCE ONLY. NO REPRESENTATION OR WARRANTY IS MADE AS TO LOCATION OF BOUNDARIES OR OTHER POINTS OF REFERENCE

SPLICE INFORMATION		
	FOS9	
STRUCTURE :	STR 100	
DESCRIPTION :	SUBMARINE FIBER	24 FIBER OPGW
REEL NO. :	–	4
COILED CABLE :	100'	100'
DIST. NEXT SPLICE :	7,543' BACK	2,819' AHEAD

200 100 0 200 400 600

GRAPHIC SCALE
1" = 200'

NEWINGTON, N. H.

DURHAM, N. H.

N

MATCH LINE

STA 422+40

NEWINGTON, N.H.
DURHAM, N.H. TOWN LINE

STA 429+10

LITTLE BAY

UNDERGROUND F107 LINE 115KV
SEE NOTE 1

ROSS, DOUGLAS A. & ANGELITA R.
LL 400.01

BESWICK, PAUL R. 2008 TRUST
AGA–407, EAA–11590, EAN–65, RCRD 3231/2796 & 2515/982
LL 400

CROWLEY, JOYCE REVOC. TRUST
LL 401

VEITAS, LAWRENCE W. & SUZANNE M.
EAN–65 & 2515/982
LL 402

THIS EASEMENT TO BE RELEASED

UNDERGROUND WATER LINE

UNDERGROUND ELECTRIC

THIS EASEMENT TO BE RELEASED

HERBERT FAMILY 2012 REV TRUST
LL 402.01

UNDERGROUND WATER LINE

DAVIS, PETER K. & LINDA B.
LL 403.01

UNDERGROUND ELECTRIC

LITTLE BAY RD

GUNDALOW LANDING

P.I. STA 470+84.24 STR 101
DEF <17°11'32" LT

PERMANENT CONSTRUCTION ACCESS ROW

F107 LINE 115kV

STA 475+20

MATCH LINE

FOS9
#100(#102)
#101(#104)
#102(#105)
50'
50'
100'

COMO, RICHARD A. & COMO, LYNN M.
LL 403.06

RAYMOND, ROBERT P. & PERNAA
EAN–65 & 2515/982
LL 404

THIS EASEMENT TO BE RELEASED

UNDERGROUND ELECTRIC

HAMLIN, RICHARD P.
EAN–65 & 2515/982
LL 403

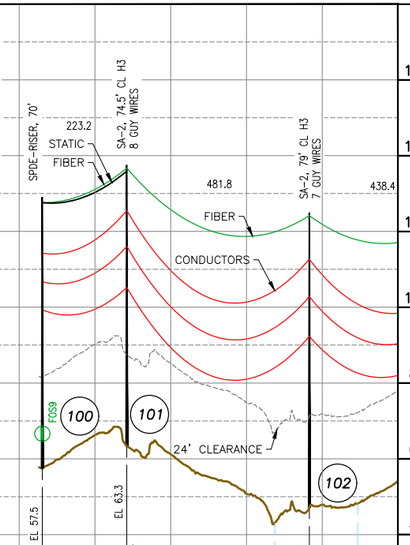
TOWN OF NEWINGTON
EAN–118 & EAN–73
LL 405

19#10 ALUMOWELD @ 4,200 LBS. NESC HEAVY, 120°F

1590 ACSR 45/7 LAPWING @ 11,400 LBS. NESC HEAVY, 285°F
24 FIBER OPGW @ 4,500 LBS. NESC HEAVY, 120°F
RULING SPAN = 509' (STR 100 TO STR 106)

NOTES:
1. SEE DRAWING NO. F10743003 FOR UNDERGROUND PORTION.
2. COUNTERPOISE LOCATIONS ARE APPROXIMATE AND SHALL BE VERIFIED IN THE FIELD. CONTRACTOR SHALL COMPLETE RESISTIVITY TESTING IN ACCORDANCE WITH OTRM 064 AND 264 AND ADJUST COUNTERPOISE INSTALLATION ACCORDINGLY.
3. PARCEL DATA, DATED 2/24/17, ALONG WITH UNDERGROUND UTILITIES, DATED 7/3/14, PROVIDED BY CORNERSTONE ENERGY SERVICES INC.
4. RIGHT OF WAY AND PARCEL BOUNDARIES PROVIDED BY DOUCET SURVEY INC., DATED 8/18/16.

SEE NOTE 1



160' 140' 120' 100' 80' 60' 40' 20' 0'

418+00 420+00 422+00 424+00 426+00 428+00 430+00 432+00 434+00 436+00 438+00 440+00 442+00 444+00 446+00 448+00 450+00 452+00 454+00 456+00 458+00 460+00 462+00 464+00 466+00 468+00 470+00 472+00 474+00 476+00 478+00

NO.	REVISION	DRWN	APPRV.	DATE
E	ISSUED FOR SEC AMENDMENT	SCF	KMS	8/30/17
D	ISSUED FOR BID WO# 1127641	SCF	KMS	6/29/17
C	ISSUED FOR 100% REVIEW WO# 1127641	SCF	KMS	4/27/17
B	ISSUED FOR SEC AMENDMENT WO# 1127641	SCF	KMS	07/10/16
A	ISSUED FOR 100% REVIEW WO# 1127641	SCF	KMS	11/18/16

FIBER OPTIC CABLE: 24 FIBER OPGW (SHIELD WIRE)
CONDUCTOR: 1590 ACSR 45/7 LAPWING (115kV)
GROUND OR NEUTRAL: 19#10 ALUMOWELD

EVERSOURCE ENERGY

T F

MADBURY S/S TO PORTSMOUTH S/S
115kV TRANSMISSION LINE
MILE SHEET

DATE: 09/01/2016

SCALE: H 1"=200', V 1"=20'

DES: EDR | CHK: KMS
DRW: SCF | APR: APJ

TOWN: DURHAM, NEWINGTON
TRANSMISSION LINE: F107
MILE NO: 9
DISCIPLINE/SHT NO.
SHEET 9 OF 13
F10743001

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ES VER: 11/2015

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SPLICE INFORMATION		
	FOS10	
STRUCTURE :	STR 106	
DESCRIPTION :	24 FIBER OPGW	24 F UG FIBER OPTIC CABLE
REEL NO. :	4	UG
COILED CABLE :	100'	100'
DIST. NEXT SPLICE :	2,819' BACK	2,677' AHEAD

SPLICE INFORMATION		
	FOS11	
STRUCTURE :	STR 107	
DESCRIPTION :	24 F UG FIBER OPTIC CABLE	24 FIBER OPGW
REEL NO. :	UG	4
COILED CABLE :	100'	100'
DIST. NEXT SPLICE :	2,677' BACK	10,447' AHEAD

NEWINGTON, N. H.

N

QUINN, STEVEN C. & DONNA L. LL 405.05

STA 475+66.00 STR 102 DEF <12°20'17" LT P.I.

KOWALSKY, ANDREW J. TRUST LL 405.04

LEMIEUX, JOHN L. & MARIE A. LL 405.06

STA 475+20

MATCH LINE

PICKERING, CURTIS J. EAN-6 LL 406

POULIN, MICHAEL V. & JUDITH A. EAN-6 LL 407

PICKERING, LULU ARLINE; GILBERT EAN-6 LL 408

OVERHEAD RIGHTS TO BE RELEASED TO FRINK FARM ONLY. MAINTAINED ON HANNAH LANE.

FRINK FAMILY TRUST OF 2004 EAN-117 LL 410

SABINE, STEPHEN E. & BRENDA J. LL 411.01

UNDERGROUND WATER LINE

SABINE, STEPHEN E. & BRENDA J. LL 411.01

OLD POST RD

BAGLEY, PAUL L. & SHERYL A. EAN-114 LL 413

LEE, JOHN & GINA EAN-114 LL 412

FOX POINT NOMINEE TRUST; JACQUE EAN-112 LL 416

DENNETT FARM, LLC EAN-113 LL 415

STA 525+00

FOX POINT RD

MATCH LINE

BUSH, STEVEN J. & CAROL A. EAN-114 LL 414

#102(#105) #103(#106) #104(#107) #105(#108) #106(#109) #107(#113) #108(#114) #109(#115) #63 #70 #76.5 #78 #79 #80 #81 #82

F107 LINE 115KV

FOS10 FOS11

SEE NOTE 1 UNDERGROUND F107 LINE 115KV

EXISTING 3850 STRUCTURES BETWEEN F107 STRUCTURES 106 AND 107 TO BE REMOVED

FRINK, JOHN & HELEN RYDER FAMILY TRUST 25% LL 410.02

ABBOTT, BLANCHE & CLIFFORD A. EAN-114 & EAN-115 LL 411

NIMBLE HILL RD

HANNAH LANE

EXISTING 3850 STRUCTURES BETWEEN F107 STRUCTURES 106 AND 107 TO BE REMOVED

1590 ACSR 45/7 LAPWING @ 11,400 LBS. NESC HEAVY, 285'F
24 FIBER OPGW @ 4,500 LBS. NESC HEAVY, 120'F

RULING SPAN = 509' (STR 100 TO STR 106)

19#10 ALUMOWELD @ 4,200 LBS. NESC HEAVY, 120'F

19#10 ALUMOWELD @ 4,200 LBS. NESC HEAVY, 120'F

RULING SPAN = 483' (STR 107 TO STR 112)

GRAPHIC SCALE 1" = 200'

NO.	REVISION	DRWN	CHKD	APPRV.	DATE
E	ISSUED FOR SEC AMENDMENT	SCF	KMS	APJ	8/30/17
D	ISSUED FOR BID WO# 1127641	SCF	KMS	APJ	8/29/17
C	ISSUED FOR 100% REVIEW WO# 1127641	SCF	KMS	APJ	4/27/17
B	ISSUED FOR SEC AMENDMENT	SCF	KMS	APJ	07/10/16
A	ISSUED FOR 100% REVIEW WO# 1127641	SCF	KMS	APJ	06/28/16

24 FIBER OPGW (SHIELD WIRE)
FIBER OPTIC CABLE
1590 ACSR 45/7 LAPWING (115kV)
CONDUCTOR
19#10 ALUMOWELD
GROUND OR NEUTRAL

NOTES:
1. SEE DRAWING NO. F10743004 FOR UNDERGROUND PORTION.
2. COUNTERPOISE LOCATIONS ARE APPROXIMATE AND SHALL BE VERIFIED IN THE FIELD. CONTRACTOR SHALL COMPLETE RESISTIVITY TESTING IN ACCORDANCE WITH OTRM 064 AND 264 AND ADJUST COUNTERPOISE INSTALLATION ACCORDINGLY.
3. PARCEL DATA, DATED 2/24/17, ALONG WITH UNDERGROUND UTILITIES, DATED 7/3/14, PROVIDED BY CORNERSTONE ENERGY SERVICES INC.
4. RIGHT OF WAY AND PARCEL BOUNDARIES PROVIDED BY DOUCET SURVEY INC., DATED 8/18/16.

SEE NOTE 1

SA-2, 79' CL H3 7 GUY WIRES
ST-1, 75' CL H9 1 HEAD GUY
SRAX, 65.5' CL H1
SRAX, 70' CL H1
SPDE-RISER, 75'
SPDE-RISER, 70'
ST-2-SB, 79' CL H9 1 GUY WIRE
ST-2-SB, 84' CL H9

FIBER
STATIC
CONDUCTORS
24' CLEARANCE

481.8 438.4 571.1 534.9 569.1 374.2 452.3

102 103 104 105 106 107 108 109

FOS10 FOS11

EL 47.2 EL 53.5 EL 60.3 EL 54.3 EL 43.2 EL 61.1 EL 57.0 EL 43.0

STA 475+65.44 P.I. DEF < 12°20'17" LT
STA 480+03.88
STA 485+74.99
STA 491+09.87
STA 496+79.01
STA 523+55.59
STA 527+29.81
STA 531+82.12

Edge of Wet WET

Edge of Road UG WATER LINE
Edge of Road DISTR CROSSING
FOX POINT RD

160' 140' 120' 100' 80' 60' 40' 20' 0'

472+00 474+00 476+00 478+00 480+00 482+00 484+00 486+00 488+00 490+00 492+00 494+00 496+00 498+00 500+00 502+00 504+00 506+00 508+00 510+00 512+00 514+00 516+00 518+00 520+00 522+00 524+00 526+00 528+00 530+00 532+00

EVERSOURCE ENERGY

T F

MADBURY S/S TO PORTSMOUTH S/S
115kV TRANSMISSION LINE
MILE SHEET

DATE: 08/03/2016
SCALE: H 1"=200', V 1"=20'

DES: EDR CHK: KMS
DRW: SCF APR: APJ

TOWN: NEWINGTON
TRANSMISSION LINE: F107
MILE NO: 10
DISCIPLINE/SHT NO.
SHEET 10 OF 13
F10743001

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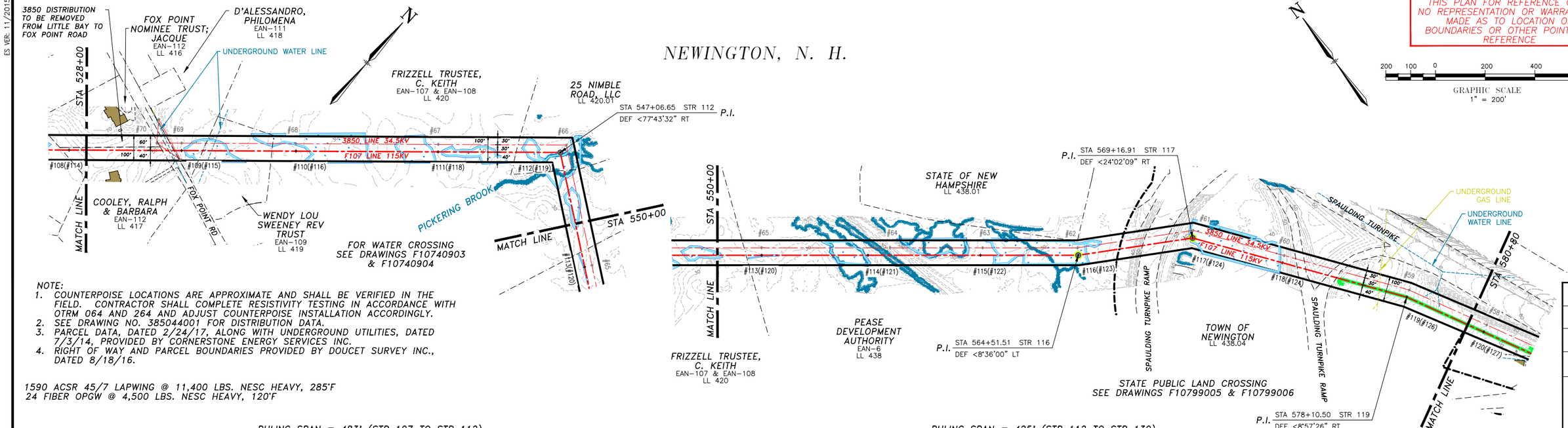
ES VER: 11/2015

THIS PLAN FOR REFERENCE ONLY. NO REPRESENTATION OR WARRANTY IS MADE AS TO LOCATION OF BOUNDARIES OR OTHER POINTS OF REFERENCE

NEWINGTON, N. H.

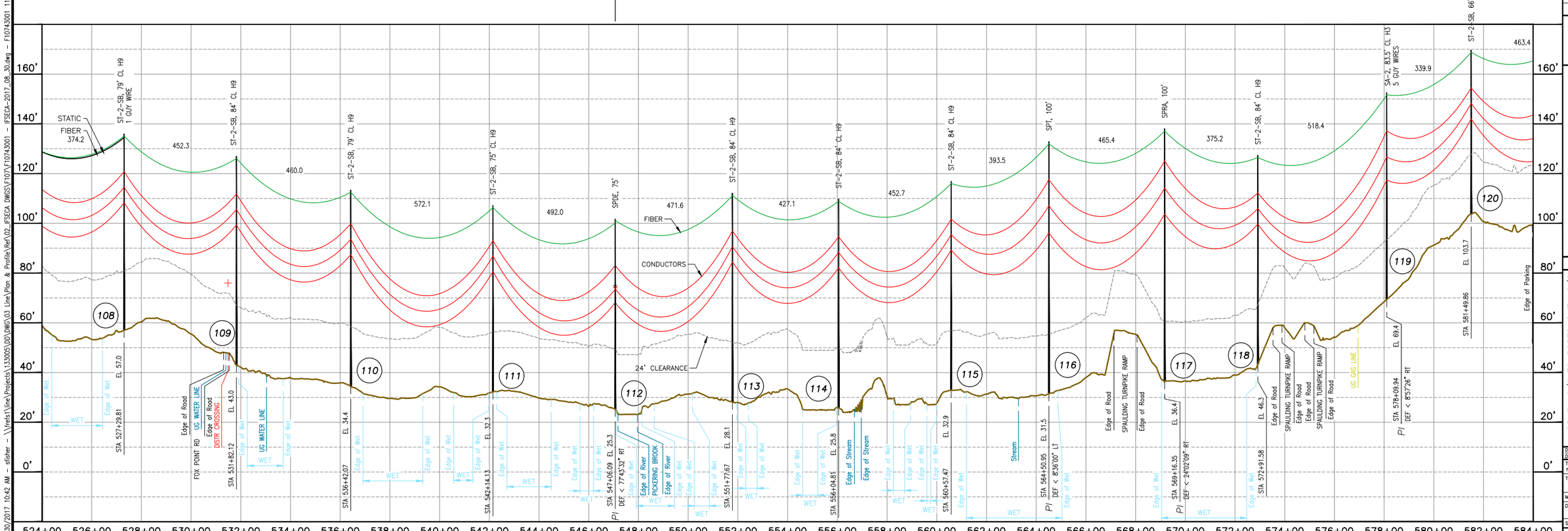


NOTE:
1. COUNTERPOISE LOCATIONS ARE APPROXIMATE AND SHALL BE VERIFIED IN THE FIELD. CONTRACTOR SHALL COMPLETE RESISTIVITY TESTING IN ACCORDANCE WITH OTRM 064 AND 264 AND ADJUST COUNTERPOISE INSTALLATION ACCORDINGLY.
2. SEE DRAWING NO. 385044001 FOR DISTRIBUTION DATA.
3. PARCEL DATA, DATED 2/24/17, ALONG WITH UNDERGROUND UTILITIES, DATED 7/3/14, PROVIDED BY CORNERSTONE ENERGY SERVICES INC.
4. RIGHT OF WAY AND PARCEL BOUNDARIES PROVIDED BY DOUCET SURVEY INC., DATED 8/18/16.

1590 ACSR 45/7 LAPWING @ 11,400 LBS. NESC HEAVY, 285'F
24 FIBER OPGW @ 4,500 LBS. NESC HEAVY, 120'F

RULING SPAN = 483' (STR 107 TO STR 112)

RULING SPAN = 425' (STR 112 TO STR 130)



NO.	REVISION	DATE	DRWN	APPRV.
E	ISSUED FOR SEC AMENDMENT	8/30/17	SCF	APJ
D	ISSUED FOR BID WO# 11276A1	8/29/17	SCF	KMS
C	ISSUED FOR 100% REVIEW WO# 11276A1	4/27/17	SCF	APJ
B	ISSUED FOR SEC AMENDMENT WO# 11276A1	07/10/17	SCF	KMS
A	ISSUED FOR 100% REVIEW WO# 11276A1	6/15/16	CHKD	APJ

24 FIBER OPGW (SHIELD WIRE)
CONDUCTOR 1590 ACSR 45/7 LAPWING (115kV)
FIBER OPTIC CABLE
GROUND OR NEUTRAL

EVERSOURCE ENERGY

T E

MADBURY S/S TO PORTSMOUTH S/S
115kV TRANSMISSION LINE
MILE SHEET

DATE: 09/01/2016

SCALE: H: 1"=200', V: 1"=20'

DES: EDR CHK: KMS
DRW: SCF APR: APJ

TOWN: NEWINGTON
TRANSMISSION LINE: F107
MILE NO: 11
DISCIPLINE/SHT NO.
SHEET 11 OF 13
F10743001

8/30/2017 10:42 AM – sfisher – \\Vefs1\Line\Projects\133065\00\DWG\03 Line\Plan & Profile\Rev\A\02_PSECA_DWGS\F107\F10743001 – PSECA-2017_08_30.dwg – F10743001 11-13

ES VER: 11/2015

NEWINGTON, N. H.

NOTES:
1. SEE DRAWING NO. 385044001 FOR DISTRIBUTION UNDERBUILD DATA. NEUTRAL STANDARD GROUND CLEARANCE 18' (DTR 04.115).
2. COUNTERPOISE LOCATIONS ARE APPROXIMATE AND SHALL BE VERIFIED IN THE FIELD. CONTRACTOR SHALL COMPLETE RESISTIVITY TESTING IN ACCORDANCE WITH OTRM 064 AND 264 AND ADJUST COUNTERPOISE INSTALLATION ACCORDINGLY.
3. PARCEL DATA, DATED 2/24/17, ALONG WITH UNDERGROUND UTILITIES, DATED 7/3/14, PROVIDED BY CORNERSTONE ENERGY SERVICES INC.
4. RIGHT OF WAY AND PARCEL BOUNDARIES PROVIDED BY DOUCET SURVEY INC., DATED 8/18/16.

SPLICE INFORMATION		
	FOS12	
STRUCTURE :	STR 131	
DESCRIPTION :	24 FIBER OPGW	24 FIBER OPGW
REEL NO. :	4	5
COILED CABLE :	100'	100'
DIST. NEXT SPLICE :	10,447' BACK	2,873' AHEAD

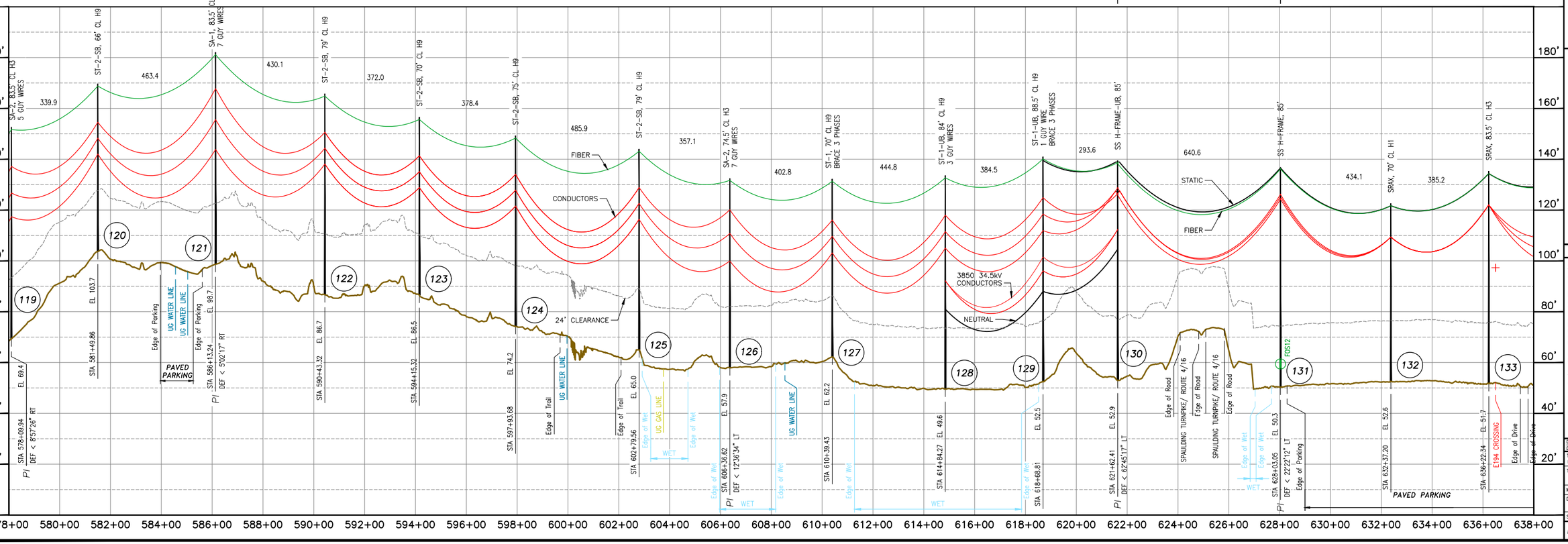
200 100 0 200 400 600
GRAPHIC SCALE
1" = 200'

THIS PLAN FOR REFERENCE ONLY. NO REPRESENTATION OR WARRANTY IS MADE AS TO LOCATION OF BOUNDARIES OR OTHER POINTS OF REFERENCE

STA 580+80
MATCH LINE
TOWN OF NEWINGTON LL 438.04
CITY OF PORTSMOUTH EAN-6 & OTHERS LL 423
STA 586+13.80 STR 121 P.I.
DEF <5°02'17" RT
TOWN OF NEWINGTON LL 438.04
TAP TO PLANET FITNESS
P.I. STA 606+37.18 STR 126
DEF <12°36'34" LT
STATE PUBLIC LAND CROSSING
SEE DRAWINGS F10799007 & F10799008
PEASE DEVELOPMENT AUTHORITY EAN-6 LL 438
P.I. STA 628+03.61 STR 131
DEF <22°22'12" LT
SBAF RUNNING FOX, INC C/O KEYPO LL 424
MATCH LINE
STA 633+60
N/A
STA 621+62.97 STR 130 P.I.
DEF <62°45'17" LT
3850 LINE 34.5KV
F107 LINE 115KV
3163 LINE 34.5KV
UNDERGROUND WATER LINE
UNDERGROUND GAS LINE
ARBORETUM DR
SPAULDING TURNPIKE/ ROUTE 4/16
PARKING LOT
FOS12

1590 ACSR 45/7 LAPWING @ 11,400 LBS. NESC HEAVY, 285'F
24 FIBER OPGW @ 4,500 LBS. NESC HEAVY, 120'F
RULING SPAN = 425' (STR 112 TO STR 130)

19#10 ALUMOWELD @ 4,200 LBS. NESC HEAVY, 120'F
RULING SPAN = 641' (STR 130 TO STR 131)
RULING SPAN = 493' (STR 131 TO STR 137)



NO.	DESCRIPTION	DATE	DRWN	APPRV.
E	ISSUED FOR SEC AMENDMENT	8/30/17	SCF	KMS
D	ISSUED FOR BID WO# 1127641	6/29/17	SCF	KMS
C	ISSUED FOR 100% REVIEW WO# 1127641	4/27/17	SCF	KMS
B	ISSUED FOR SEC AMENDMENT WO# 1127641	01/10/17	SCF	KMS
A	ISSUED FOR 90% REVIEW WO# 1127641	11/7/16	SCF	KMS

FIBER OPTIC CABLE: 24 FIBER OPGW (SHIELD WIRE)
CONDUCTOR: 1590 ACSR 45/7 LAPWING (115kV)
GROUND OR NEUTRAL: 19#10 ALUMOWELD

EVERSOURCE ENERGY

T E

MADBURY S/S TO PORTSMOUTH S/S
115kV TRANSMISSION LINE
MILE SHEET

DATE:08/03/2016
SCALE: H 1"=200', V 1"=20'

DES: EDR CHK:KMS
DRW: SCF APP: APJ
TOWN: NEWINGTON
TRANSMISSION LINE: F107
MILE NO: 12
DISCIPLINE/SHT NO.
SHEET 12 OF 13
F10743001

8/30/2017 10:42 AM – sfisher – \\fretls1\Line Projects\133005\00\DWG\03 Line\Plan & Profile\Ref\02_PSECA DWGS\F107\F10743001 – PSECA-2017_08_30.dwg – F10743001 12-13

ES VER: 11/2015

N

THIS PLAN FOR REFERENCE ONLY. NO REPRESENTATION OR WARRANTY IS MADE AS TO LOCATION OF BOUNDARIES OR OTHER POINTS OF REFERENCE

NEWINGTON, N. H.

PORTSMOUTH, N. H.

P.I. STA 656+76.48 STR 137 DEF <11°17'35" RT

STA 659+27.61 STR 138 DEF <82°06'12" RT P.I.

STA 660+35.49 STR 139 DEF <42°48'25" LT P.I.

STA 663+53.83 STR 140 DEF <9°09'57" RT P.I.

SHATTUCK WAY EASEMENT

UNDERGROUND GAS LINE

REALTY INCOME CORPORATION C/O N LL 439

DILORENZO REAL ESTATE, LLC LL 446.02

WOODBURY AVE

SBAF RUNNING FOX, INC C/O KEYPO LL 424

SBAF RUNNING FOX, INC C/O KEYPO LL 441

TOYS 'R' US LL 440

PARKING LOT

E194 LINE 115KV
F107 LINE 115KV
U181 LINE 345KV
3135 LINE 345KV

NEWINGTON, N.H. TOWN PORTSMOUTH, N.H. LINE

GOSLING ROAD

P.I. STA 652+44.05 STR 136 DEF <3°08'18" LT

P.I. STA 669+37.79 STR 142 DEF <24°28'11" RT

P.I. STA 674+88.79 STR 143 DEF <63°41'27" LT

STA 678+87.08 STR 144 DEF <108°20'18" LT P.I.

PORTSMOUTH S/S

T13 LINE 115KV
Z166 LINE 34.5KV
367 LINE 34.5KV
3135 LINE 345KV

T13 TAP LINE 115kV (TO BE REMOVED)

PARCELS:
1. CUMBERLAND FARMS, INC, LL 442
2. RPI NEWINGTON REALTY, LLC, LL 443
3. HALLETT TRUSTEE, RICHARD S., LL 444
4. SYLVIA H. MARPLE REVOC TRUST, LL 445
5. DILORENZO REAL ESTATE, LLC, LL 446
6. PUBLIC SERVICE COMPANY OF NH, LL 432
7. RETROSI PROPERTIES LLC, 448
8. PUBLIC SERVICE COMPANY OF NH, LL 447

SPLICE INFORMATION		
	FOS13	
STRUCTURE :	STR 137	
DESCRIPTION :	24 FIBER OPGW	24 FIBER ADSS
REEL NO. :	5	ADSS 2
COILED CABLE :	100'	100'
DIST. NEXT SPLICE :	2,873' BACK	287' AHEAD

SPLICE INFORMATION		
	FOS14	
STRUCTURE :	STR 139	
DESCRIPTION :	24 FIBER ADSS	24 FIBER OPGW
REEL NO. :	ADSS 2	5
COILED CABLE :	100'	100'
DIST. NEXT SPLICE :	287' BACK	1,896' AHEAD

SPLICE INFORMATION		
	FOS15	
STRUCTURE :	STR 144	
DESCRIPTION :	24 FIBER OPGW	ADSS TO CH
REEL NO. :	5	ADSS 3
COILED CABLE :	100'	0'
DIST. NEXT SPLICE :	1,896' BACK	450' AHEAD

ADSS FIBER @ 1,100 LBS. NESC HEAVY, 120'F

19#10 ALUMOWELD @ 4,200 LBS. NESC HEAVY, 120'F

1590 ACSR 45/7 LAPWING @ 3,400 LBS. NESC HEAVY, 285'F
ADSS FIBER @ 500 LBS. NESC HEAVY, 120'F

1590 ACSR 45/7 LAPWING @ 11,400 LBS. NESC HEAVY, 285'F
24 FIBER OPGW @ 4,500 LBS. NESC HEAVY, 120'F
(STR 132 TO PORTSMOUTH S/S)

19#10 ALUMOWELD @ 4,200 LBS. NESC HEAVY, 120'F

1590 ACSR 45/7 LAPWING @ 5,000 LBS. NESC HEAVY, 285'F
19#10 ALUMOWELD @ 2,500 LBS. NESC HEAVY, 120'F
24 FIBER OPGW @ 2,500 LBS. NESC HEAVY, 120'F

RULING SPAN = 199' (STR 137 TO STR 138)

RULING SPAN = 88' (STR 138 TO STR 139)

RULING SPAN = 493' (STR 131 TO STR 137)

RULING SPAN = 427' (STR 139 TO STR 143)

RULING SPAN = 398' (STR 143 TO 144)

RULING SPAN = 139' (STR 144 TO PORTSMOUTH S/S)

GRAPHIC SCALE
1" = 200'

SRAX, 70' CL H1 — 434.1
385.2
SRAX, 83.5' CL H3 — 487.5
565.2
SPT, 95'
SPT, 90' — 568.4
SPT, 90' — 432.4
SPDE, 70' — 199.4
SS H-FRAME, 30' — 88.1
SS H-FRAME, 55' — 318.3
SA-2, 79' CL H3 7 GUY WIRES — 224.9
ST-2-SB, 75' CL H9 — 360.5
SA-3, 74.5' CL H3 9 GUY WIRES
SDA-3, 92.5' CL H3 17 GUY WIRES — 398.3
SDA-3, 70' CL H1 17 GUY WIRES — 139.3
S/S STEEL TAKEOFF
STATIC
FIBER
CONDUCTORS
24' CLEARANCE
ADSS TO CONTROL HOUSE
ADSS FIBER

132 133 134 135 136 137 138 139 140 141 142 143 144

FOS13 FOS14 FOS15

EL 52.6 — STA 632+37.20
EL 51.7 — STA 636+22.34 — E194 CROSSING
PAVED PARKING
Edge of Drive
Edge of Drive
EL 52.4 — STA 641+09.84
Edge of Parking
Edge of Drive
Edge of Drive
EL 44.2 — STA 646+75.07
Edge of Driveway
Edge of Driveway
Edge of Wet
Edge of Wet
Edge of Road — WOODBURY AVE
Edge of Road
367X2 CROSSING
EL 44.9 — STA 652+43.49 — DEF < 3°08'18" LT
Edge of Driveway
Edge of Driveway
EL 38.7 — STA 656+75.92 — DEF < 11°17'35" RT
Edge of Wet
3135 CROSSING
Edge of Stream
WET
Edge of Wet
EL 40.7 — STA 658+75.30 — DEF < 82°06'12" RT
U181 CROSSING
EL 37.5 — STA 659+63.42 — DEF < 42°48'25" LT
Edge of Shattuck Way Ease
Edge of Shattuck Way Ease
EASE
EL 42.6 — STA 663+26.41 — DEF < 9°09'57" RT
Edge of Wet
Edge of Wet
WET
Edge of Wet
367X2 CROSSING
Edge of Road — GOSLING RD
Edge of Road
EL 46.2 — STA 665+51.32
Edge of Wet
WET
Edge of Wet
EL 48.1 — STA 669+10.38 — DEF < 24°28'11" RT
EL 52.3 — STA 674+61.37 — DEF < 63°41'27" LT
367 CROSSING
T13 CROSSING
EL 90.6 — STA 678+59.67 — DEF < 108°20'18" LT
Fence

PI

NOTES:
1. COUNTERPOISE LOCATIONS ARE APPROXIMATE AND SHALL BE VERIFIED IN THE FIELD. CONTRACTOR SHALL COMPLETE RESISTIVITY TESTING IN ACCORDANCE WITH OTRM 064 AND 264 AND ADJUST COUNTERPOISE INSTALLATION ACCORDINGLY.
2. PARCEL DATA, DATED 2/24/17, ALONG WITH UNDERGROUND UTILITIES, DATED 7/3/14, PROVIDED BY CORNERSTONE ENERGY SERVICES INC.
3. RIGHT OF WAY AND PARCEL BOUNDARIES PROVIDED BY DOUCET SURVEY INC., DATED 8/18/16.

630+00 632+00 634+00 636+00 638+00 640+00 642+00 644+00 646+00 648+00 650+00 652+00 654+00 656+00 658+00 660+00 662+00 664+00 666+00 668+00 670+00 672+00 674+00 676+00 678+00 680+00 682+00 684+00 686+00 688+00 690+00

0' 20' 40' 60' 80' 100' 120' 140' 160'

NO.	DESCRIPTION	DATE	DRWN	CHKD	APPRV.
E	ISSUED FOR SEC AMENDMENT	8/30/17	SCF	KMS	APJ
D	ISSUED FOR BID WO# T127641	8/29/17	SCF	KMS	APJ
C	ISSUED FOR 100% REVIEW WO# T127641	4/27/17	SCF	KMS	APJ
B	ISSUED FOR SEC AMENDMENT	01/10/17	SCF	KMS	APJ
A	ISSUED FOR 100% REVIEW WO# T127641	10/7/16	SCF	KMS	APJ

FIBER OPTIC CABLE: 24 FIBER OPGW & ADSS SHIELD WIRE
CONDUCTOR: 1590 ACSR 45/7 LAPWING (115kV)
GROUND OR NEUTRAL: 19#10 ALUMOWELD

EVERSOURCE ENERGY

T E

MADBURY S/S TO PORTSMOUTH S/S
115kV TRANSMISSION LINE
MILE SHEET

DATE:08/03/2016
SCALE: H 1"=200', V 1"=20'

DES: EDR CHK:KMS
DRW: SCF APR:APJ

TOWN: NEWINGTON
TRANSMISSION LINE: F107
MILE NO: 13
DISCIPLINE/SHT NO.
SHEET 13 OF 13
F10743001

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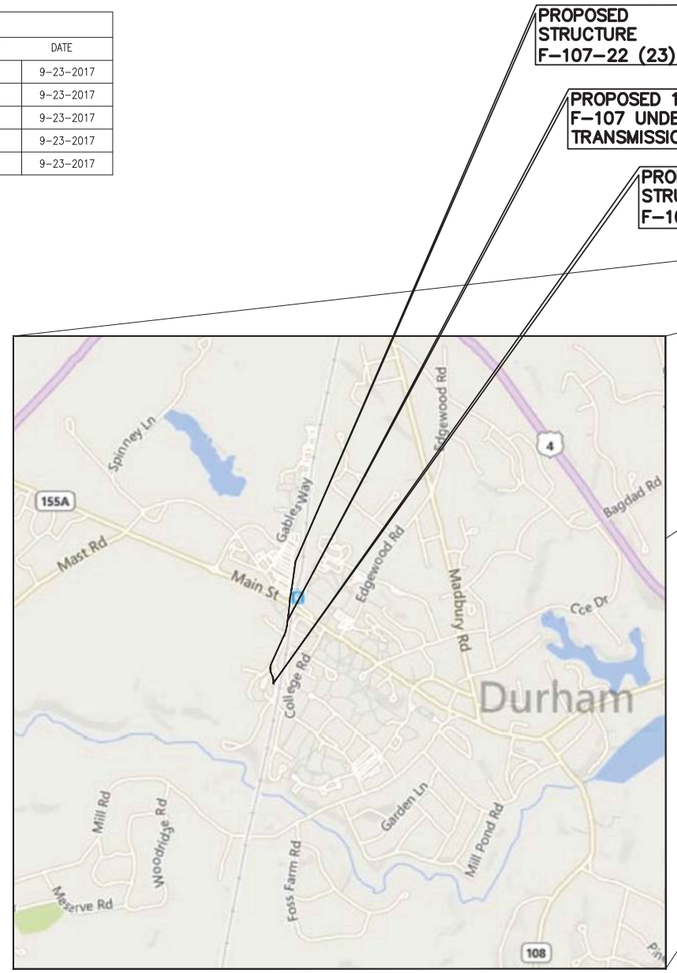
ES VER: 11/2015

PUBLIC SERVICE COMPANY OF NEW HAMPSHIRE
CIRCUIT F-107
UNH, DURHAM
115kV UNDERGROUND TRANSMISSION LINE

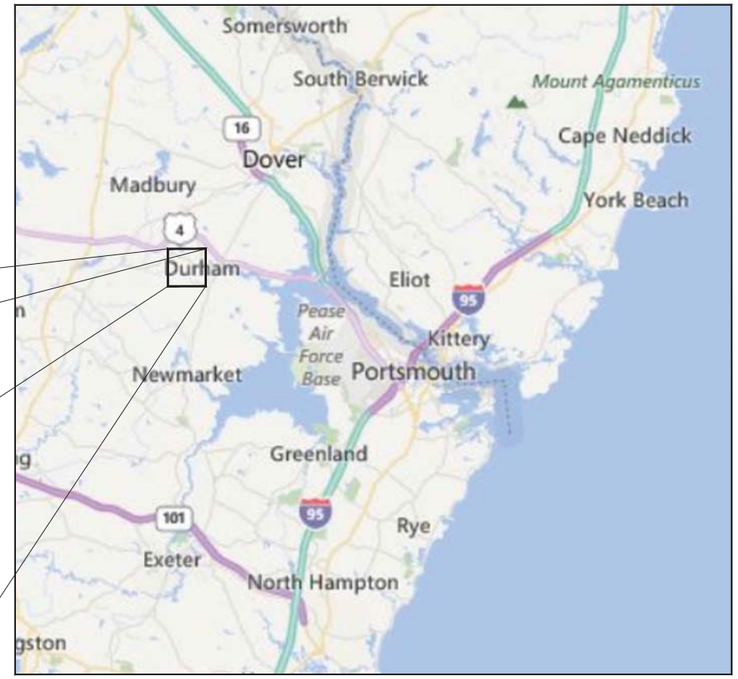
DRAWING MANIFEST			
DRAWING NO.	TITLE/DESCRIPTION	REVISION	DATE
SHEET 1 OF 5	COVER SHEET, LEGEND, AND DRAWING MANIFEST	S	9-23-2017
SHEET 2 OF 5	PLAN AND PROFILE DRAWING STA. 73+00 TO STA. 84+00	S	9-23-2017
SHEET 3 OF 5	PLAN AND PROFILE DRAWING STA. 84+00 TO STA. 95+00	S	9-23-2017
SHEET 4 OF 5	RISER SWEEP AND PIPE JACKING DETAILS	S	9-23-2017
SHEET 5 OF 5	MISCELLANEOUS DETAILS	S	9-23-2017

LEGEND

	ELECTRICAL STRUCTURE
	LAMP POST
	WOODEN POST
ICV	IRRIGATION CONTROL VALVE
E	ELECTRIC BOX
T	TELECOMMUNICATION BOX
	UTILITY BOX
	CATCH BASIN
	CONIFEROUS TREE
	DECIDUOUS TREE
	CONCRETE
	RIP RAP
	LANDSCAPED AREA
	CRUSHED STONE
	SURFACE LEDGE
TYP.	TYPICAL
RET.	RETAINING
EP	EDGE OF PAVEMENT
CONC.	CONCRETE
	TREE LINE
	SHRUB LINE
	PROPERTY LINES
SD	STORM DRAIN
OHW	OVERHEAD ELECTRIC
UGE	UNDERGROUND ELECTRIC
XW	EXISTING WATER LINE
TELE	TELEPHONE LINE
SX	EXISTING SEWER
STM	STEAM LINE
PD	PROPOSED DRAIN
	EASMENT
GAS	GAS
PD	PROPOSED STORM DRAIN
UD	UNDER DRAIN
PUD	PROPOSED UNDER DRAIN



VICINITY MAP
NOT TO SCALE



AREA MAP
NOT TO SCALE

General Notes

1. THE UTILITIES PROVIDED BY THIGHE & BOND FROM RECORD PLANS AND SURVEY RELATED TO THE UNH SOCCER FIELD AND SOUTH STREET PROJECTS AND WILL BE VERIFIED IN THE FIELD. ADDITIONAL EXISTING CONDITIONS PROVIDED BY DOUCET SURVEY INC.
2. TOPOGRAPHY IS BASED ON AN AERIAL LIDAR SURVEY AND SATELLITE IMAGERY, THEREFORE GRADES ARE APPROXIMATE. AN ON THE GROUND DETAIL SURVEY WILL BE REQUIRED FOR DESIGN.
3. CONTRACTOR IS RESPONSIBLE FOR PLACING SILT FENCE OR OTHER APPROVED EROSION CONTROL DEVICES. WETLANDS HAVE NOT BEEN DELINEATED AND HAVE NOT BEEN CONSIDERED FOR DESIGN.
4. CONTRACTOR SHALL INSTALL SILT SACK OR APPROVED EQUAL TO ALL CATCH BASINS OR CURB INLETS WITHIN THE DEFINED WORK ZONE.
5. CONTRACTOR SHALL ENSURE PROPER CONTROLS ARE IN PLACE SO WORKERS DO NOT TRACK SEDIMENT PAST THE LIMITS OF WORK.
6. ALL VERTICAL RADII ARE 500' UNLESS OTHERWISE NOTED.
7. STRUCTURE NUMBERS SHOWN ARE THE FINAL CONSTRUCTION/FIELD NUMBERS. STRUCTURE NUMBERS IN PARENTHESES REFERENCE STRUCTURE NUMBERS USED IN SEC PERMITTING.

NO.	REVISION	DATE	DRAWN	CHKD	APPRVD
S	REVISED 70A DESIGN - UPDATED ALIGNMENT	8-23-17	REO	SGG	TSC
R	REVISED 70A DESIGN - REGRADE AT PARK/ SOCCER FIELD	3-15-17	REO	SGG	TSC
Q	REVISED 70A DESIGN	12-22-16	REO	SGG	TSC
P	REVISED 70A DESIGN	9-16-16	REO	SGG	TSC
N	ISSUE FOR BID	8-24-16	REO	SGG	TSC
M	ISSUE FOR REVIEW	6-24-16	REO	SGG	TSC

EVERSOURCE ENERGY

T | R

CIRCUIT F-107 115kV
UNDERGROUND TRANSMISSION LINE
PLAN AND PROFILE COVER

DATE: 07/15/2015
SCALE: N.T.S.

DES: REO | CHK: TSC
DRW: REO | APR:

TOWN: DURHAM
TRANSMISSION LINE: LINE
MILE NO: 2
DISCIPLINE/SHT NO.
SHEET 1 OF 5
F10743102

PSNH (PUBLIC SERVICE COMPANY OF NEW HAMPSHIRE)
DESIGN ENGINEER: JOSEPH SPERRY

POWER ENGINEERS
PROJECT ENGINEER: TODD GOYETTE

PSNH (PUBLIC SERVICE COMPANY OF NEW HAMPSHIRE)
WORK ORDER NUMBER:

POWER ENGINEERS
PROJECT NUMBER: 133007

PRINT DRAWING TO SCALE ON 22"X34" SHEET

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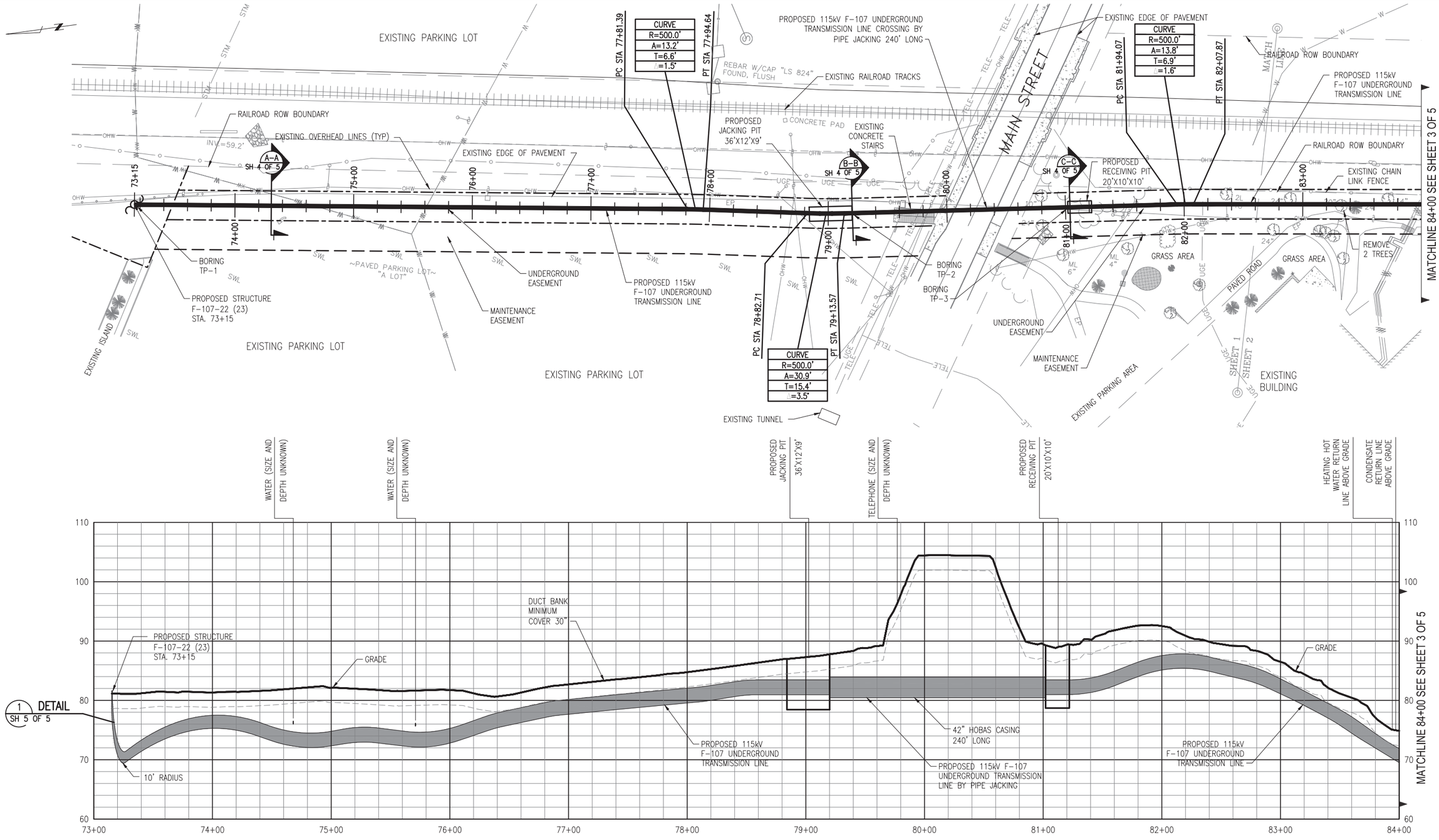
NEW HAMPSHIRE DIG SAFE SYSTEM, INC.
TOLL FREE
1-888-344-7233

ISSUE FOR PERMITTING
NOT FOR CONSTRUCTION

POWER ENGINEERS

8/24/2017 1:47 PM - dclifford - R:\Projects\133007\DD\DWG\03_Line\UNH\F10743002 REVISED BASE 8-18-17.dwg - SH 1 COVER

ES VER: 11/2015



General Notes

1. THE UTILITIES PROVIDED BY THIGHE & BOND FROM RECORD PLANS AND SURVEY RELATED TO THE UNH SOCCER FIELD AND SOUTH STREET PROJECTS AND WILL BE VERIFIED IN THE FIELD. ADDITIONAL EXISTING CONDITIONS PROVIDED BY DOUCET SURVEY INC.
2. TOPOGRAPHY IS BASED ON AN AERIAL LIDAR SURVEY AND SATELLITE IMAGERY, THEREFORE GRADES ARE APPROXIMATE. AN ON THE GROUND DETAIL SURVEY WILL BE REQUIRED FOR DESIGN.
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4. CONTRACTOR SHALL INSTALL SILT SACK OR APPROVED EQUAL TO ALL CATCH BASINS OR CURB INLETS WITHIN THE DEFINED WORK ZONE.
5. CONTRACTOR SHALL ENSURE PROPER CONTROLS ARE IN PLACE SO WORKERS DO NOT TRACK SEDIMENT PAST THE LIMITS OF WORK.
6. ALL VERTICAL RADII ARE 500' UNLESS OTHERWISE NOTED.
7. STRUCTURE NUMBERS SHOWN ARE THE FINAL CONSTRUCTION/FIELD NUMBERS. STRUCTURE NUMBERS IN PARENTHESES REFERENCE STRUCTURE NUMBERS USED IN SEC PERMITTING.

0 4 8 16 24 FEET
VERTICAL 1"= 8'
0 20 40 80 120 FEET
HORIZONTAL 1"= 40'

PRINT DRAWING TO SCALE ON 22"X34" SHEET

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ISSUE FOR PERMITTING
NOT FOR CONSTRUCTION

POWER ENGINEERS

NO.	REVISION	DATE	DRWN	CHKD	APPRVD
S	REVISED 70% DESIGN - UPDATED ALIGNMENT	8-23-17	REO	SCG	TSC
R	REVISED 70% DESIGN - REGRADE AT PROP. SOCCER FIELD	3-15-17	REO	SCG	TSC
Q	REVISED 70% DESIGN	12-22-16	REO	SCG	TSC
P	REVISED 70% DESIGN	9-16-16	REO	SCG	TSC
N	ISSUE FOR BID	8-16-16	REO	SCG	TSC
M	ISSUE FOR REVIEW	6-24-16	REO	SCG	TSC

EVERSOURCE ENERGY

T R

CIRCUIT F-107 115kV
UNDERGROUND TRANSMISSION LINE
PLAN AND PROFILE VIEW
DATE:07/15/2015
SCALE: H 1"=40', V 1"=8'

DES: REO CHK:TSG
DRW: REO APR:
TOWN: DURHAM
TRANSMISSION LINE: LINE
MILE NO: 2
DISCIPLINE/SHT NO.
SHEET 2 OF 5
F10743002

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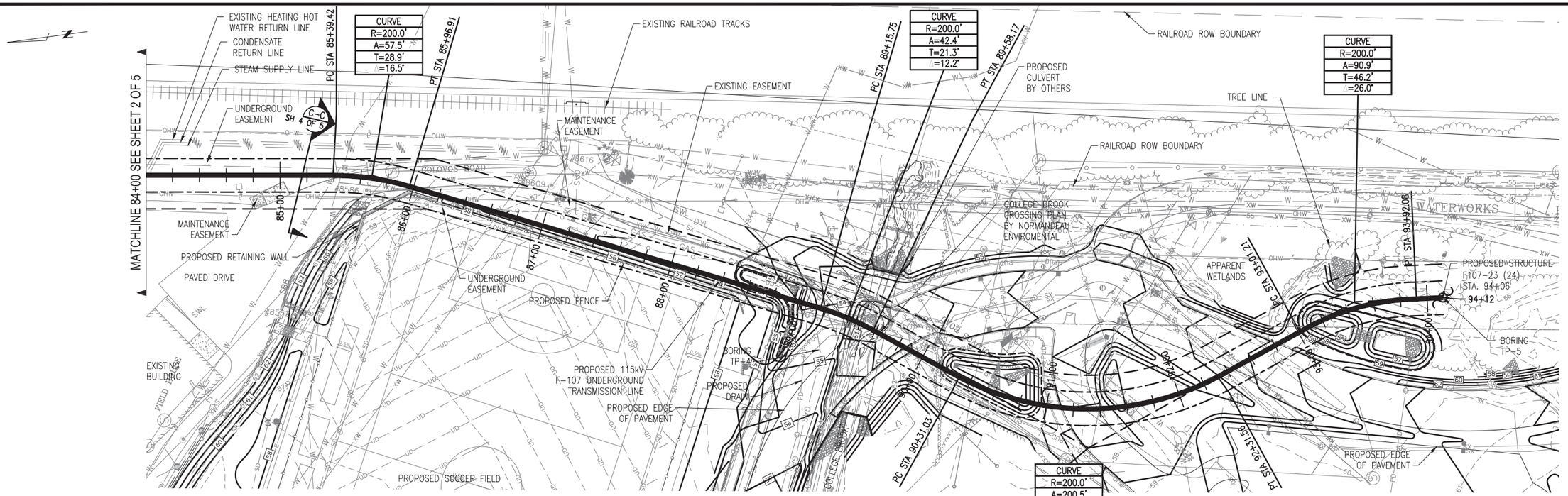
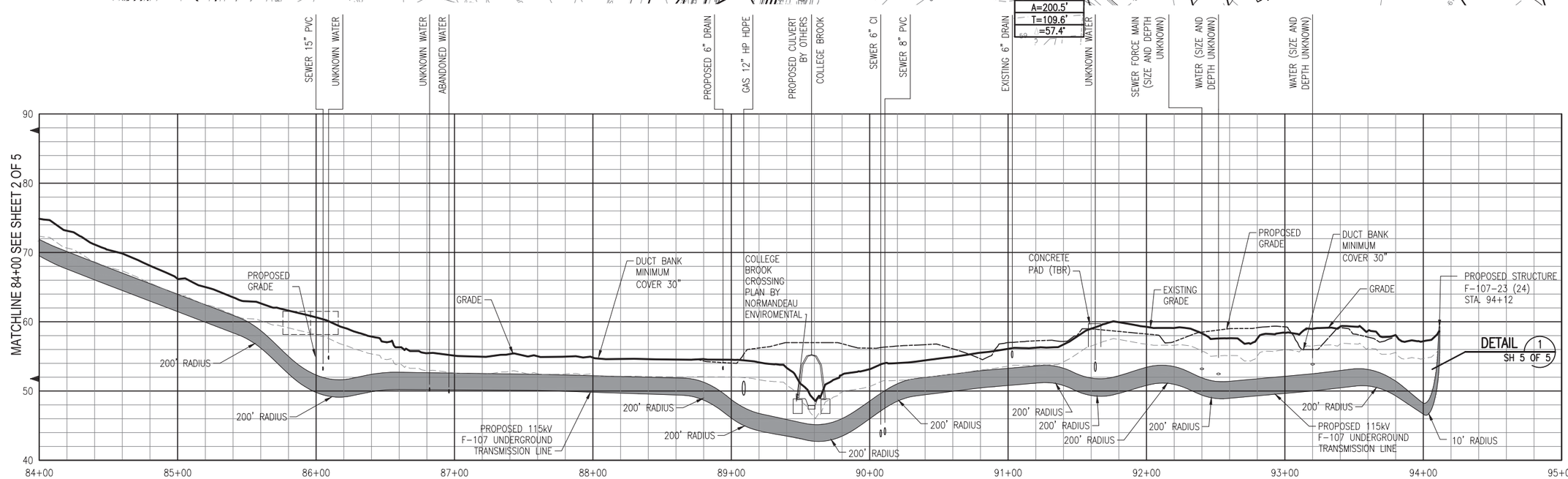
ES VER: 11/2015





General Notes

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0 4 8 16 24 FEET
VERTICAL 1"= 8'
0 20 40 80 120 FEET
HORIZONTAL 1"= 40'
PRINT DRAWING TO SCALE ON 22"X34" SHEET

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ISSUE FOR PERMITTING
NOT FOR CONSTRUCTION

POWER ENGINEERS

NO.	REVISION	DATE	DRWN	CHKD	APPRV
S	REVISED 70% DESIGN - UPDATED ALIGNMENT	8-23-17	REO	SGG	TSG
R	REVISED 70% DESIGN - REGRADE AT PROP. SOCCER FIELD	3-15-17	REO	SGG	TSG
Q	REVISED 70% DESIGN	12-22-16	REO	SGG	TSG
P	REVISED 70% DESIGN	9-16-16	REO	SGG	TSG
N	ISSUE FOR BID	8-16-16	REO	SGG	TSG
M	ISSUE FOR REVIEW	8-4-16	REO	SGG	TSG

EVERSOURCE ENERGY

T R

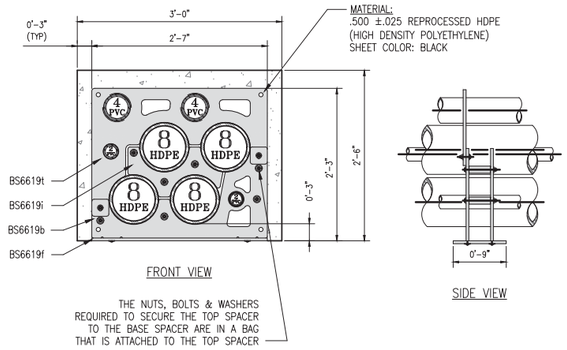
CIRCUIT F-107 115kV
UNDERGROUND TRANSMISSION LINE
PLAN AND PROFILE VIEW

DATE: 07/15/2015
SCALE: H 1"=40', V 1"=8'

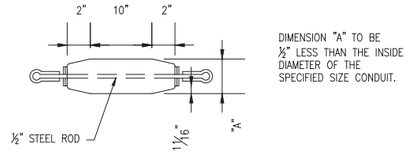
DES: REO | CHK: TSG
DRW: REO | APR:
TOWN: DURHAM
TRANSMISSION LINE: LINE
MILE NO: 2
DISCIPLINE/SHT NO.
SHEET 3 OF 5
F10743002

8/24/2017 1:47 PM - dclifford - R:\Projects\13007\0D\DWG\03 Line\UNH\F10743002 REVISED BASE 8-18-17.dwg - SH 3

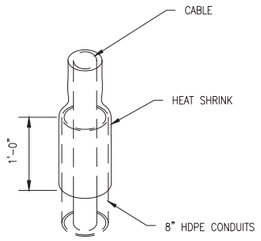
ES VER: 11/2015



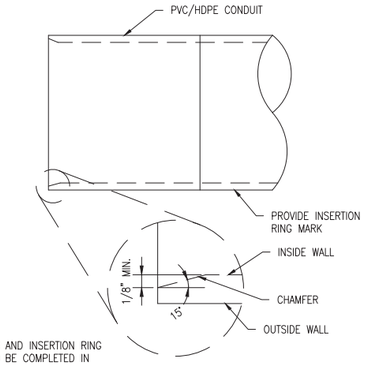
UNDERGROUND DEVICES SPACER ARRANGEMENT
DETAIL 1
SCALE N.T.S. SH 4 OF 5



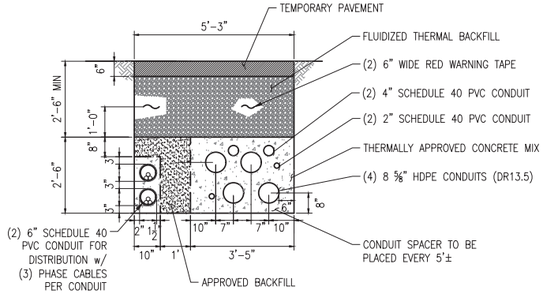
MANDREL DETAIL
DETAIL 2
SCALE N.T.S. SH 4 OF 5



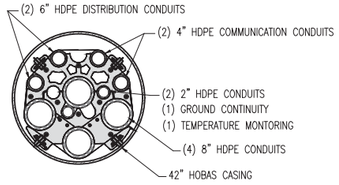
HEAT SHRINK DETAIL
DETAIL 3
SCALE N.T.S. SH 4 OF 5



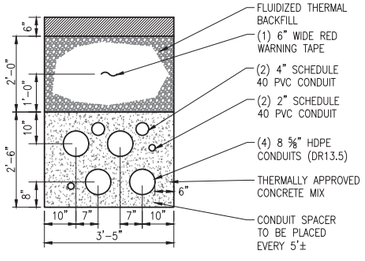
PVC/HDPE DUCT CHAMFER DETAIL
DETAIL 4
SCALE N.T.S. SH 4 OF 5



TYPICAL DUCT BANK WITH DISTRIBUTION AT UNH CAMPUS
SECTION A-A
SCALE: N.T.S. SH 4 OF 5



TYPICAL CASING SECTION
SECTION B-B
SCALE: N.T.S. SH 4 OF 5



TYPICAL DUCT BANK AT UNH CAMPUS
SECTION C-C
SCALE: N.T.S. SH 4 OF 5

NO.	REVISION	DATE	DRAWN	CHKD	APPROV.
S	REVISED TOA DESIGN - UPDATED ALIGNMENT	8-23-17	REO	SGG	TSG
R	REVISED TOA DESIGN - REGRADE AT PROP. SOCCER FIELD	3-15-17	REO	SGG	TSG
Q	REVISED TOA DESIGN	12-22-16	REO	SGG	TSG
P	REVISED TOA DESIGN	9-16-16	REO	SGG	TSG
N	ISSUE FOR BID	8-16-16	REO	SGG	TSG
M	ISSUE FOR REVIEW	6-24-16	REO	SGG	TSG

EVERSOURCE ENERGY

T | R

CIRCUIT F107 115kV UNDERGROUND
UNDERGROUND TRANSMISSION LINE
MISCELLANEOUS DETAILS

DATE: 07/15/2015
SCALE: N.T.S.

DES: REO | CHK: TSG
DRW: REO | APR:
TOWN: DURHAM
TRANSMISSION LINE: LINE
MILE NO: 2
DISCIPLINE/SHT NO.
SHEET 4 OF 5
F10743002

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POWER ENGINEERS

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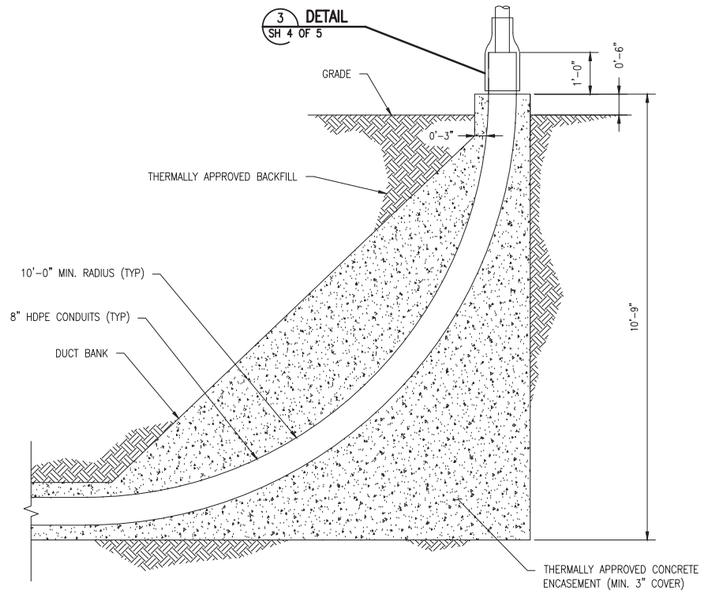
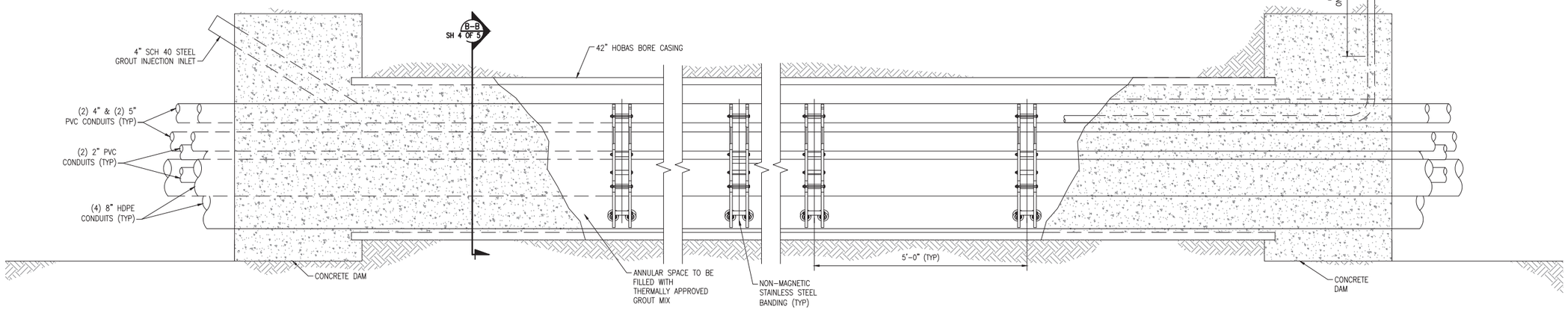
8/24/2017 1:47 PM - dclifford - R:\Projects\133007\05\DWG\03 Line\UNH\F10743002 REVISED BASE 8-18-17.dwg - SH 4 DETAILS

ES VER: 11/2015



RISER SWEEP DETAIL
DETAIL 1 SH 5 OF 5
SCALE N.T.S.



TYP PIPE JACKING DETAIL
DETAIL 2 SH 5 OF 5
SCALE N.T.S.

NO.	REVISION	DATE	DRWN	CHKD	APPRV
S	REVISED TSR DESIGN - UPDATED ALIGNMENT	8-23-17	REO	SGG	TSG
R	REVISED TSR DESIGN - REGRADE AT PROP. SOCCER FIELD	3-15-17	REO	SGG	TSG
Q	REVISED TSR DESIGN	12-22-16	REO	SGG	TSG
P	REVISED TSR DESIGN	9-16-16	REO	SGG	TSG
N	ISSUE FOR BID	8-16-16	REO	SGG	TSG
M	ISSUE FOR REVIEW	6-24-16	REO	SGG	TSG

EVERSOURCE ENERGY

T | R

CIRCUIT F107 115kV UNDERGROUND
UNDERGROUND TRANSMISSION LINE
RISER AND PIPE JACKING DETAILS

DATE: 07/15/2015
SCALE: N.T.S.

DES: REO | CHK: TSG
DRW: REO | APR:
TOWN: DURHAM
TRANSMISSION LINE: LINE
MILE NO: 2
DISCIPLINE/SHT NO.
SHEET 5 OF 5
F10743002

ISSUE FOR PERMITTING
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POWER ENGINEERS

PRINT DRAWING TO SCALE ON 22"X34" SHEET

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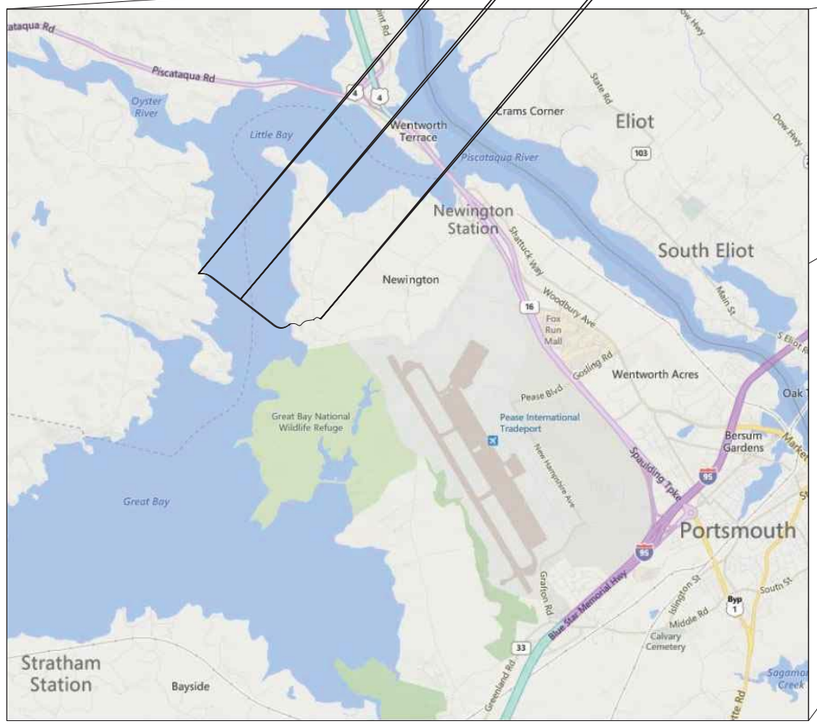
ES VER: 11/2015

PUBLIC SERVICE COMPANY OF NEW HAMPSHIRE
CIRCUIT F-107
LITTLE BAY, NEWINGTON
115kV UNDERGROUND TRANSMISSION LINE

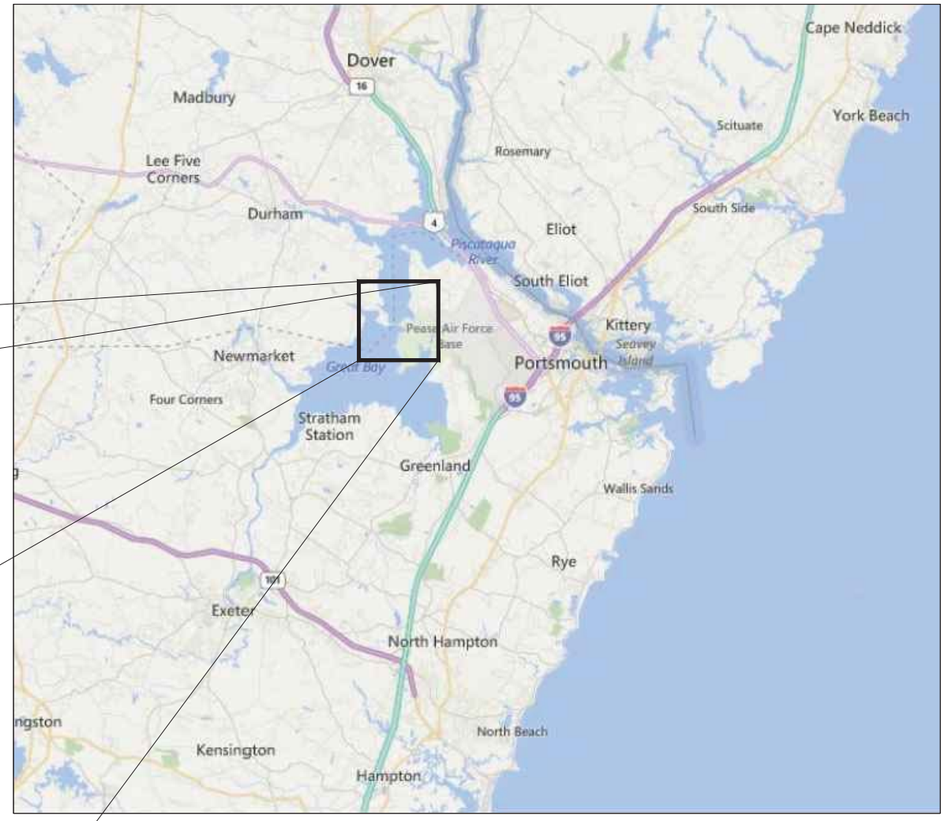
DRAWING MANIFEST			
DRAWING NO.	TITLE/DESCRIPTION	REVISION	DATE
SHEET 1 OF 13	COVER SHEET, LEGEND, AND DRAWING MANIFEST	12	8-2-2017
SHEET 2 OF 13	PLAN AND PROFILE DRAWING STA. 393+00 TO STA. 403+00	12	8-2-2017
SHEET 3 OF 13	PLAN AND PROFILE DRAWING STA. 403+00 TO STA. 413+00	12	8-2-2017
SHEET 4 OF 13	PLAN AND PROFILE DRAWING STA. 413+00 TO STA. 423+00	12	8-2-2017
SHEET 5 OF 13	PLAN AND PROFILE DRAWING STA. 423+00 TO STA. 433+00	12	8-2-2017
SHEET 6 OF 13	PLAN AND PROFILE DRAWING STA. 433+00 TO STA. 443+00	12	8-2-2017
SHEET 7 OF 13	PLAN AND PROFILE DRAWING STA. 443+00 TO STA. 453+00	12	8-2-2017
SHEET 8 OF 13	PLAN AND PROFILE DRAWING STA. 453+00 TO STA. 463+00	12	8-2-2017
SHEET 9 OF 13	PLAN AND PROFILE DRAWING STA. 463+00 TO STA. 470+00	12	8-2-2017
SHEET 10 OF 13	TRENCH AND JET PLOW DETAILS	12	8-2-2017
SHEET 11 OF 13	SPLICE VAULT DETAILS	12	8-2-2017
SHEET 12 OF 13	SPLICE VAULT DETAILS	12	8-2-2017
SHEET 13 OF 13	SPLICE VAULT MISCELLANEOUS DETAILS	12	8-2-2017

LEGEND

	ELECTRICAL STRUCTURE
	LAMP POST
	WOODEN POST
ICV	IRRIGATION CONTROL VALVE
E	ELECTRIC BOX
T	TELECOMMUNICATION BOX
	UTILITY BOX
	CATCH BASIN
	CONIFEROUS TREE
	DECIDUOUS TREE
	CONCRETE
	RIP RAP
	LANDSCAPED AREA
	CRUSHED STONE
	SURFACE LEDGE
TYP.	TYPICAL
RET.	RETAINING
EP	EDGE OF PAVEMENT
CONC.	CONCRETE
	TREE LINE
	SHRUB LINE
	PROPERTY LINES
D	DRAIN LINE
OHW	OVERHEAD ELECTRIC
UGE	UNDERGROUND ELECTRIC
W	WATER LINE
TELE	TELEPHONE LINE
S	SEWER
STM	STEAM LINE
PD	PROPOSED DRAIN
	EASMENT



VICINITY MAP
NOT TO SCALE



AREA MAP
NOT TO SCALE

General Notes

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NO.	REVISION	DATE	DRWN	CHKD	APPRV
12	ISSUED FOR SEC. REVISED BURIAL DEPTH	8/2/17	REO	SCG	TSG
11	REVISED 70% DESIGN	1/26/17	REO	SCG	TSG
10	REVISED 30% DESIGN	9/16/16	REO	SCG	TSG
9	ISSUE FOR BID	8/15/16	REO	SCG	TSG
8	ISSUE FOR PERMIT RELOCATE RISER	5/9/16	REO	SCG	TSG
7	ISSUE FOR PERMIT	12/04/15	REO	SCG	TSG

EVERSOURCE ENERGY

T | 12

CIRCUIT F-107 115kV
UNDERGROUND TRANSMISSION LINE
COVER SHEET

DATE: 08/25/2015
SCALE: N.T.S.

DES: REO | CHK: TSG
DRW: REO | APR:
TOWN: NEWINGTON
TRANSMISSION LINE: LINE
MILE NO: 8 & 9
DISCIPLINE/SHT NO.
SHEET 1 OF 13
F10743103

PSNH (PUBLIC SERVICE COMPANY OF NEW HAMPSHIRE)
DESIGN ENGINEER: JOSEPH SPERRY

POWER ENGINEERS
PROJECT ENGINEER: TODD GOYETTE

PSNH (PUBLIC SERVICE COMPANY OF NEW HAMPSHIRE)
WORK ORDER NUMBER:

POWER ENGINEERS
PROJECT NUMBER: 133007

PRINT DRAWING TO SCALE ON 22"X34" SHEET

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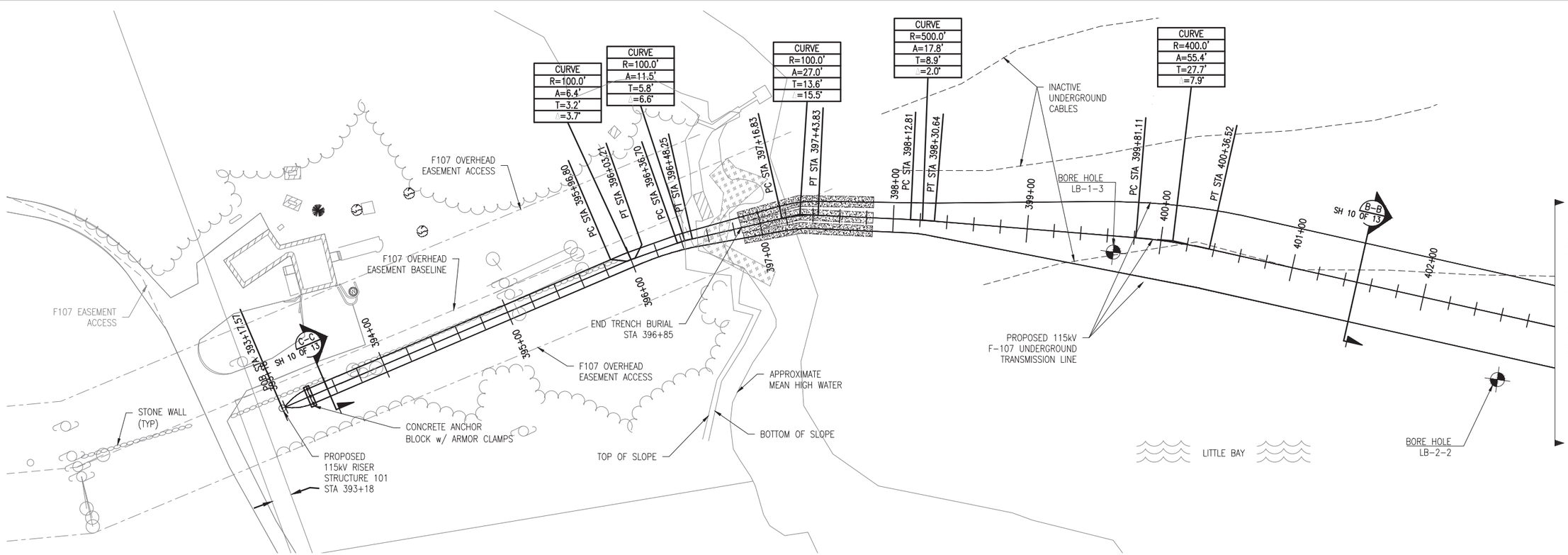
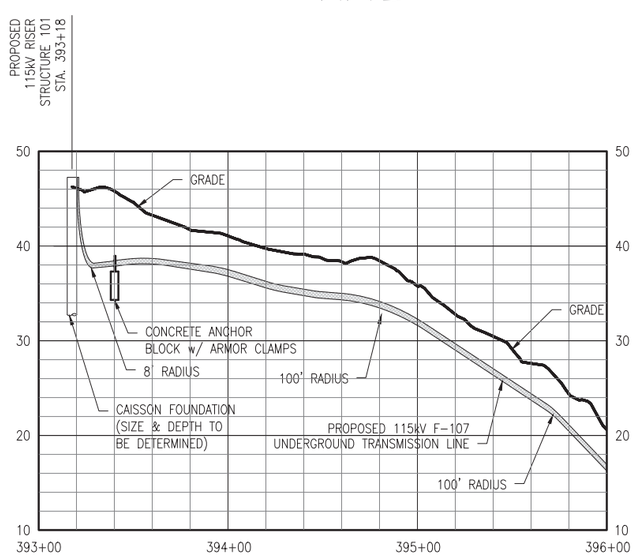
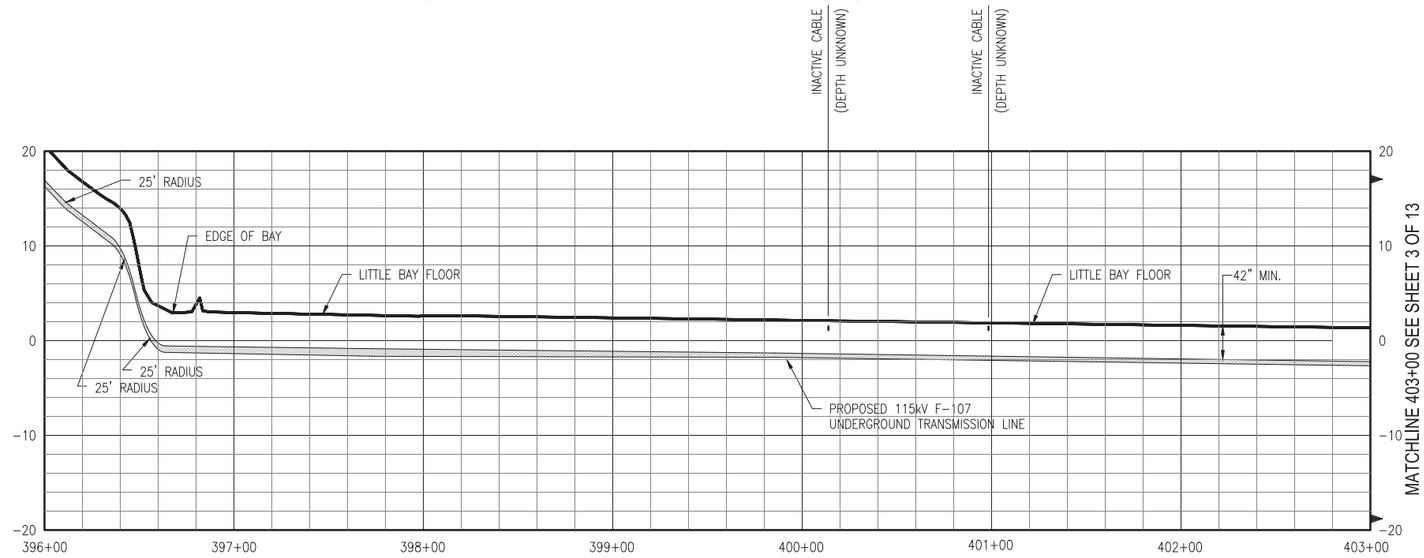
ES VER: 11/2015







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13. SEE CABLE REMOVAL PLAN PREPARED BY NORMANDEAU ASSOCIATES FOR REMOVAL LOCATIONS OF EXISTING CABLES.

0 4 8 16 24 FEET
VERTICAL 1"= 8'
0 20 40 80 120 FEET
HORIZONTAL 1"= 40'

PRINT DRAWING TO SCALE ON 22"X34" SHEET

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NO.	REVISION	DATE	DRWN	CHKD	APPRV.
12	ISSUED FOR SEC. REVISED BURIAL DEPTH	8/2/17	REO	SCG	TSG
11	REVISED 70% DESIGN	1/20/17	REO	SCG	TSG
10	REVISED 30% DESIGN	9/16/16	REO	SCG	TSG
9	ISSUE FOR BID	8/15/16	REO	SCG	TSG
8	ISSUE FOR PERMIT RELOCATE RISER	5/9/16	REO	SCG	TSG
7	ISSUE FOR PERMIT	12/30/15	REO	SCG	TSG

EVERSOURCE ENERGY

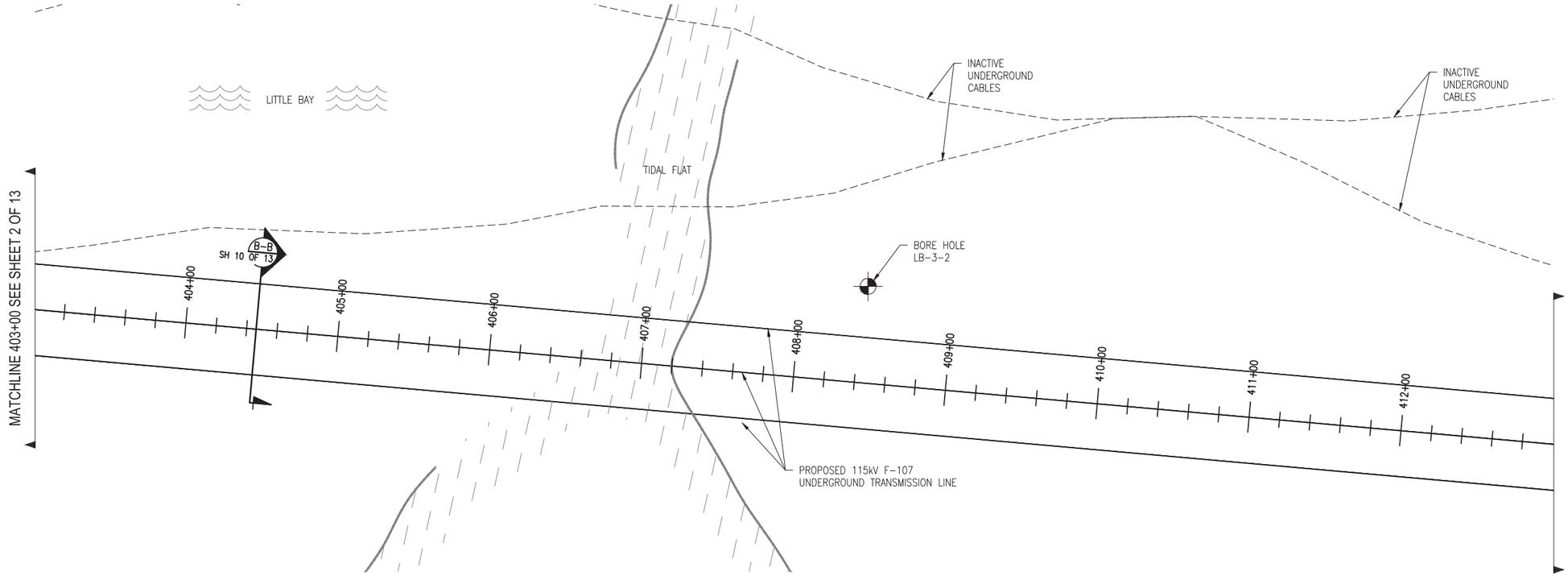
T 12

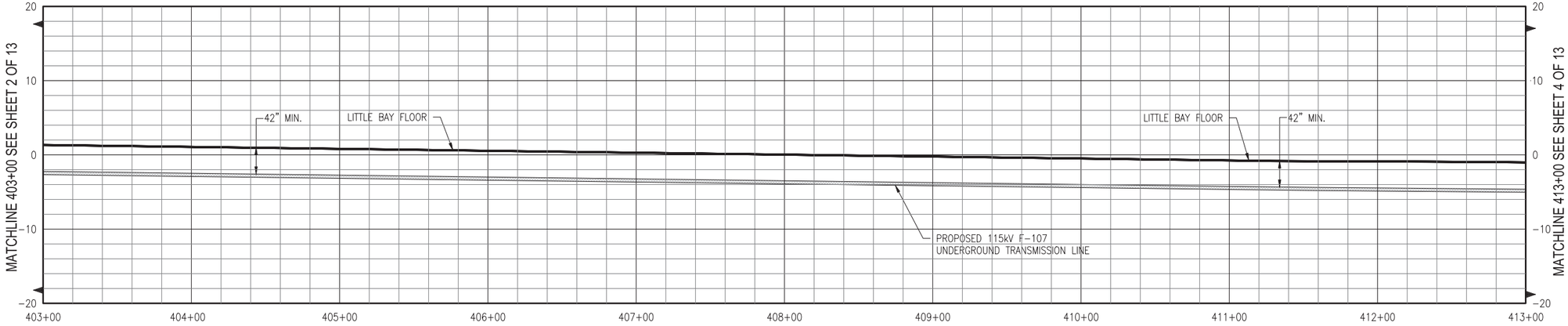
CIRCUIT F-107 115kV
UNDERGROUND TRANSMISSION LINE
PLAN AND PROFILE VIEW
SCALE: H 1"=40', V 1"=8"
DATE: 08/25/2015

DES: REO CHK: TSG
DRW: REO APR:
TOWN: NEWINGTON
TRANSMISSION LINE: LINE
MILE NO: 8 & 9
DISCIPLINE/SHT NO.
SHEET 2 OF 13
F10743003

8/2/2017 3:26 PM - rolsen - E:\Projects\133007\00\DWG\03 Line\F10743003 REV 12.dwg - 2

ES VER: 11/2015





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0 4 8 16 24 FEET
VERTICAL 1"= 8'
0 20 40 80 120 FEET
HORIZONTAL 1"= 40'
PRINT DRAWING TO SCALE ON 22"X34" SHEET

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NO.	REVISION	DATE	DRWN	CHKD	APPRV
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9	ISSUE FOR BID	8/15/16	REO	SCG	TSG
8	ISSUE FOR REVIEW	5/9/16	REO	SCG	TSG
7	ISSUE FOR PERMIT RELOCATE RISER	12/04/15	REO	SCG	TSG

EVERSOURCE ENERGY

T 12

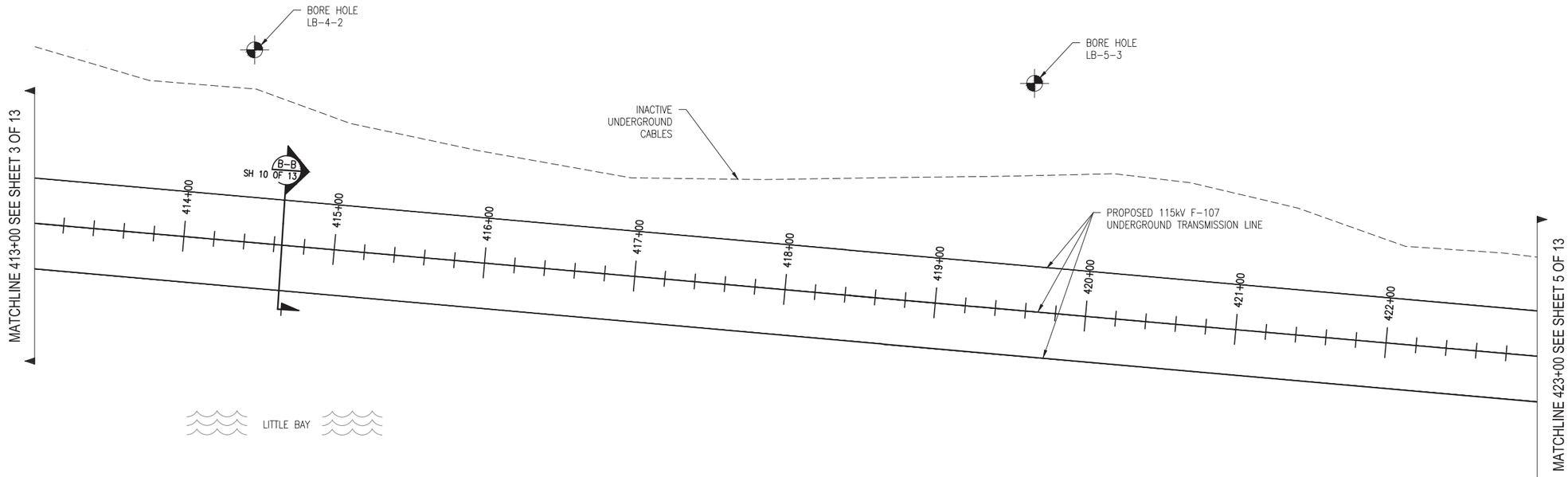
CIRCUIT F-107 115kV
UNDERGROUND TRANSMISSION LINE
PLAN AND PROFILE VIEW

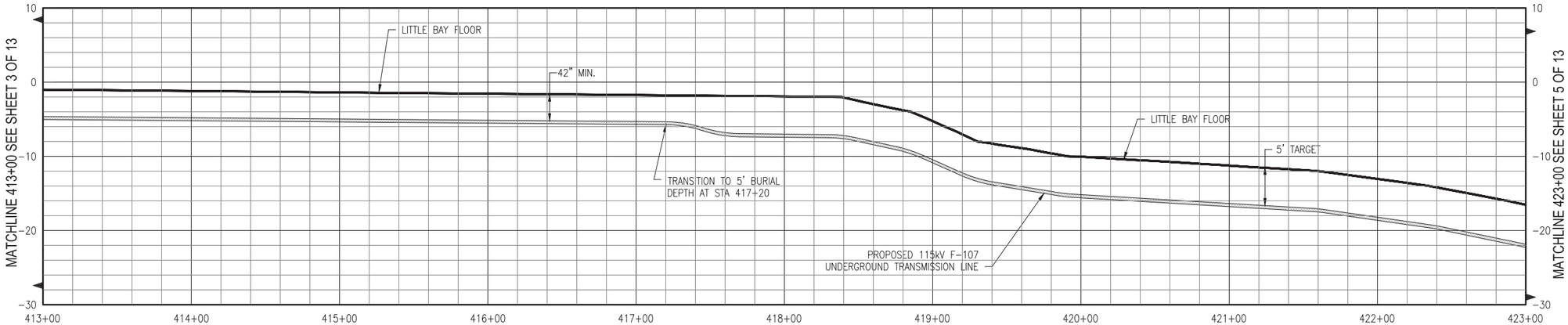
DATE: 08/25/2015
SCALE: H 1"=40', V 1"=8'

DES: REO | CHK: TSG
DRW: REO | APR:
TOWN: NEWINGTON
TRANSMISSION LINE: LINE
MILE NO: 8 & 9
DISCIPLINE/SHT NO.
SHEET 3 OF 13
F10743003

8/2/2017 2:48 PM - robsn - E:\Projects\133007\00\DWG\03 Line\F10743003 REV 12.dwg - 3

ES VER: 11/2015





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VERTICAL 1"= 8'
0 20 40 80 120 FEET
HORIZONTAL 1"= 40'
PRINT DRAWING TO SCALE ON 22"X34" SHEET

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NO.	REVISION	DATE	DRWN	CHKD	APPRV
12	ISSUED FOR SEC. REVISED BURIAL DEPTH	8/2/17	REO	SCG	TSG
11	REVISED 70% DESIGN	1/26/17	REO	SCG	TSG
10	REVISED 30% DESIGN	9/16/16	REO	SCG	TSG
9	ISSUE FOR BID	8/15/16	REO	SCG	TSG
8	ISSUE FOR REVIEW	5/9/16	REO	SCG	TSG
7	ISSUE FOR PERMIT RELOCATE RISER	12/28/15	REO	SCG	TSG

EVERSOURCE ENERGY

T 12

CIRCUIT F-107 115kV
UNDERGROUND TRANSMISSION LINE
PLAN AND PROFILE VIEW
DATE: 08/25/2015
SCALE: H 1"=40', V 1"=8'

DES: REO CHK: TSG
DRW: REO APR:
TOWN: NEWINGTON
TRANSMISSION LINE: LINE
MILE NO: 8 & 9
DISCIPLINE/SHT NO.
SHEET 4 OF 13
F10743003

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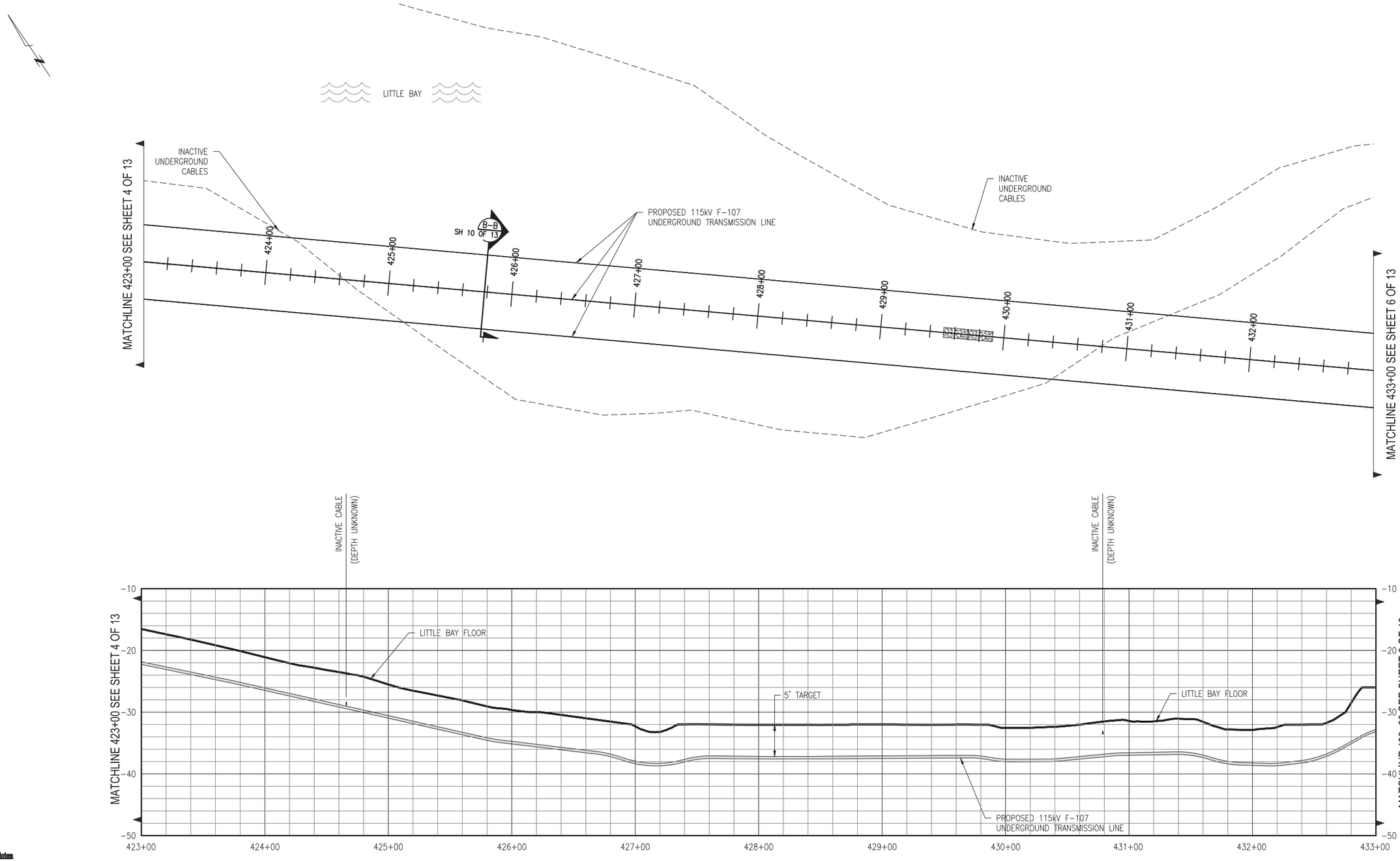
ES VER: 11/2015



General Notes

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3. TOPOGRAPHY IS BASED ON AN AERIAL LIDAR SURVEY AND SATELLITE IMAGERY, THEREFORE GRADES ARE APPROXIMATE. AN ON THE GROUND DETAIL SURVEY WILL BE REQUIRED FOR DESIGN.
4. DETAIL DESIGN MAY BE OPTIMIZED TO REFLECT ACTUAL CONDITIONS.
5. ALL EXISTING ROAD MARKINGS ARE ESTIMATED.
6. CONTRACTOR IS RESPONSIBLE FOR PLACING SILT FENCE OR OTHER APPROVED EROSION CONTROL DEVICES. WETLANDS HAVE NOT BEEN DELINEATED AND HAVE NOT BEEN CONSIDERED FOR DESIGN.
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13. SEE CABLE REMOVAL PLAN PREPARED BY NORMANDEAU ASSOCIATES FOR REMOVAL LOCATIONS OF EXISTING CABLES.

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EVERSOURCE ENERGY

T 12

CIRCUIT F–107 115kV
UNDERGROUND TRANSMISSION LINE
PLAN AND PROFILE VIEW
SCALE: H 1"=40', V 1"=8"
DATE: 08/25/2015

DES: REO CHK: TSG
DRW: REO APR:
TOWN: NEWINGTON
TRANSMISSION LINE: LINE
MILE NO: 8 & 9
DISCIPLINE/SHT NO.
SHEET 5 OF 13
F10743003

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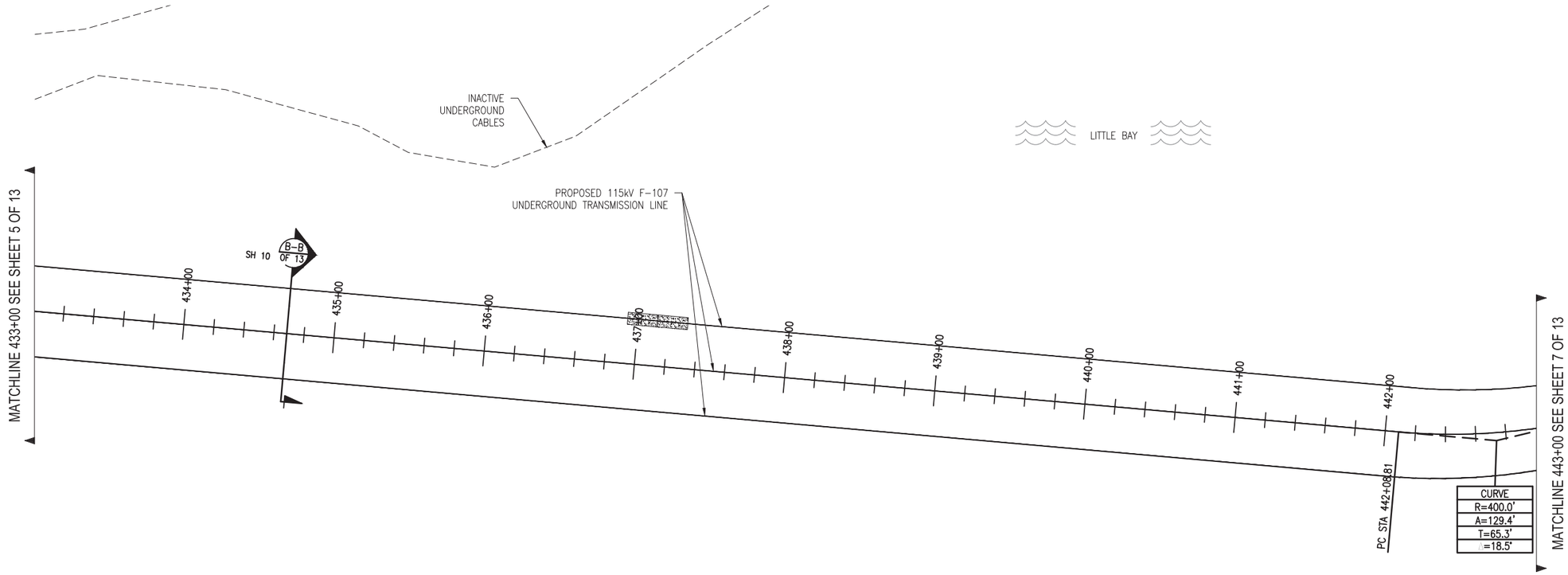
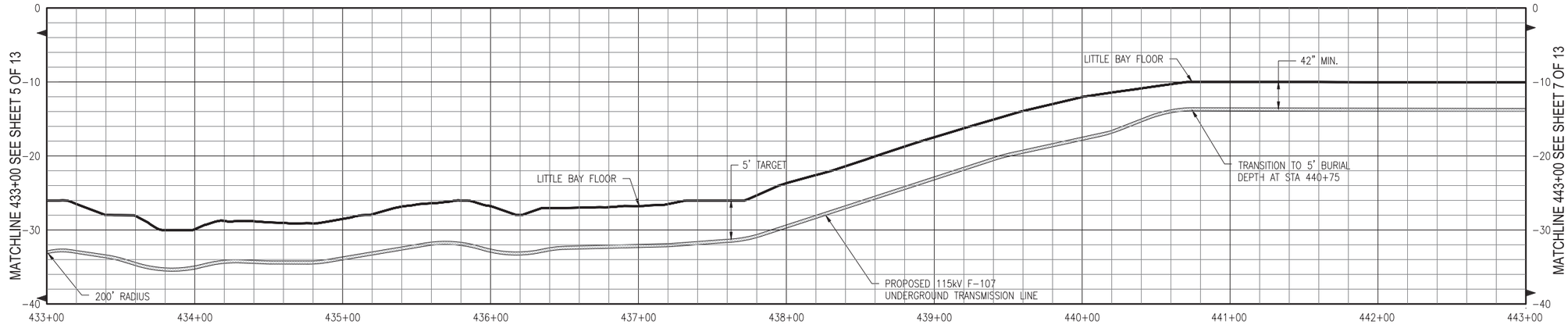
ES VER: 11/2015





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8	ISSUE FOR REVIEW	5/9/16	REO	SCG	TSG
7	ISSUE FOR PERMIT RELOCATE RISER	11/20/15	REO	SCG	TSG

EVERSOURCE ENERGY

T 12

CIRCUIT F-107 115kV
UNDERGROUND TRANSMISSION LINE
PLAN AND PROFILE VIEW
DATE: 08/25/2015
SCALE: H 1"=40', V 1"=8'

DES: REO | CHK: TSG
DRW: REO | APR:
TOWN: NEWINGTON
TRANSMISSION LINE: LINE
MILE NO: 8 & 9
DISCIPLINE/SHT NO.
SHEET 6 OF 13
F10743003

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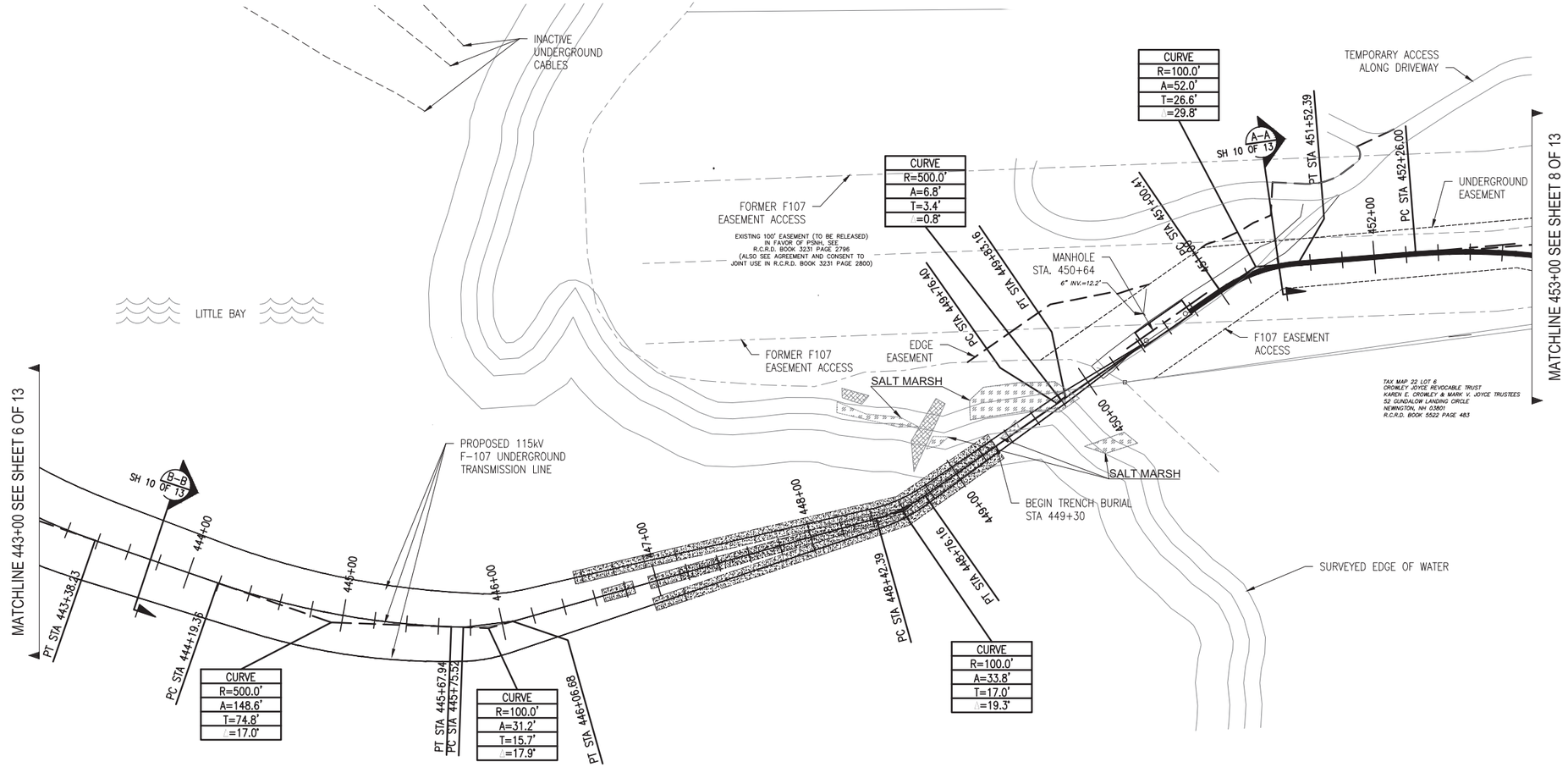
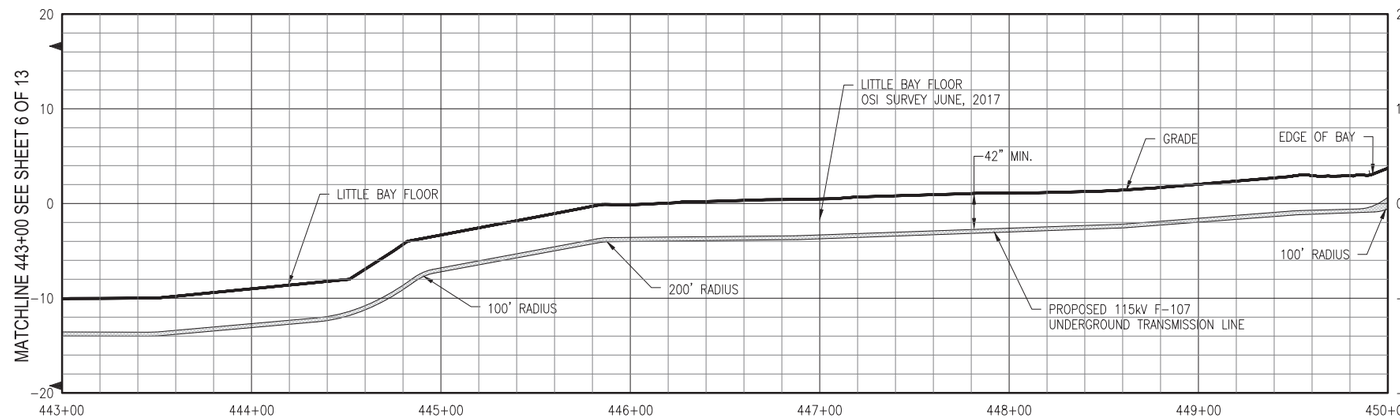
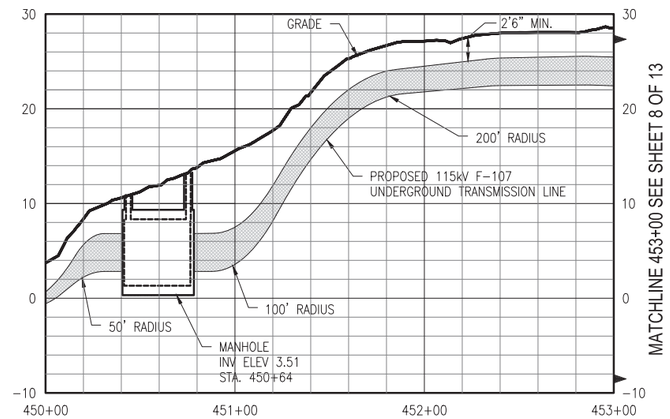
ES VER: 11/2015







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EVERSOURCE ENERGY

T 12

CIRCUIT F-107 115kV
UNDERGROUND TRANSMISSION LINE
PLAN AND PROFILE VIEW
SCALE: H 1"=40', V 1"=8'
DATE: 08/25/2015

DES: REO | CHK: TSG
DRW: REO | APR:
TOWN: NEWINGTON
TRANSMISSION LINE: LINE
MILE NO: 8 & 9
DISCIPLINE/SHT NO.
SHEET 7 OF 13
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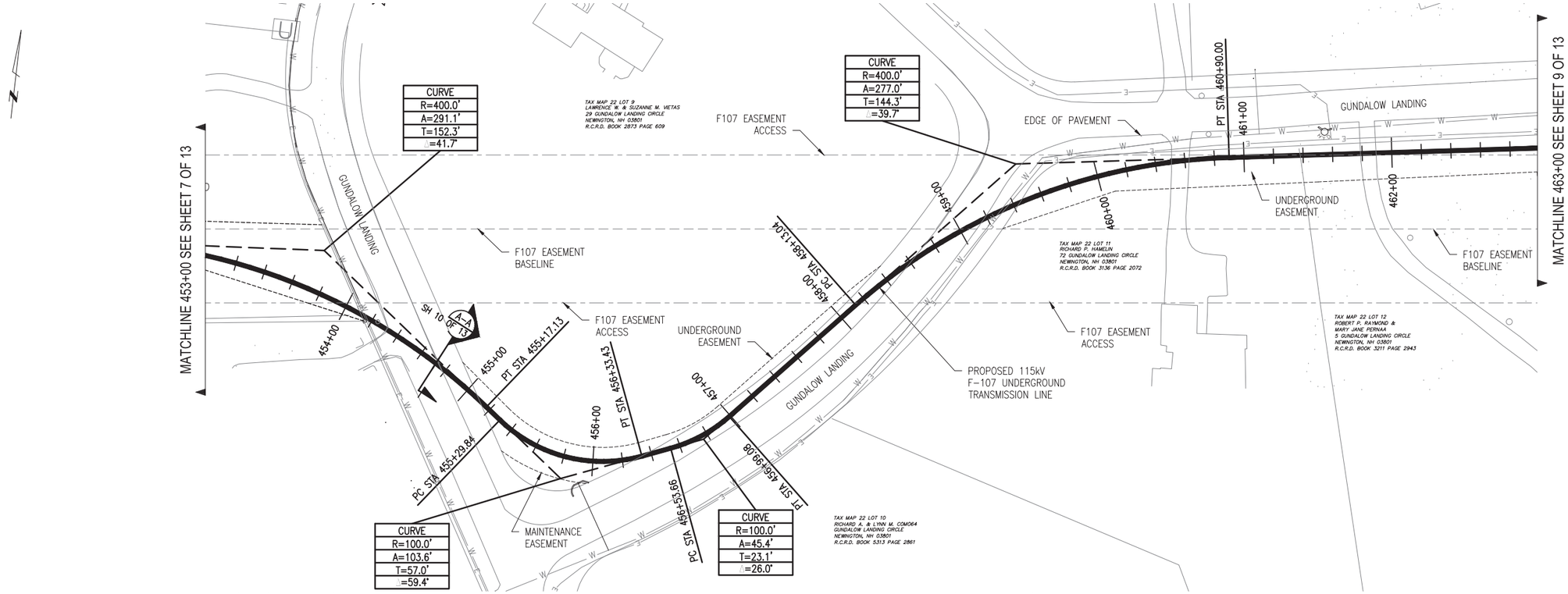

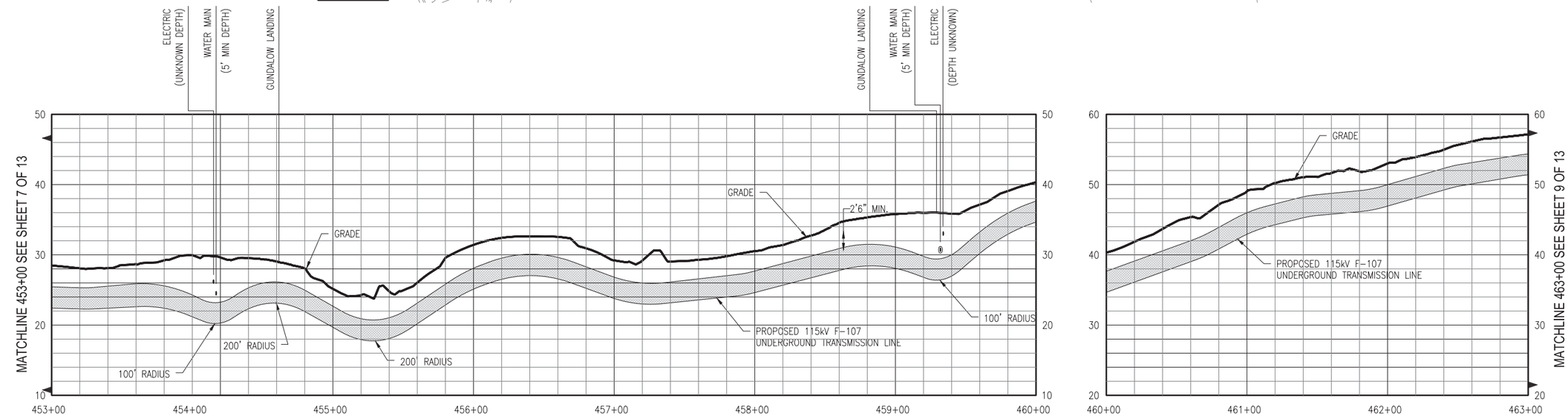

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EVERSOURCE ENERGY

T 12

CIRCUIT F-107 115kV
UNDERGROUND TRANSMISSION LINE
PLAN AND PROFILE VIEW
DATE: 08/25/2015
SCALES: H 1"=40', V 1"=8'

DES: REO CHK: TSG
DRW: REO APR:
TOWN: NEWINGTON
TRANSMISSION LINE: LINE
MILE NO: 8 & 9
DISCIPLINE/SHT NO.
SHEET 8 OF 13
F10743003

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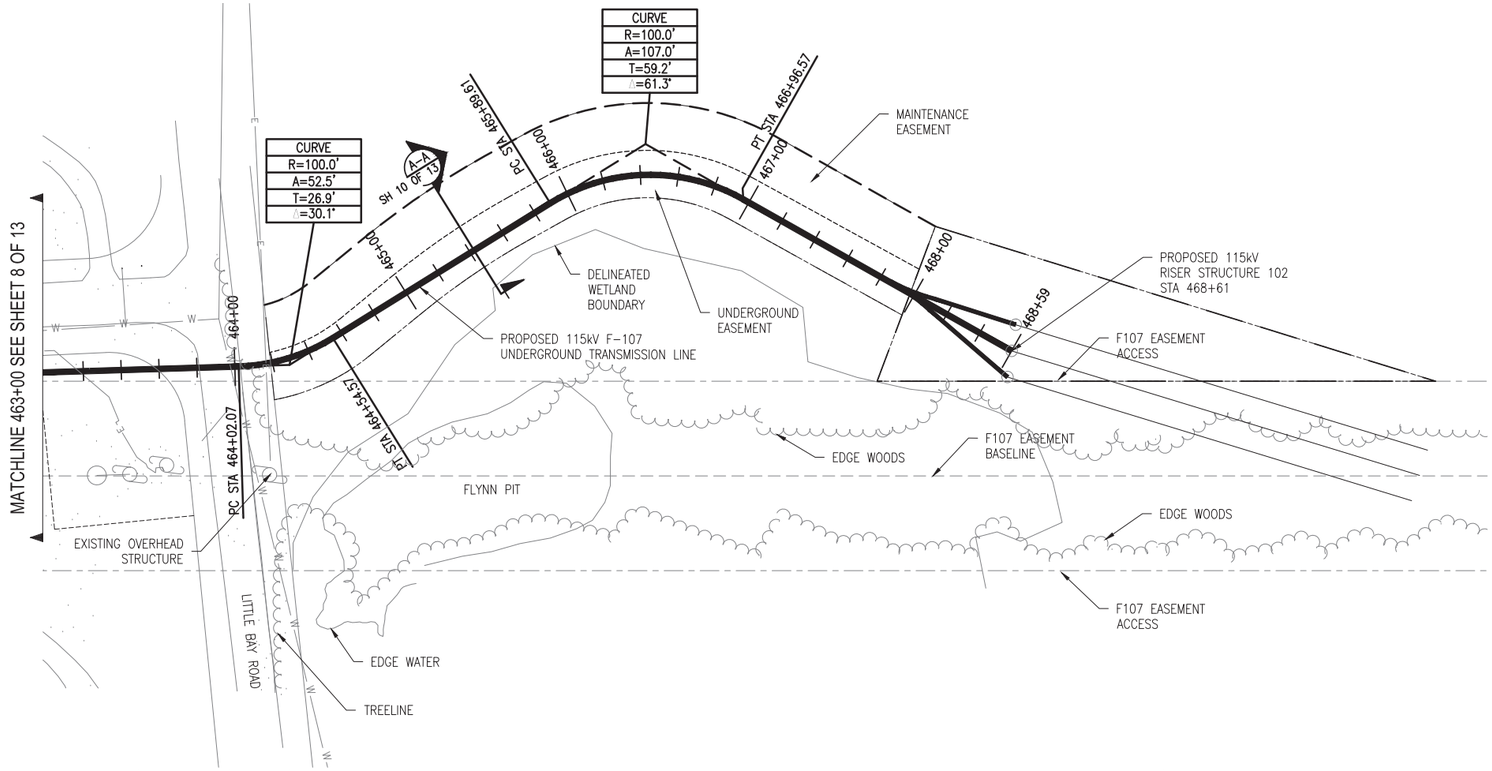
ES VER: 11/2015



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14. IF MONOPOLE RISER STRUCTURE INSTALLED AT STATION 468+61 INSTALL ALL DUCTS ALONG CENTERLINE ALIGNMENT.

0 4 8 16 24 FEET
VERTICAL 1"= 8'

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EVERSOURCE ENERGY

T 12

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SHEET 9 OF 13
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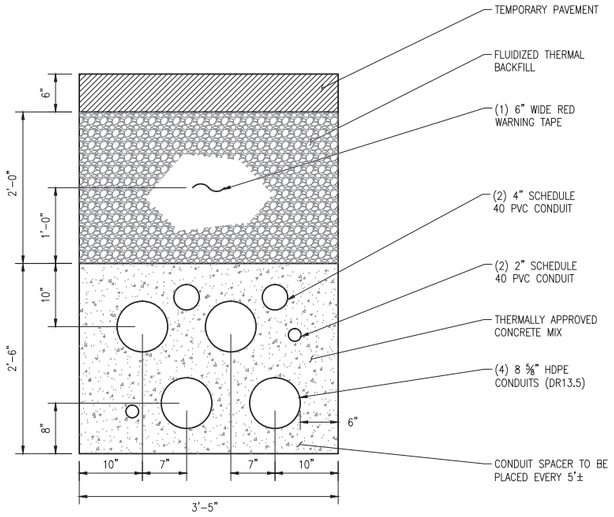

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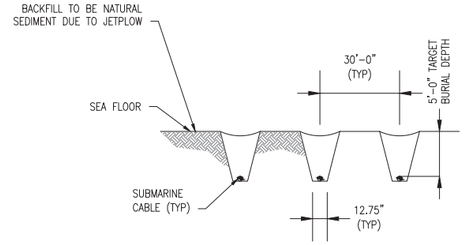
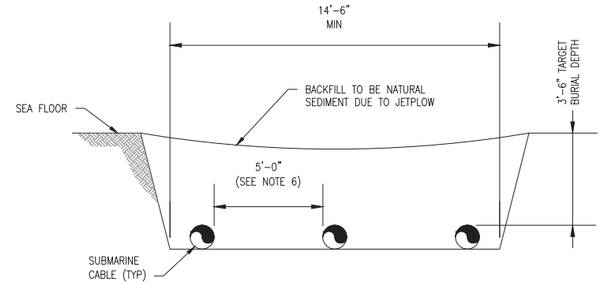
SECTION A–A
SCALE N.T.S SH 10 OF 13

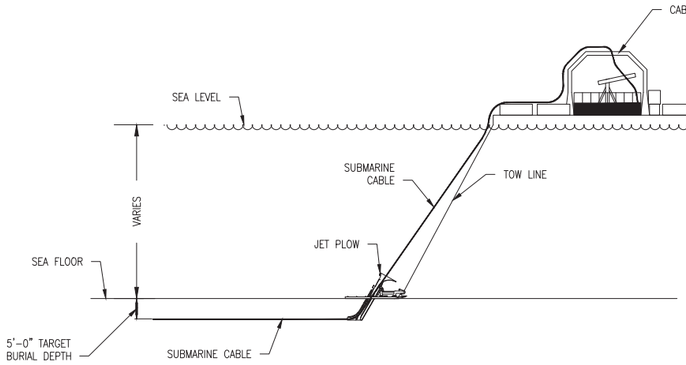


TYP SUBMARINE JET PLOW
SECTION B–B
SCALE N.T.S SH 10 OF 13

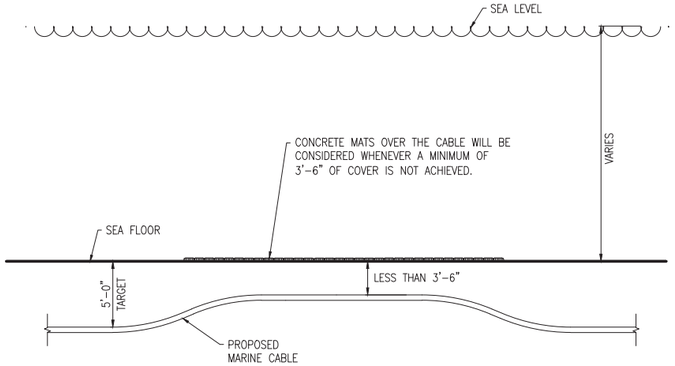


TYP SUBMARINE TRENCH
SECTION C–C
SCALE N.T.S SH 10 OF 13

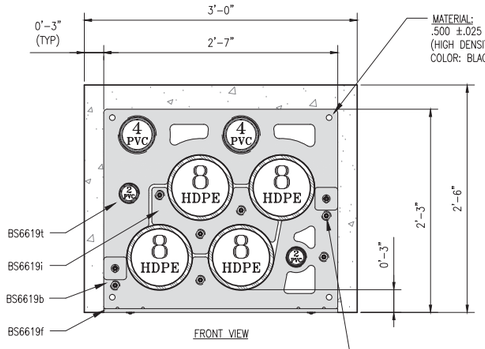
PLAN VIEW



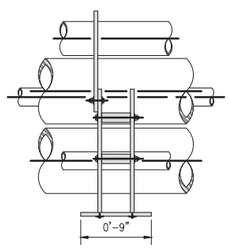
TYP SUBMARINE ELEVATION
DETAIL 2
SCALE N.T.S. SH 10 OF 13



PROFILE VIEW



FRONT VIEW

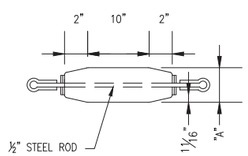


SIDE VIEW

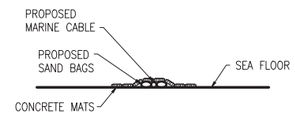
THE NUTS, BOLTS & WASHERS REQUIRED TO SECURE THE TOP SPACER TO THE BASE SPACER ARE IN A BAG THAT IS ATTACHED TO THE TOP SPACER

UNDERGROUND DEVICES SPACER ARRANGEMENT
DETAIL 1
SCALE N.T.S. SH 10 OF 13

NOTES:
1. STAGGER BELL ENDS.
2. AVOID STANDING ON CONDUIT.
3. BELL ENDS SHALL BE INSTALLED ALL IN THE SAME DIRECTION BETWEEN TERMINATIONS. (SEE PULL DIRECTION DETAIL.)
4. ALL TRENCH DETAILS AND PHASING SHOWN AS LOOKING AHEAD STATIONS.
5. ALL DUCT SPACERS ARE UNDERGROUND DEVICES SPACERS, OR APPROVED EQUIVALENT.
6. SEPARATION SHOWN IS TYPICAL SPACING IN TRENCH EXCAVATION AREAS. SEE PLAN DETAILS FOR SEPARATION AT OTHER LOCATIONS.



TYP MANDREL
DETAIL 3
SCALE N.T.S. SH 10 OF 13



CROSS SECTION

CONCRETE MATTING FOR SHALLOW PENETRATION
DETAIL 4
SCALE N.T.S. SH 10 OF 13

ISSUE FOR PERMITTING
NOT FOR CONSTRUCTION

PRINT DRAWING TO SCALE ON 22"X34" SHEET

NO.	REVISION	DRWN	CHKD	APPR.
12	ISSUED FOR SEC. REVISED BURIAL DEPTH	8/2/17	REO	SCG	TSG
11	REVISED 70% DESIGN	1/20/17	REO	SCG	TSG
10	REVISED 30% DESIGN	9/16/16	REO	SCG	TSG
9	ISSUE FOR BID	8/15/16	REO	SCG	TSG
8	ISSUE FOR BID	5/5/16	REO	SCG	TSG
7	ISSUE FOR PERMIT RELOCATE RISER	12/28/15	JMM	SCG	TSG

EVERSOURCE ENERGY

T 12

CIRCUIT F-107 115kV
UNDERGROUND TRANSMISSION LINE
TRENCH AND JET PLOW DETAILS

DATE: 08/25/2015
SCALE: N.T.S.

DES: REO | CHK: TSG
DRW: REO | APR:

TOWN: NEWINGTON
TRANSMISSION LINE: LINE
MILE NO: 8 & 9
DISCIPLINE/SHT NO.
SHEET 10 OF 13
F10705060

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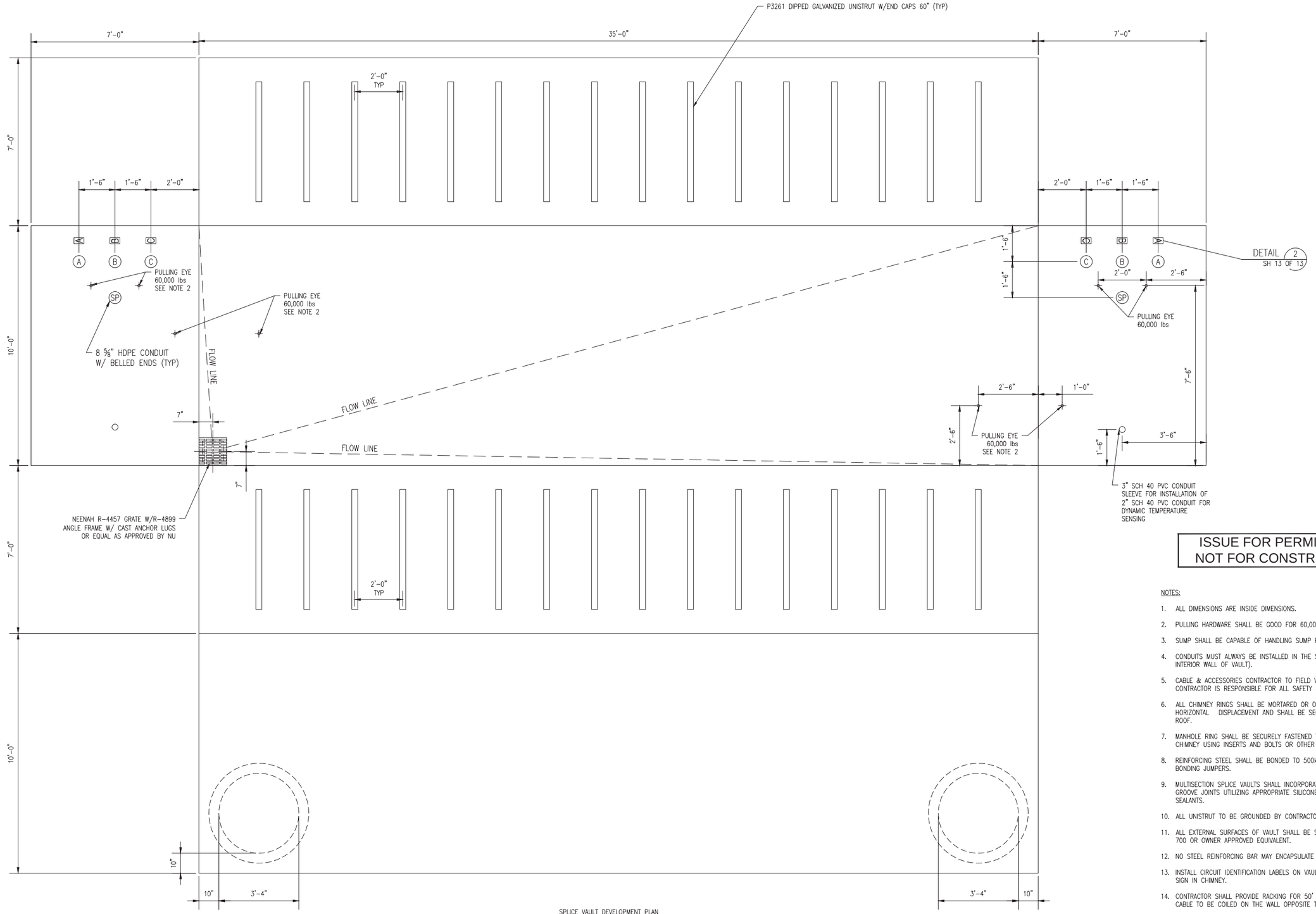
8/2/2017 10:29 AM – rolsen – E:\Projects\13300\700\DWG\03 Line\70% DESIGN\F10705060 REV 12 SH 10.dwg – 10

ES VER: 11/2015



SPLICE VAULT DEVELOPMENT PLAN
DETAIL 1 SH 11 OF 13
SCALE 1" = 2'-0"

ISSUE FOR PERMITTING
NOT FOR CONSTRUCTION

NOTES:

1. ALL DIMENSIONS ARE INSIDE DIMENSIONS.
2. PULLING HARDWARE SHALL BE GOOD FOR 60,000lbs OF TENSION, MINIMUM.
3. SUMP SHALL BE CAPABLE OF HANDLING SUMP PUMP, MINIMUM 4" DEEP.
4. CONDUITS MUST ALWAYS BE INSTALLED IN THE SAME DIRECTION (BELL END FLUSH WITH INTERIOR WALL OF VAULT).
5. CABLE & ACCESSORIES CONTRACTOR TO FIELD VERIFY ACTUAL SPLICE VAULT DEPTHS. CONTRACTOR IS RESPONSIBLE FOR ALL SAFETY & ENTRY/EXIT REQUIREMENTS.
6. ALL CHIMNEY RINGS SHALL BE MORTARED OR OTHERWISE "KEYED" TO PREVENT HORIZONTAL DISPLACEMENT AND SHALL BE SECURELY MORTARED TO SPLICE VAULT ROOF.
7. MANHOLE RING SHALL BE SECURELY FASTENED TO THE SPLICE VAULT ROOF OR CHIMNEY USING INSERTS AND BOLTS OR OTHER MEANS WITH PRIOR APPROVAL.
8. REINFORCING STEEL SHALL BE BONDED TO 500kcmil SOFT DRAWN BARE COPPER BONDING JUMPERS.
9. MULTISECTION SPLICE VAULTS SHALL INCORPORATE EITHER SHIPLAP OR TONGUE AND GROOVE JOINTS UTILIZING APPROPRIATE SILICONE, POLYMERIC OR ELASTOMERIC SEALANTS.
10. ALL UNISTRUT TO BE GROUNDED BY CONTRACTOR.
11. ALL EXTERNAL SURFACES OF VAULT SHALL BE SEALED USING SONNEDORN HYDROCIDE 700 OR OWNER APPROVED EQUIVALENT.
12. NO STEEL REINFORCING BAR MAY ENCAPSULATE ANY INDIVIDUAL CONDUIT.
13. INSTALL CIRCUIT IDENTIFICATION LABELS ON VAULT WALL AND INSTALL DANGER WARNING SIGN IN CHIMNEY.
14. CONTRACTOR SHALL PROVIDE RACKING FOR 50' OF DYNAMIC TEMPERATURE SENSING CABLE TO BE COILED ON THE WALL OPPOSITE THE CABLE SPLICES.

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NO.	REVISION	DATE	DRWN	CHKD	APPRV
12	ISSUED FOR SEC. REVISED BURIAL DEPTH	8/2/17	REO	SCG	TSG
11	REVISED 70% DESIGN	1/26/17	REO	SCG	TSG
10	REVISED 30% DESIGN	9/16/16	REO	SCG	TSG
9	ISSUE FOR BID	8/15/16	REO	SCG	TSG
8	ISSUE FOR REVIEW	5/9/16	REO	SCG	TSG
7	ISSUE FOR PERMIT RELOCATE RISER	12/30/15	REO	SCG	TSG

EVERSOURCE ENERGY

T 12

CIRCUIT F-107 115kV
UNDERGROUND TRANSMISSION LINE
SPLICE VAULT DETAIL SHEET

DATE: 08/25/2015
SCALE: N.T.S.

DES: REO | CHK: TSG
DRW: REO | APR:

TOWN: NEWINGTON
TRANSMISSION LINE: LINE
MILE NO: 8 & 9
DISCIPLINE/SHT NO.
SHEET 11 OF 13
F10705060

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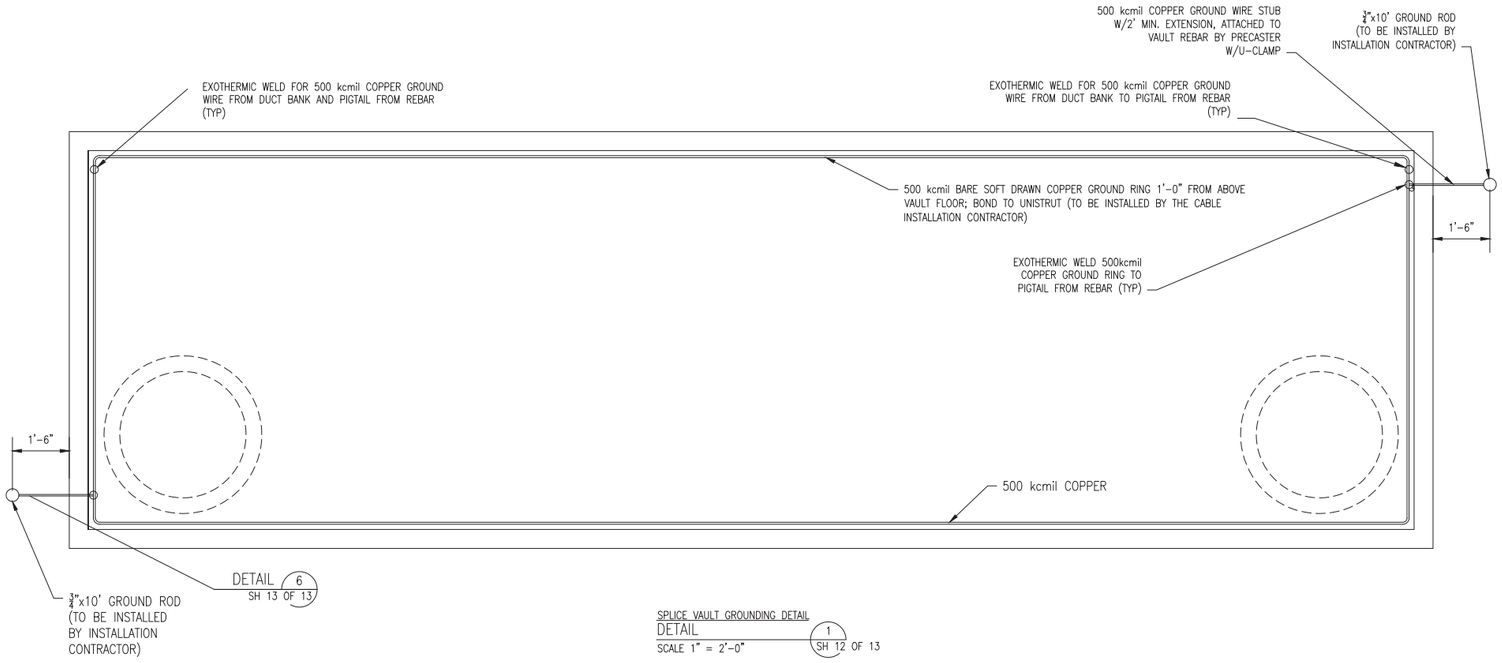
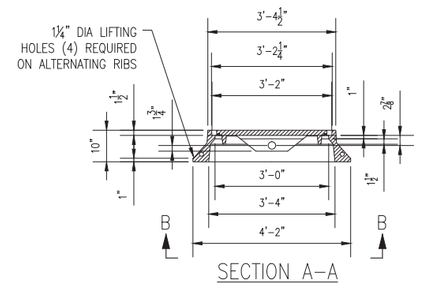
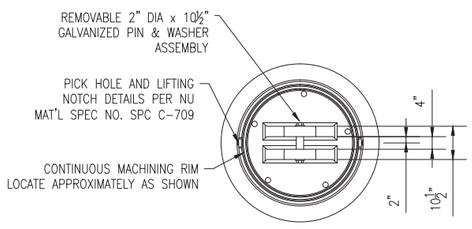
ES VER: 11/2015



SPLICE VAULT GROUNDING DETAIL
DETAIL 1 SH 12 OF 13
SCALE 1" = 2'-0"

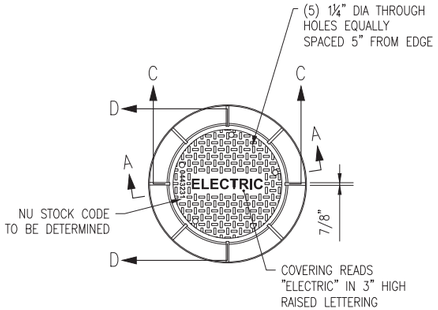


SECTION A–A

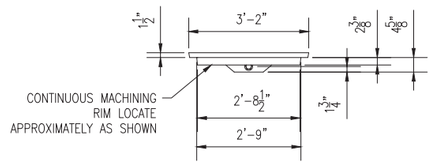


SECTION B–B
AASHTO HS 25 LOAD RATED

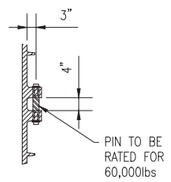
SPLICE VAULT FRAME DETAIL
DETAIL 2 SH 12 OF 13
SCALE N.T.S.



TOP VIEW



SECTION C–C
AASHTO HS 25 LOAD RATED



SECTION D–D

TETHERED SPLICE VAULT LID
DETAIL 3 SH 12 OF 13
SCALE N.T.S.

ISSUE FOR PERMITTING
NOT FOR CONSTRUCTION

NOTES:

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12. NO STEEL REINFORCING BAR MAY ENCAPSULATE ANY INDIVIDUAL CONDUIT.
13. INSTALL CIRCUIT IDENTIFICATION LABELS ON VAULT WALL AND INSTALL DANGER WARNING SIGN IN CHIMNEY.
14. CONTRACTOR SHALL PROVIDE RACKING FOR 50' OF DYNAMIC TEMPERATURE SENSING CABLE TO BE COILED ON THE WALL OPPOSITE THE CABLE SPLICES.

NO.	REVISION	DATE	DRWN	CHKD	APPRV
12	ISSUED FOR SEC. REVISED BURIAL DEPTH	8/2/17	REO	SCG	TSG
11	REVISED 70% DESIGN	1/26/17	REO	SCG	TSG
10	REVISED 30% DESIGN	9/16/16	REO	SCG	TSG
9	ISSUE FOR BID	8/15/16	REO	SCG	TSG
8	ISSUE FOR REVIEW	5/17/16	REO	SCG	TSG
7	ISSUE FOR PERMIT RELOCATE RISER	11/20/15	REO	SCG	TSG

EVERSOURCE ENERGY

T 12

CIRCUIT F-107 115kV
UNDERGROUND TRANSMISSION LINE
SPLICE VAULT DETAIL SHEET

DATE: 08/25/2015
SCALE: N.T.S.

DES: REO | CHK: TSG
DRW: REO | APR:

TOWN: NEWINGTON
TRANSMISSION LINE: LINE
MILE NO: 8 & 9
DISCIPLINE/SHT NO.
SHEET 12 OF 13
F10705060

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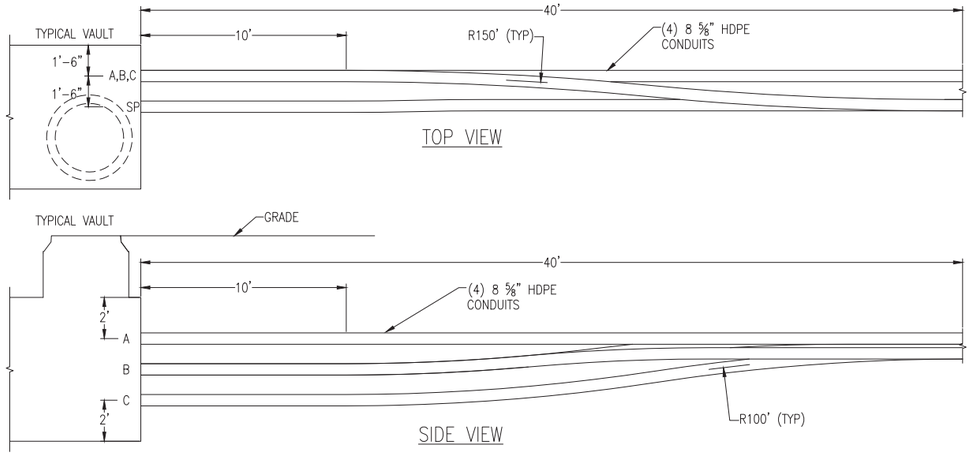
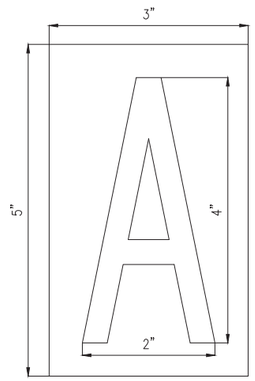
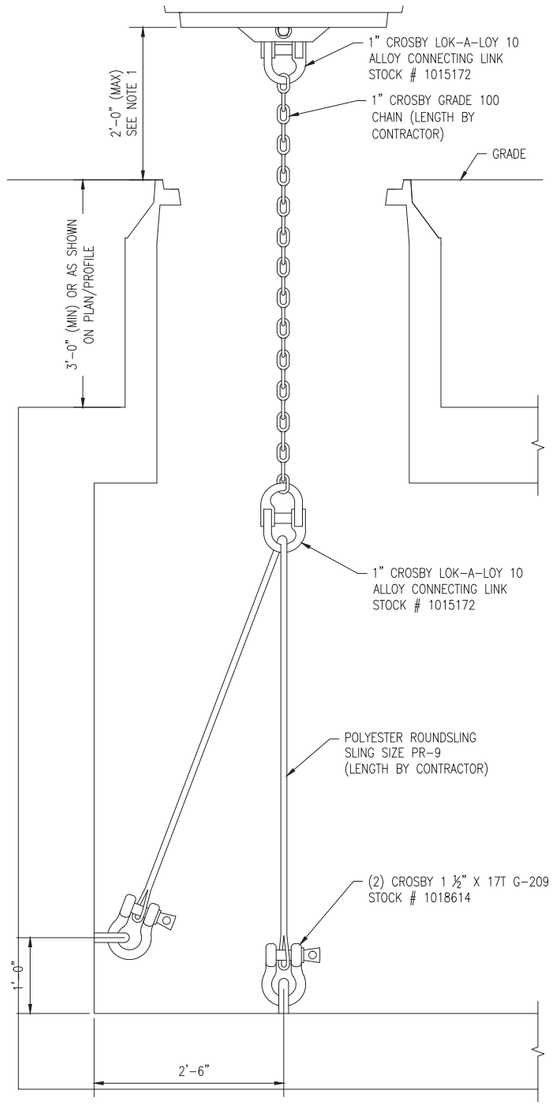


SPLICE VAULT TRANSITION DETAIL
DETAIL 1 SH 13 OF 13
NTS



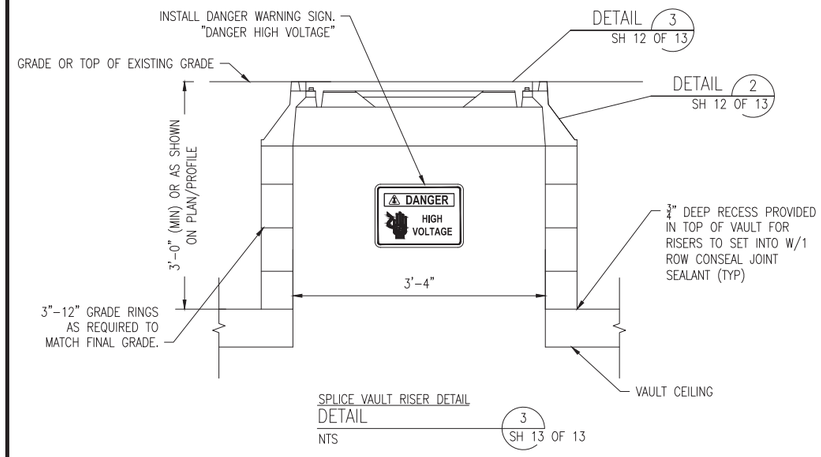
PHASE IDENTIFICATION TAG
DETAIL 2 SH 13 OF 13
NTS

NOTES:
1. CHARACTER SHALL BE 4" HIGH BOLD TYPE.
2. CHARACTER SHALL BE CENTERED ON SIGN.
3. BACKGROUND: WHITE
   LETTERING: BLACK
   CHARACTERS: A, B & C AS SHOWN

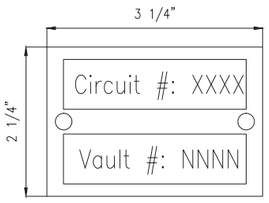


MANHOLE TETHER DETAIL
DETAIL 8 SH 13 OF 13
NTS

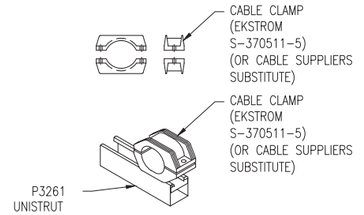
NOTE:
1. CONTRACTOR TO ADJUST TETHER SYSTEM FOR MAXIMUM COVER RISE OF 24".



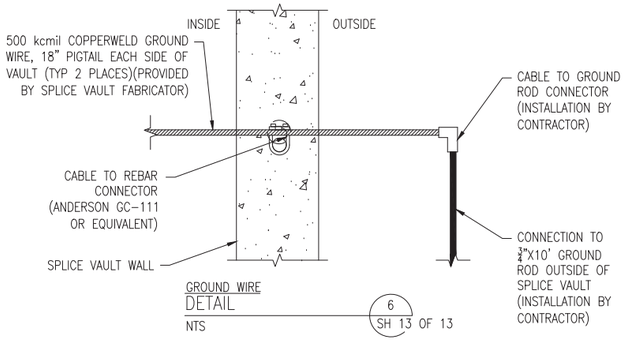
SPLICE VAULT RISER DETAIL
DETAIL 3 SH 13 OF 13
NTS



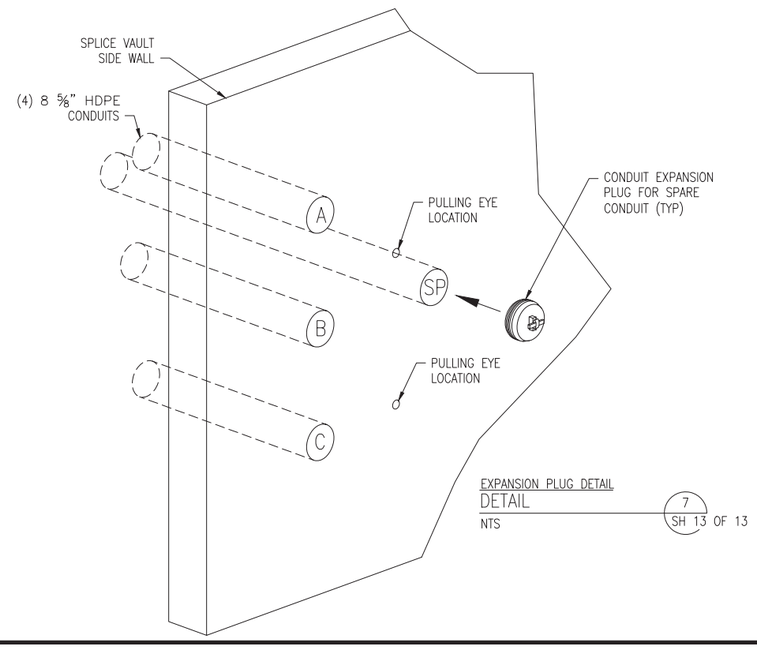
CIRCUIT IDENTIFICATION TAG
DETAIL 4 SH 13 OF 13
NTS



VAULT RACKING CABLE CLAMP
DETAIL 5 SH 13 OF 13
NTS



GROUND WIRE
DETAIL 6 SH 13 OF 13
NTS



EXPANSION PLUG DETAIL
DETAIL 7 SH 13 OF 13
NTS

ISSUE FOR PERMITTING
NOT FOR CONSTRUCTION

NO.	REVISION	DATE	DRWN	CHKD	APPRV
12	ISSUED FOR SEC. REVISED BURIAL DEPTH	8/2/17	REO	SCG	TSG
11	REVISED 70% DESIGN	1/20/17	REO	SCG	TSG
10	REVISED 30% DESIGN	9/16/16	REO	SCG	TSG
9	ISSUE FOR BID	8/15/16	REO	SCG	TSG
8	ISSUE FOR REVIEW	5/17/16	REO	SCG	TSG
7	ISSUE FOR PERMIT RELOCATE RISER	12/7/15	REO	SCG	TSG

EVERSOURCE ENERGY

T | 12

CIRCUIT F-107 115kV
UNDERGROUND TRANSMISSION LINE
SPLICE VAULT DETAIL SHEET

DATE: 08/25/2015
SCALE: N.T.S.

DES: REO | CHK: TSG
DRW: REO | APR:

TOWN: NEWINGTON
TRANSMISSION LINE: LINE
MILE NO: 8 & 9
DISCIPLINE/SHT NO.
SHEET 13 OF 13
F10705060

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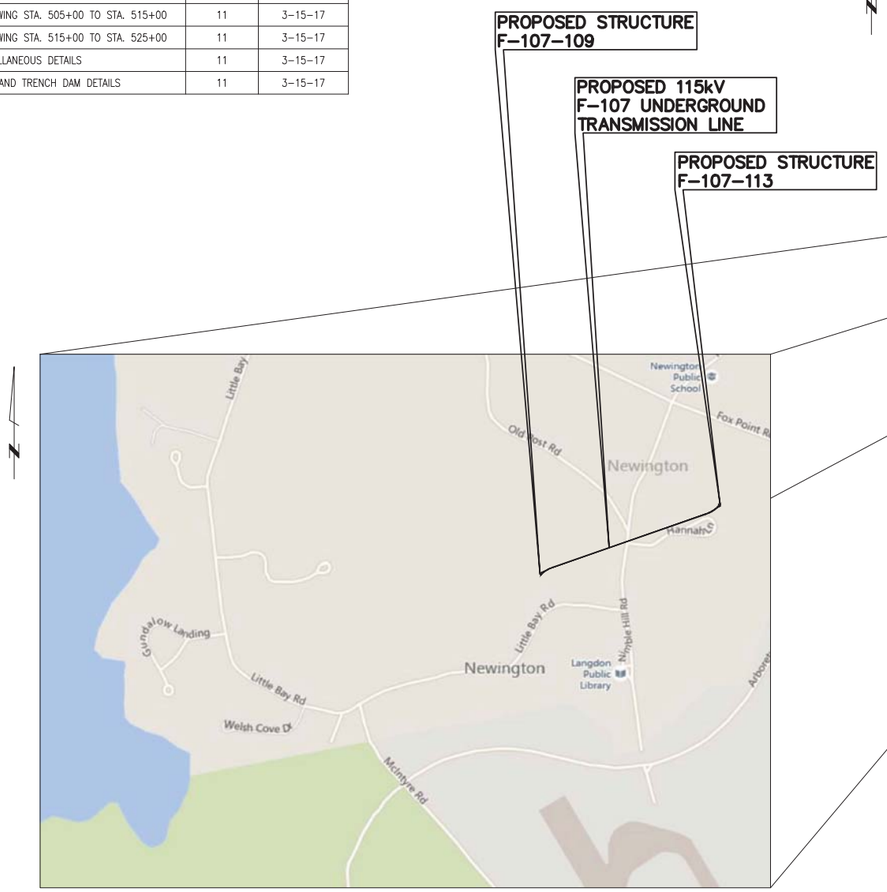
ES VER: 11/2015

PUBLIC SERVICE COMPANY OF NEW HAMPSHIRE
CIRCUIT F-107
FRINK FARM, NEWINGTON
115 kV UNDERGROUND TRANSMISSION LINE

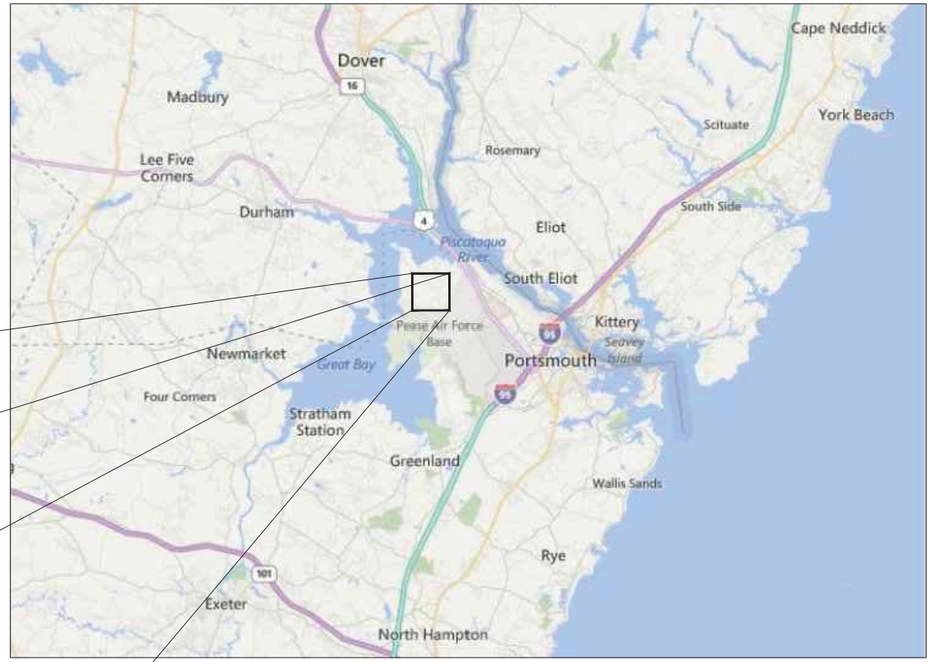
DRAWING MANIFEST			
DRAWING NO.	TITLE/DESCRIPTION	REVISION	DATE
SHEET 1 OF 6	COVER SHEET, LEGEND, AND DRAWING MANIFEST	11	3-15-17
SHEET 2 OF 6	PLAN AND PROFILE DRAWING STA. 495+00 TO STA. 505+00	11	3-15-17
SHEET 3 OF 6	PLAN AND PROFILE DRAWING STA. 505+00 TO STA. 515+00	11	3-15-17
SHEET 4 OF 6	PLAN AND PROFILE DRAWING STA. 515+00 TO STA. 525+00	11	3-15-17
SHEET 5 OF 6	MISCELLANEOUS DETAILS	11	3-15-17
SHEET 6 OF 6	RISER SWEEP AND TRENCH DAM DETAILS	11	3-15-17

LEGEND

- ELECTRICAL STRUCTURE
- LAMP POST
- WOODEN POST
- IRRIGATION CONTROL VALVE (ICV)
- ELECTRIC BOX (E)
- TELECOMMUNICATION BOX (T)
- UTILITY BOX
- CATCH BASIN
- CONIFEROUS TREE
- DECIDUOUS TREE
- CONCRETE
- RIP RAP
- LANDSCAPED AREA
- CRUSHED STONE
- SURFACE LEDGE
- TYP. TYPICAL
- RET. RETAINING
- EP EDGE OF PAVEMENT
- CONC. CONCRETE
- TREE LINE
- SHRUB LINE
- PROPERTY LINES
- D DRAIN LINE
- OHW OVERHEAD ELECTRIC
- UGE UNDERGROUND ELECTRIC
- W WATER LINE
- TELE TELEPHONE LINE
- S SEWER
- STM STEAM LINE
- PD PROPOSED DRAIN
- EASMENT



VICINITY MAP
NOT TO SCALE



AREA MAP
NOT TO SCALE

General Notes

1. THE UTILITIES HAVE NOT BEEN IDENTIFIED AND WILL IMPACT THE DESIGN OF THE UNDERGROUND TRANSMISSION LINE AT THE LOCATION OF ANY CROSSINGS.
2. ALL PROPERTY LINE INFORMATION IS SHOWN APPROXIMATE AND BASED ON TOWN ASSESSOR'S PLATS ONLY. THE AERIAL TRANSMISSION EASEMENT HAS BEEN ESTABLISHED BY SURVEY.
3. TOPOGRAPHY IS BASED ON AN AERIAL LIDAR SURVEY AND SATELLITE IMAGERY, THEREFORE GRADES ARE APPROXIMATE. AN ON THE GROUND DETAIL SURVEY WILL BE REQUIRED FOR DESIGN.
4. DETAIL DESIGN MAY BE OPTIMIZED TO REFLECT ACTUAL CONDITIONS.
5. ALL EXISTING ROAD MARKINGS ARE ESTIMATED.
6. CONTRACTOR IS RESPONSIBLE FOR PLACING SILT FENCE OR OTHER APPROVED EROSION CONTROL DEVICES. WETLANDS HAVE NOT BEEN DELINEATED AND HAVE NOT BEEN CONSIDERED FOR DESIGN.
7. CONTRACTOR SHALL INSTALL SILT SACK OR APPROVED EQUAL TO ALL CATCH BASINS OR CURB INLETS WITHIN THE DEFINED WORK ZONE.
8. CONTRACTOR SHALL ENSURE PROPER CONTROLS ARE IN PLACE SO WORKERS DO NOT TRACK SEDIMENT PAST THE LIMITS OF WORK.
9. ALL VERTICAL RADII ARE 500' UNLESS OTHERWISE NOTED

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POWER ENGINEERS

PSNH (PUBLIC SERVICE COMPANY OF NEW HAMPSHIRE)
DESIGN ENGINEER: JOSEPH SPERRY

POWER ENGINEERS
PROJECT ENGINEER: TODD GOYETTE

PSNH (PUBLIC SERVICE COMPANY OF NEW HAMPSHIRE)
WORK ORDER NUMBER:

POWER ENGINEERS
PROJECT NUMBER: 133007

PRINT DRAWING TO SCALE ON 22"X34" SHEET

NO.	REVISION	DATE	DRAWN	CHKD	APPRV.
12	REVISED TRANSITION STRUCTURES	8-30-17	REO	TSG	
11	REVISED 70'E - ADDED DELINEATED WETLANDS	3-15-17	REO	TSG	
10	REVISED 30'A DESIGN	12-22-16	REO	TSG	
9	REVISED 30'A DESIGN	9-16-16	REO	TSG	
8	REVISED PER REV 109 LOCATION	8-15-16	REO	TSG	
7	REVISED RISER 109 LOCATION PER EVERSOURCE	7-27-16	REO	TSG	

EVERSOURCE ENERGY

T 12

CIRCUIT F-107 115kV
UNDERGROUND TRANSMISSION LINE
PLAN AND PROFILE COVER

DATE: 07/24/2015
SCALE: N.T.S.

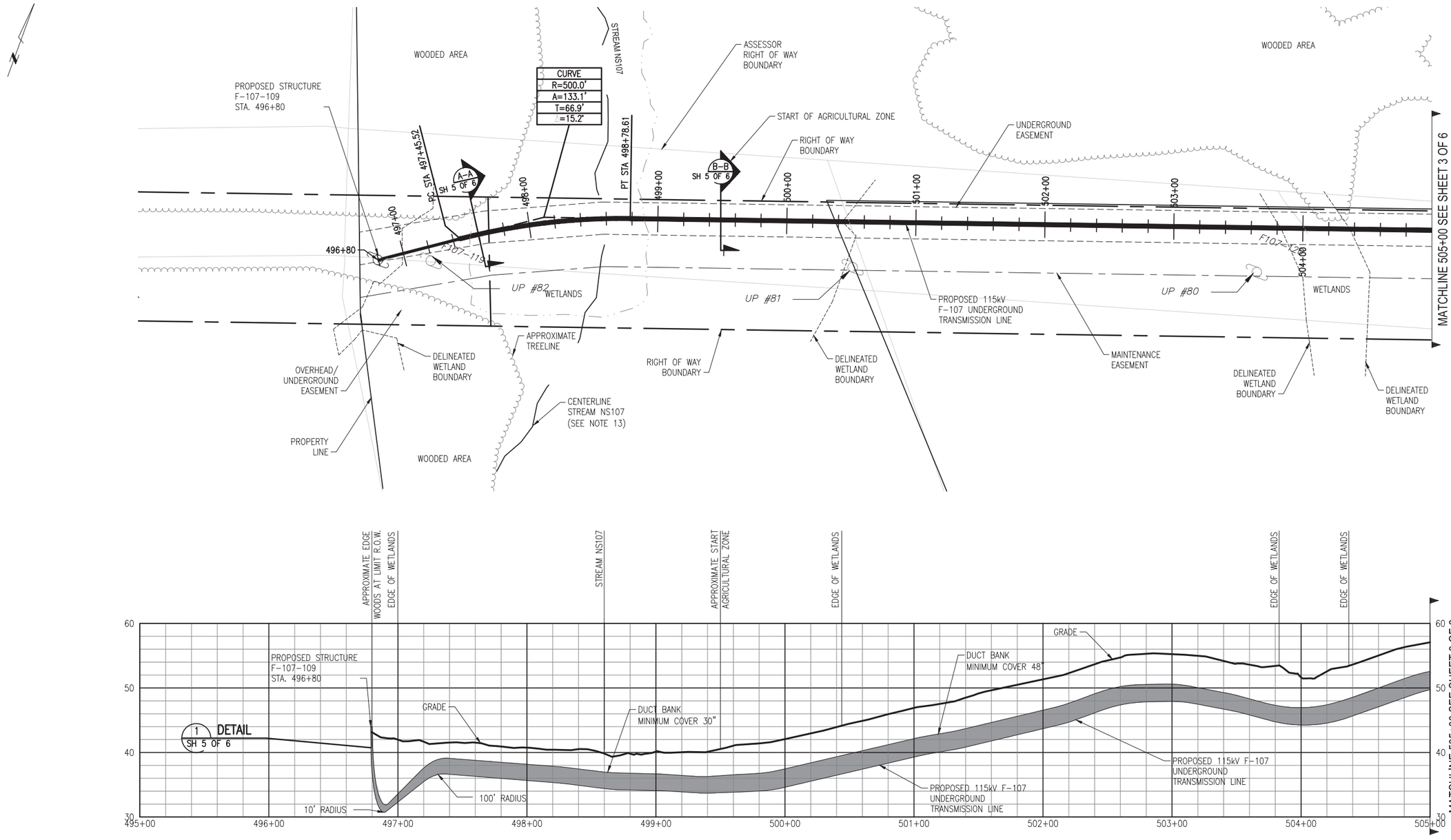
DES: REO | CHK: TSG
DRW: REO | APR:

TOWN: NEWINGTON
TRANSMISSION LINE: LINE
MILE NO: 10
DISCIPLINE/SHT NO.
SHEET 1 OF 6

F10743104

8/30/2017 11:40 AM - dclifford - R:\Projects\133007\00\DWG\03 Line\FRINK FARM\F10743004 - REV 12.dwg - SH 1 COVER

ES VER: 11/2015



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7. CONTRACTOR SHALL INSTALL SILT SACK OR APPROVED EQUAL TO ALL CATCH BASINS OR CURB INLETS WITHIN THE DEFINED WORK ZONE.
8. CONTRACTOR SHALL ENSURE PROPER CONTROLS ARE IN PLACE SO WORKERS DO NOT TRACK SEDIMENT PAST THE LIMITS OF WORK.
9. ALL VERTICAL RADII ARE 500' UNLESS OTHERWISE NOTED
10. WARNING TAPE TO BE PLACED DIRECTLY ABOVE DUCT AT EXTENDED DEPTH TRENCH.
11. THE TOP SOIL IN THE AGRICULTURAL ZONE (STA 500+05 TO STA 511+25) WILL BE STOCKPILED AND PRESERVED. THIS TOPSOIL WILL BE REPLACED AT THE CONCLUSION OF THE PROJECT UNDER THE SUPERVISION OF A CERTIFIED SOIL SCIENTIST.
12. STREAM TO BE TEMPORARILY DIVERTED DURING CONSTRUCTION.
13. STREAM/BROOK CROSSINGS AND DIVERSIONS SHALL BE CONSTRUCTED IN ACCORDANCE WITH DETAILS PROVIDED BY NORMANDEAU ASSOCIATES AND GEI CONSULTANTS

0 4 8 16 24 FEET
VERTICAL 1"= 8'

0 20 40 80 120 FEET
HORIZONTAL 1"= 40'

PRINT DRAWING TO SCALE ON 22"X34" SHEET

811 Know what's below. Call before you dig.

THREE BUSINESS DAYS BEFORE YOU DIG CALL
NEW HAMPSHIRE DIG SAFE SYSTEM, INC.
TOLL FREE
1-888-344-7233

ISSUE FOR PERMITTING
NOT FOR CONSTRUCTION

POWER ENGINEERS

NO.	REVISION	DATE	DRAWN	CHKD	APPRV.
12	REVISED TRANSITION STRUCTURES	8-30-17	REO	SGC	TSC
11	REVISED 70'E - ADDED DELINEATED WETLANDS	3-15-17	REO	SGC	TSC
10	REVISED 30'A DESIGN	12-22-16	REO	SGC	TSC
9	REVISED 30'A DESIGN	9-16-16	REO	SGC	TSC
8	ADDED PLAN AND PROFILE	8-24-16	REO	SGC	TSC
7	REVISED ROUTE 108 LOCATION PER EVERSOURCE	7-27-16	REO	SGC	TSC

EVERSOURCE ENERGY

T 12

115kV F107 UNDERGROUND TRANSMISSION LINE
PLAN AND PROFILE VIEW

DATE: 07/24/2015

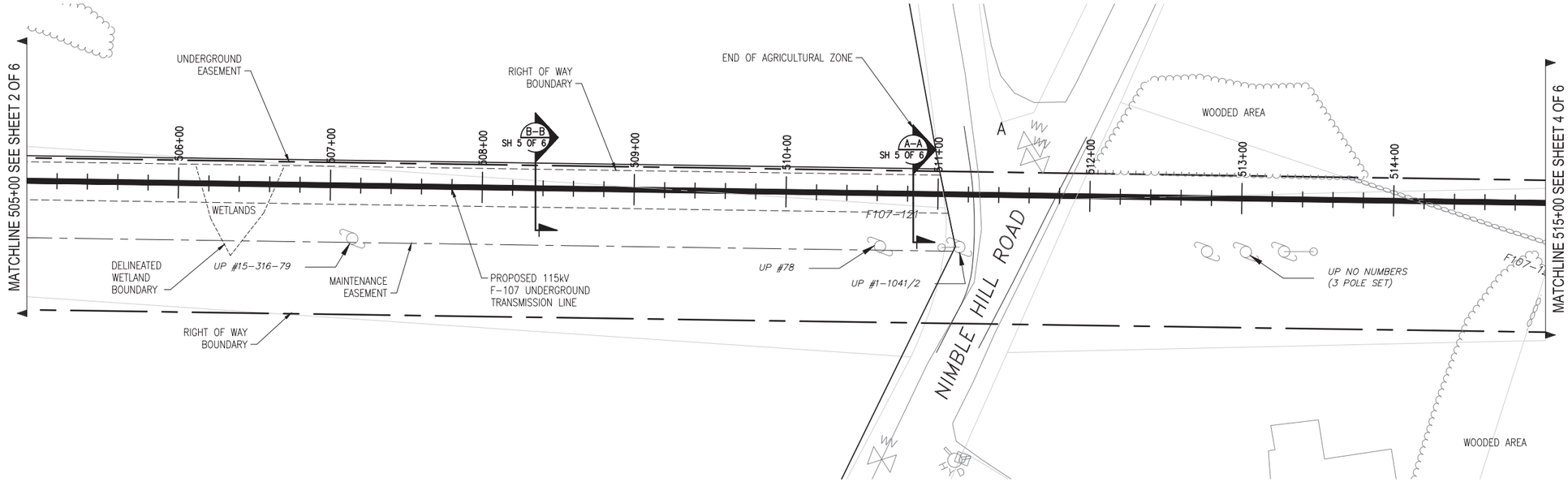
SCALE: H 1"=40', V 1"=8'

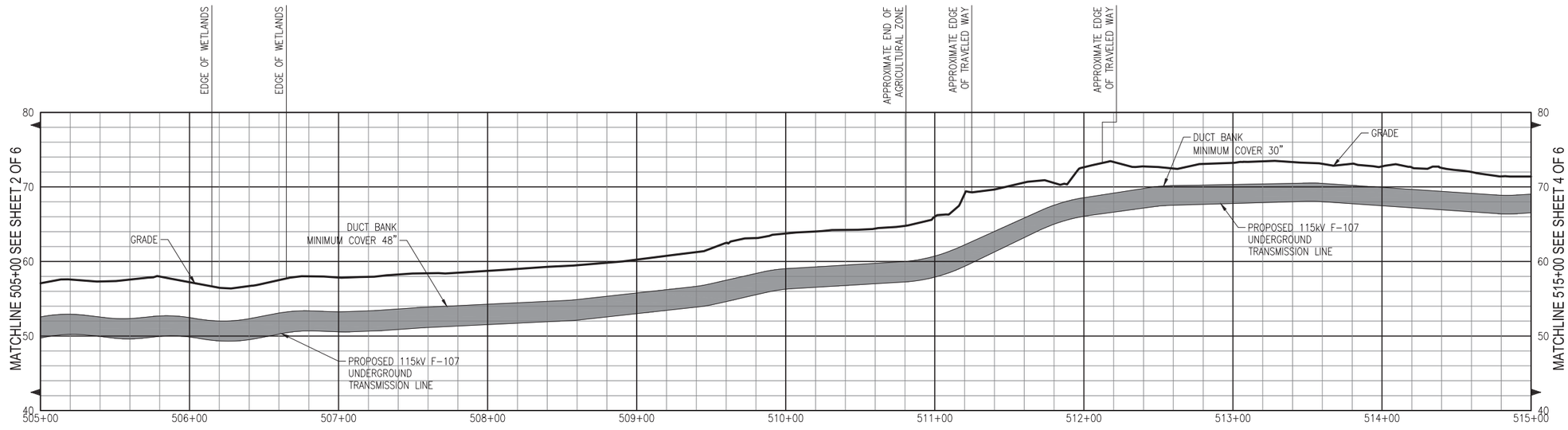
DES: REO | CHK: SGC
DRW: REO | APR:

TOWN: NEWINGTON
TRANSMISSION LINE: LINE
MILE NO: 10
DISCIPLINE/SHT NO.
SHEET 2 OF 6
F10743004

8/30/2017 11:40 AM - dclifford - R:\Projects\133007\DD\DWG\03 Line\FRINK FARM\F10743004 - REV 12.dwg - SH 2

ES VER. 11/2015





General Notes

1. THE UTILITIES HAVE NOT BEEN IDENTIFIED AND WILL IMPACT THE DESIGN OF THE UNDERGROUND TRANSMISSION LINE AT THE LOCATION OF ANY CROSSINGS.
2. ALL PROPERTY LINE INFORMATION IS SHOWN APPROXIMATE AND BASED ON TOWN ASSESSOR'S PLATS ONLY. THE AERIAL TRANSMISSION EASEMENT HAS BEEN ESTABLISHED BY SURVEY.
3. TOPOGRAPHY IS BASED ON AN AERIAL LIDAR SURVEY AND SATELLITE IMAGERY, THEREFORE GRADES ARE APPROXIMATE. AN ON THE GROUND DETAIL SURVEY WILL BE REQUIRED FOR DESIGN.
4. DETAIL DESIGN MAY BE OPTIMIZED TO REFLECT ACTUAL CONDITIONS.
5. ALL EXISTING ROAD MARKINGS ARE ESTIMATED.
6. CONTRACTOR IS RESPONSIBLE FOR PLACING SILT FENCE OR OTHER APPROVED EROSION CONTROL DEVICES. WETLANDS HAVE NOT BEEN DELINEATED AND HAVE NOT BEEN CONSIDERED FOR DESIGN.
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12. STREAM TO BE TEMPORARILY DIVERTED DURING CONSTRUCTION.

0 4 8 16 24 FEET
VERTICAL 1"= 8'

0 20 40 80 80 FEET
HORIZONTAL 1"= 40'

PRINT DRAWING TO SCALE ON 22"X34" SHEET

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TOLL FREE
1-888-344-7233

ISSUE FOR PERMITTING
NOT FOR CONSTRUCTION

POWER ENGINEERS

NO.	REVISION	DATE	DRAWN	CHKD	APPRV.
12	REVISED TRANSITION STRUCTURES	8-30-17	REO	SGG	TSG
11	REVISED 70'E - ADDED DELINEATED WETLANDS	3-15-17	REO	SGG	TSG
10	REVISED 30'A DESIGN	12-22-16	REO	SGG	TSG
9	REVISED 30'A DESIGN	9-16-16	REO	SGG	TSG
8	REVISED PER REQ	8-12-16	REO	SGG	TSG
7	REVISED ROSP 109 LOCATION PER EVERSOURCE	7-27-16	REO	SGG	TSG

EVERSOURCE ENERGY

T 12

CIRCUIT F-107 115kV
UNDERGROUND TRANSMISSION LINE
PLAN AND PROFILE VIEW

DATE: 07/24/2015
SCALE: H 1"=40', V 1"=8'

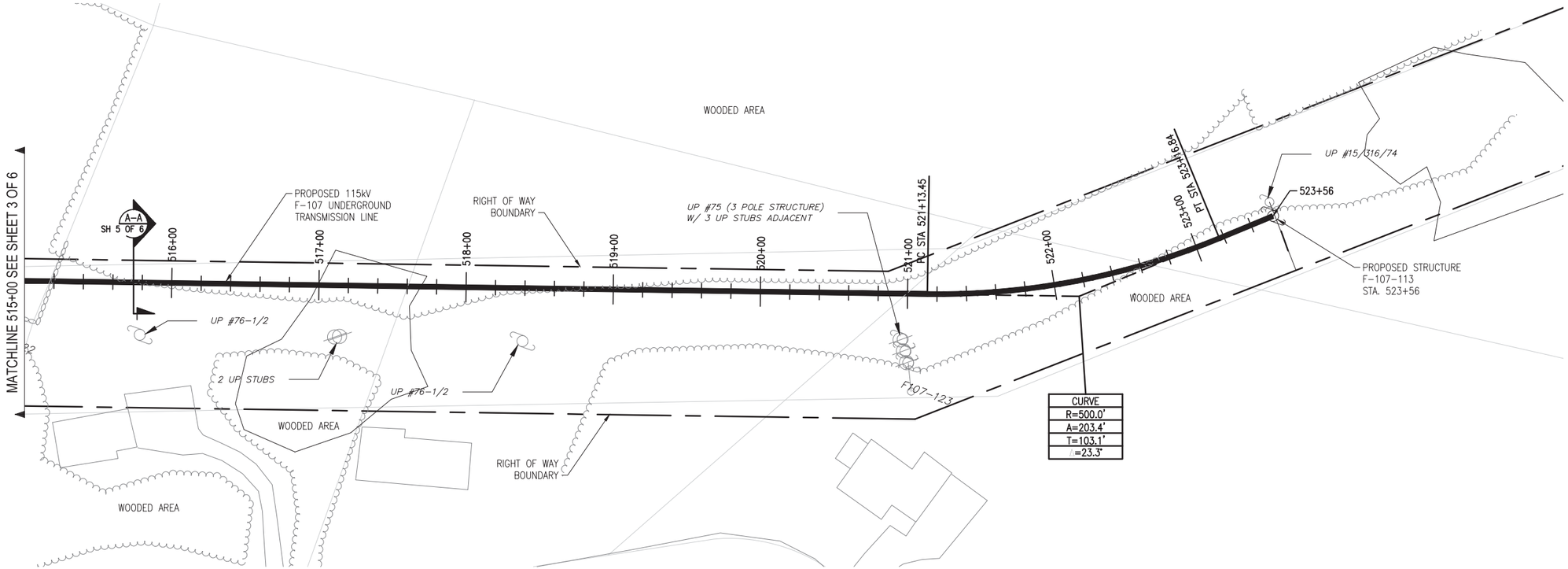
DES: REO | CHK: TSG
DRW: REO | APR:

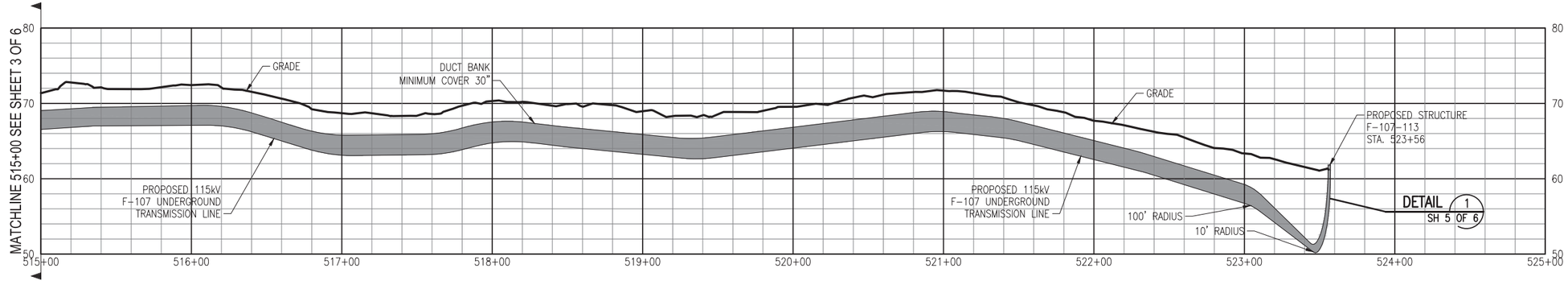
TOWN: NEWINGTON
TRANSMISSION LINE: *LINE*
MILE NO: 10
DISCIPLINE/SHT NO.
SHEET 3 OF 6

F10743004

8/30/2017 11:40 AM - dclford - R:\Projects\13300\D\DWG\03 Line\FRINK FARM\F10743004 - REV 12.dwg - Sht 3

ES VER. 11/2015





General Notes

1. THE UTILITIES HAVE NOT BEEN IDENTIFIED AND WILL IMPACT THE DESIGN OF THE UNDERGROUND TRANSMISSION LINE AT THE LOCATION OF ANY CROSSINGS.
2. ALL PROPERTY LINE INFORMATION IS SHOWN APPROXIMATE AND BASED ON TOWN ASSESSOR'S PLATS ONLY. THE AERIAL TRANSMISSION EASEMENT HAS BEEN ESTABLISHED BY SURVEY.
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12. STREAM TO BE TEMPORARILY DIVERTED DURING CONSTRUCTION.

0 4 8 16 24 FEET
VERTICAL 1"= 8'

0 20 40 80 80 FEET
HORIZONTAL 1"= 40'

PRINT DRAWING TO SCALE ON 22"X34" SHEET

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1–888–344–7233

ISSUE FOR PERMITTING
NOT FOR CONSTRUCTION

POWER ENGINEERS

NO.	REVISION	DATE	DRAWN	CHKD	APPRV.
12	REVISED TRANSITION STRUCTURES	8-30-17	REO	SGG	TSG
11	REVISED 70'# - ADDED DELINEATED WETLANDS	3-15-17	REO	SGG	TSG
10	REVISED 30'# DESIGN	12-22-16	REO	SGG	TSG
9	REVISED 30'# DESIGN	9-16-16	REO	SGG	TSG
8	REVISED PER REQ	8-15-16	REO	SGG	TSG
7	REVISED PER 109 LOCATION PER EVERSOURCE	7-21-16	REO	SGG	TSG

EVERSOURCE ENERGY

T 12

CIRCUIT F107 115kV
UNDERGROUND TRANSMISSION LINE
PLAN AND PROFILE VIEW

DATE: 7/24/2015

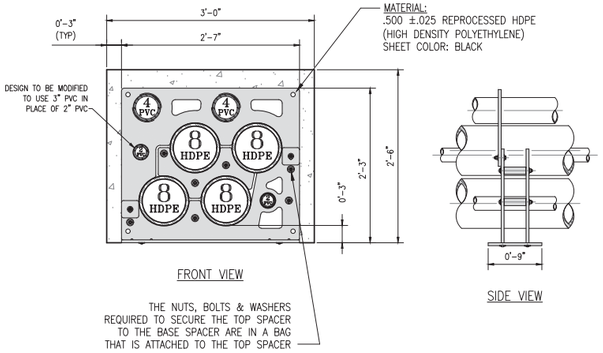
SCALE: H 1=40', V 1=8'

DES: REO | CHK: TSG
DRW: REO | APR:

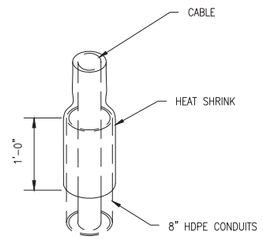
TOWN: NEWINGTON
TRANSMISSION LINE: LINE
MILE NO: 10
DISCIPLINE/SHT NO.
SHEET 4 OF 6
F10743004

8/30/2017 11:40 AM – dclifford – R:\Projects\133007\DD\DWG\03 Line\FRINK FARM\F10743004 – REV 12.dwg – SH 4

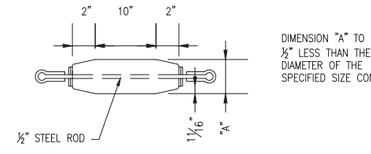
ES VER: 11/2015



UNDERGROUND DEVICES SPACER ARRANGEMENT
DETAIL 1 — SCALE N.T.S. — SH 5 OF 6

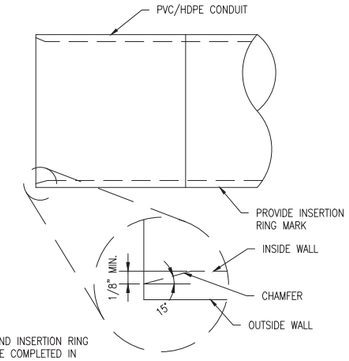


HEAT SHRINK DETAIL
DETAIL 2 — SCALE N.T.S. — SH 5 OF 6



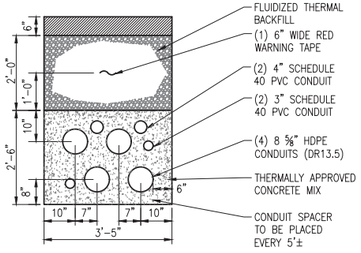
DIMENSION "A" TO BE ½" LESS THAN THE INSIDE DIAMETER OF THE SPECIFIED SIZE CONDUIT.

MANDREL DETAIL
DETAIL 3 — SCALE N.T.S. — SH 5 OF 6

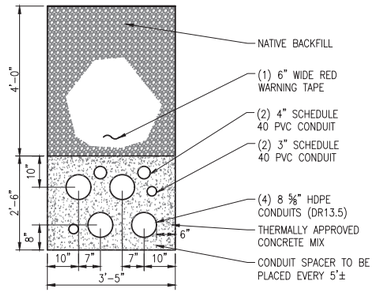


NOTE:
CHAMFER AND INSERTION RING MARK TO BE COMPLETED IN FACTORY.

PVC/HDPE DUCT CHAMFER DETAIL
DETAIL 4 — SCALE N.T.S. — SH 5 OF 6



SINGLE CIRCUIT TRENCH SECTION
SECTION A–A — SCALE: N.T.S. — SH 5 OF 6



FARMLAND TRENCH SECTION
SECTION B–B — SCALE: N.T.S. — SH 5 OF 6

NO.	REVISION	DATE	DRWN	CHKD	APPRV
12	REVISED TRANSITION STRUCTURES	8-30-17	REO	SGG	TSG
11	REVISED 70'# - ADDED DELINEATED WETLANDS	3-15-17	REO	SGG	TSG
10	REVISED 30'A DESIGN	12-22-16	REO	SGG	TSG
9	REVISED 30'A DESIGN	9-16-16	REO	SGG	TSG
8	REVISED PER REV 109	8-15-16	REO	SGG	TSG
7	REVISED PER 109 LOCATION PER EVERSOURCE	6-7-16	REO	SGG	TSG

EVERSOURCE ENERGY

T | 12

CIRCUIT F-107 115kV
UNDERGROUND TRANSMISSION LINE
MISCELLANEOUS DETAILS

DATE: 07/24/2015
SCALE: N.T.S.

DES: REO | CHK: TSG
DRW: REO | APR:

TOWN: NEWINGTON
TRANSMISSION LINE: LINE
MILE NO: 10
DISCIPLINE/SHT NO.
SHEET 5 OF 6
F10743004

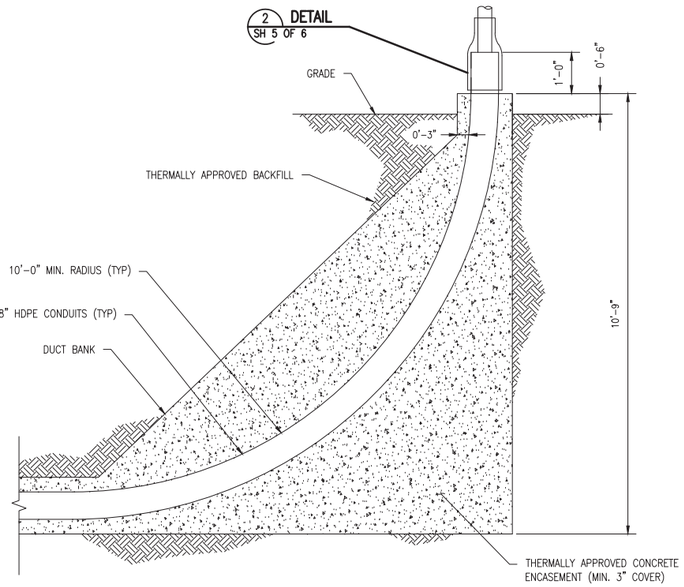
ISSUE FOR PERMITTING
NOT FOR CONSTRUCTION

POWER ENGINEERS

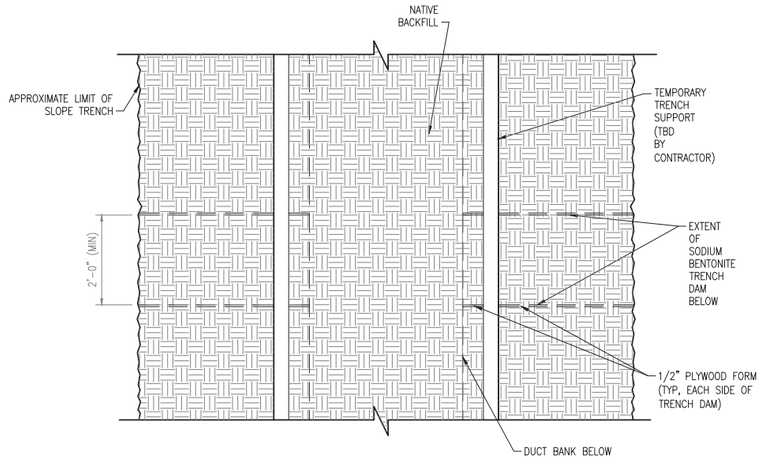
PRINT DRAWING TO SCALE ON 22"X34" SHEET

8/30/2017 11:40 AM – delliford – R:\Projects\13300\CDV\DWG\03 Line\FRINK FARM\F10743004 – REV 12.dwg – DETAILS SH 5

ES VER. 11/2015

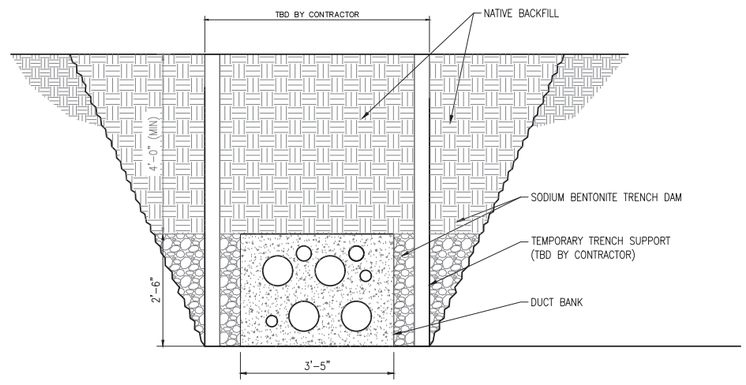


RISER SWEEP DETAIL
DETAIL 1 SH 6 OF 6
SCALE N.T.S.



PLAN

NOTE:
1. COPE PLYWOOD FORM TO FIT SNUGLY OVER CONCRETE DUCT BANK.



PROFILE

NOTE:
1. PLACE BENTONITE BETWEEN DUCT BANK AND TRENCH SUPPORT AND BETWEEN TRENCH SUPPORT AND TRENCH SIDEWALLS.
2. SEE F107 LINE CROSSING FRINK FARM, REVISION 0, TRENCH DAM LOCATION PLAN FIGURE 3, BY GEI CONSULTANTS, FOR PLACEMENT.

GEI FARMLAND TRENCH DAM
DETAIL 2 SH 6 OF 6
SCALE N.T.S.

ISSUE FOR PERMITTING
NOT FOR CONSTRUCTION

PRINT DRAWING TO SCALE ON 22"X34" SHEET

NO.	REVISION	DATE	DRAWN	CHKD	APPRV.
12	REVISED TRANSITION STRUCTURES	8-30-17	REO	SGG	TSG
11	REVISED TYR - ADDED DELINEATED WETLANDS	3-15-17	REO	SGG	TSG
10	REVISED TYR DESIGN	12-22-16	REO	SGG	TSG
9	REVISED 30R DESIGN	9-16-16	REO	SGG	TSG
8	REVISED TYR DESIGN	8-15-16	REO	SGG	TSG
7	REVISED RISER 109 LOCATION PER EVERSOURCE	6-24-16	REO	SGG	TSG

EVERSOURCE ENERGY

T 12

CIRCUIT F-107 115kV
UNDERGROUND TRANSMISSION LINE
RISER AND TRENCH DAM DETAILS

DATE: 07/24/2015
SCALE: N.T.S.

DES: REO | CHK: TSG
DRW: REO | APR:

TOWN: NEWINGTON
TRANSMISSION LINE: LINE
MILE NO: 10
DISCIPLINE/SHT NO.
SHEET 6 OF 6

F10743004

POWER ENGINEERS

8/30/2017 11:40 AM - dclifford - R:\Projects\133007\00\DWG\03 Line\FRINK FARM\F10743004 - REV 12.dwg - DETAILS SH 6

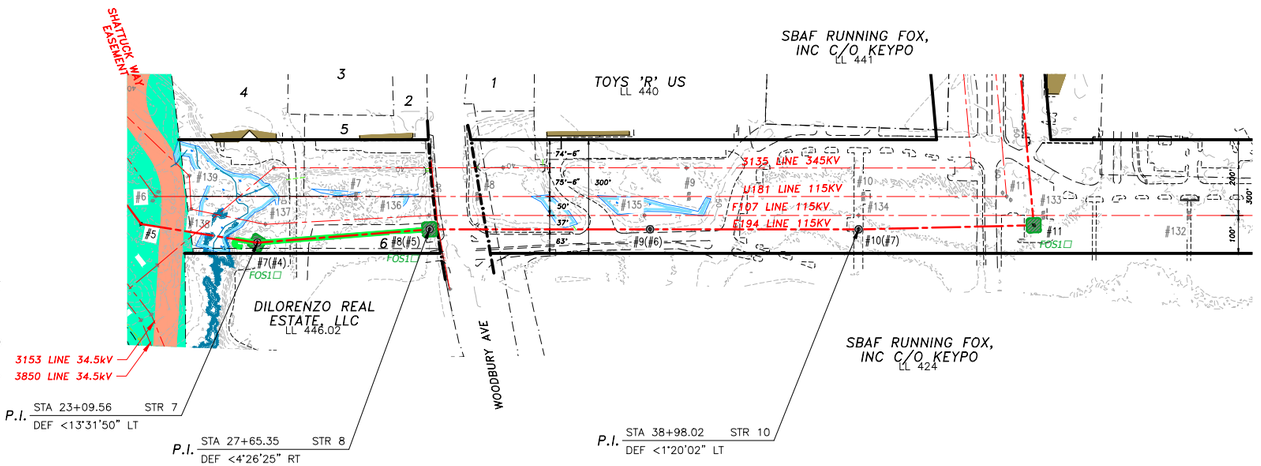
ES VER: 11/2015

PARCELS:
1. CUMBERLAND FARMS, INC, LL 442
2. RPI NEWINGTON REALTY, LLC, LL 443
3. HALLETT TRUSTEE, RICHARD S., LL 444
4. SYLVIA H. MARPLE REVOC TRUST, LL 445
5. PUBLIC SERVICE COMPANY OF NH, LL 432
6. DILORENZO REAL ESTATE, LLC, LL 446

1590 ACSR 45/7 LAPWING @ 4,200 LBS. NESC HEAVY, 285'F
ADSS @ 1,100 LBS. NESC HEAVY, 120'F
(STR 5 TO STR 7)
1590 ACSR 45/7 LAPWING @ 11,400 LBS. NESC HEAVY, 285'F
24 FIBER OPGW @ 4,500 LBS. NESC HEAVY, 120'F
(STR 7 TO STR 11)
19 NO. 10 ALUMOWELD @ 4,200 LBS. NESC HEAVY, 120'F
(STR 10 TO STR 11)

NOTES:
1. COUNTERPOISE LOCATIONS ARE APPROXIMATE AND SHALL BE VERIFIED IN THE FIELD. CONTRACTOR SHALL COMPLETE RESISTIVITY TESTING IN ACCORDANCE WITH OTRM 064 AND 264 AND ADJUST COUNTERPOISE INSTALLATION ACCORDINGLY.
2. PARCEL DATA, DATED 2/24/17, ALONG WITH UNDERGROUND UTILITIES, DATED 7/3/14, PROVIDED BY CORNERSTONE ENERGY SERVICES INC.
3. RIGHT OF WAY AND PARCEL BOUNDARIES PROVIDED BY DOUCET SURVEY INC., DATED 8/18/16.

NEWINGTON, N. H.



THIS PLAN FOR REFERENCE ONLY. NO REPRESENTATION OR WARRANTY IS MADE AS TO LOCATION OF BOUNDARIES OR OTHER POINTS OF REFERENCE

SPLICE INFORMATION	FOS1A	
STRUCTURE :	STR 7	
DESCRIPTION :	72 FIBER ADSS	24 FIBER ADSS
REEL NO. :	EXISTING	ADSS 4
COILED CABLE :	100'	100'
DIST. NEXT SPLICE :	1,999' BACK	311' AHEAD

SPLICE INFORMATION	FOS1B	
STRUCTURE :	STR 8	
DESCRIPTION :	24 FIBER ADSS	24 FIBER OPGW
REEL NO. :	ADSS 4	5
COILED CABLE :	100'	100'
DIST. NEXT SPLICE :	311' BACK	2,051' AHEAD

SPLICE INFORMATION	FOS1C	
STRUCTURE :	STR 11	
DESCRIPTION :	24 FIBER OPGW	72 FIBER ADSS
REEL NO. :	5	EXISTING
COILED CABLE :	100'	100'
DIST. NEXT SPLICE :	2,051' BACK	3,737' AHEAD

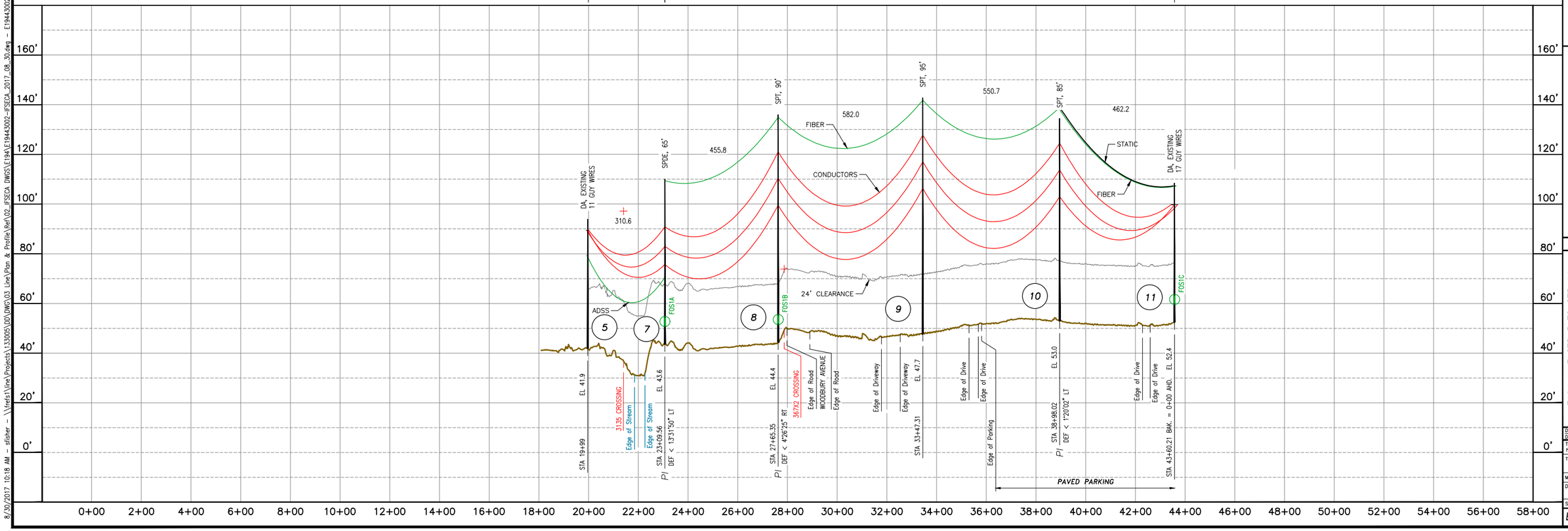
E194 PLAN AND PROFILE LEGEND:

- FENCE
- STONEWALL
- LIMITS OF WET
- EDGE OF WET DELINEATION
- TOPOGRAPHICAL CONTOURS WITH 10' INTERVALS
- TOPOGRAPHICAL CONTOURS WITH 2' INTERVALS
- UNDERGROUND WATER LINE
- UNDERGROUND GAS LINE
- RIGHT OF WAY LINE
- DENOTES TAX MAP BOUNDARY LINE
- DENOTES LINE COUNTERPOISE
- BUILDINGS
- FEE PROPERTY
- FOS1 FIBER OPTIC SPLICE LOCATION
- #1 E194 STRUCTURE (CONSTRUCTION STR NO. (PERMIT STR NO.))
- #1 E194 STRUCTURE IN WET (CONSTRUCTION STR NO. (PERMIT STR NO.))

RULING SPAN = 311' (STR 5 TO STR 7)

RULING SPAN = 521' (STR 7 TO STR 11)

GRAPHIC SCALE
200 100 0 200 400 600
1" = 200'



NO.	DESCRIPTION	DATE	DRWN	CHKD	APPRV.
E	ISSUED FOR SEC AMENDMENT	8/30/17	SCF	KMS	APJ
D	ISSUED FOR BID WO# 112786A1	8/29/17	SCF	KMS	APJ
C	ISSUED FOR 100% REVIEW WO# 112786A1	4/27/17	SCF	KMS	APJ
B	ISSUED FOR SEC AMENDMENT WO# 112786A1	07/10/17	SCF	KMS	APJ
A	ISSUED FOR 100% REVIEW WO# 112786A1	11/7/16	SCF	KMS	APJ

FIBER OPTIC CABLE: 24 FIBER OPGW
CONDUCTOR: 1590 ACSR 45/7 LAPWING (115kV)
GROUND OR NEUTRAL: 19#10 ALUMOWELD

EVERSOURCE ENERGY

T E

E194 LINE STR 5 TO STR 11
115kV TRANSMISSION LINE
MILE SHEET

DATE: 08/03/2016
SCALE: H 1"=200', V 1"=20'

DES: EDR CHK: KMS
DRW: SCF APR: APJ

TOWN: NEWINGTON
TRANSMISSION LINE: E194
MILE NO: 1
DISCIPLINE/SHT NO.
SHEET 1 OF 1
E19443002

8/30/2017 10:18 AM – sfisher – \\refs\Line\Projects\133005\00\DWG\03 Line\Plan & Profile\Ref\02_PSECA_DWGS\E194\E19443002-PSECA_2017_08_30.dwg – E19443002

ES VER: 11/2015

380 PLAN AND PROFILE LEGEND:

- FENCE
- STONEWALL
- LIMITS OF WET
- EDGE OF WET DELINEATION
- TOPOGRAPHICAL CONTOURS WITH 10' INTERVALS
- TOPOGRAPHICAL CONTOURS WITH 2' INTERVALS
- UNDERGROUND WATER LINE
- UNDERGROUND GAS LINE
- RIGHT OF WAY LINE
- RAILROAD RIGHT OF WAY LINE
- DENOTES TAX MAP BOUNDARY LINE
- DENOTES LINE COUNTERPOISE
- BUILDINGS
- FEE PROPERTY
- 380 STRUCTURE (CONSTRUCTION STR NO. (PERMIT STR NO.))
- 380 STRUCTURE IN WET (CONSTRUCTION STR NO. (PERMIT STR NO.))

PACKERS FALLS S/S

DURHAM S/S (TO BE REMOVED BY OTHERS)

MADBURY S/S

LEGEND:

- 380 LINE
- 380 CONSTRUCTION STRUCTURE NUMBER
  REFERENCE MILESHEETS FOR CORRESPONDING PERMITTING STRUCTURE NUMBERS
- INDICATES APPROXIMATE LIMITS OF SUBSTATION

GRAPHIC SCALE
1" = 1000'

C	ISSUED FOR SEC. AMENDMENT	8/30/17	SCF	APJ
B	ISSUED FOR BID W/# 1127641	6/29/17	SCF	APJ
A	ISSUED FOR 100% DESIGN W/# 1127641	5/9/17	SCF	APJ
NO.		DATE	DRWN	CHKD

EVERSOURCE ENERGY

D C

PACKERS FALLS S/S TO MADBURY S/S
34.5kV TRANSMISSION LINE
KEYSHEET

DATE: 07/29/16

DES: EDR CHK: KMS
DRW: SCF APR: APJ

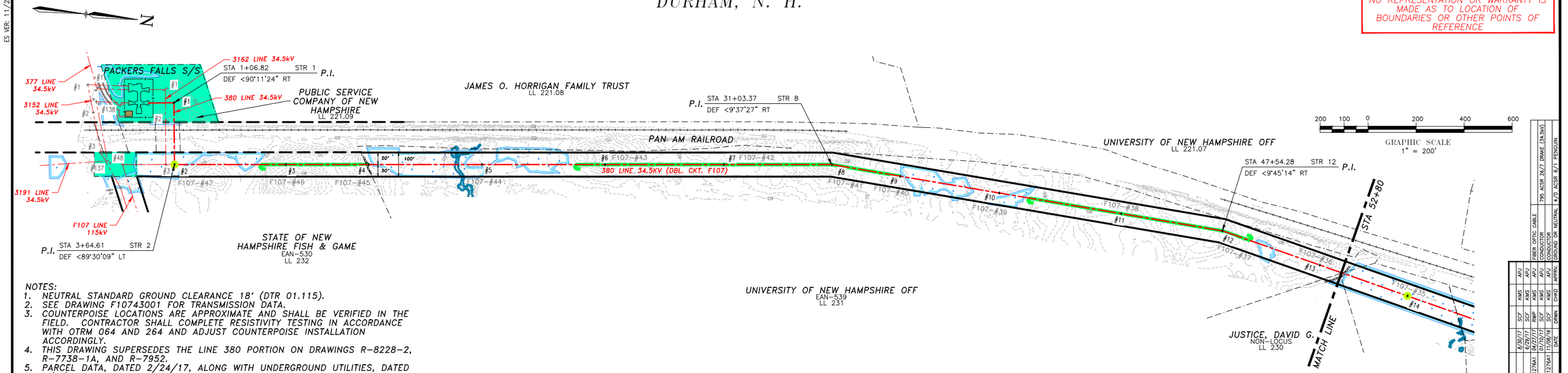
TOWN: MADBURY, DURHAM
TRANSMISSION LINE: 380
MILE NO:
DISCIPLINE/SHT NO.
SHEET 1 OF 1
038044101

8/29/2017 11:50 AM - dfisher - \\Vrafs1\Line Projects\133005\001\WO\03 Line\Key Sheet\Rel\PSECA\380\038044101_2017_08_30.dwg - 038044101

ES VER: 11/2015

DURHAM, N. H.

THIS PLAN FOR REFERENCE ONLY. NO REPRESENTATION OR WARRANTY IS MADE AS TO LOCATION OF BOUNDARIES OR OTHER POINTS OF REFERENCE



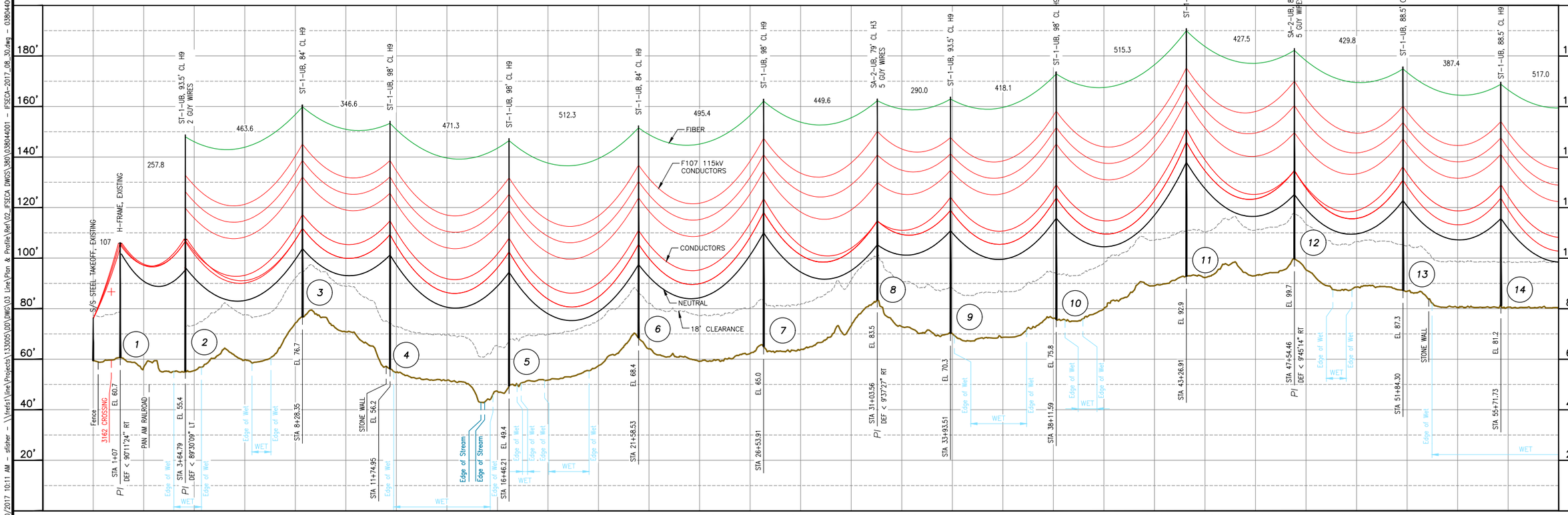
NOTES:
1. NEUTRAL STANDARD GROUND CLEARANCE 18' (DTR 01.115).
2. SEE DRAWING F10743001 FOR TRANSMISSION DATA.
3. COUNTERPOISE LOCATIONS ARE APPROXIMATE AND SHALL BE VERIFIED IN THE FIELD. CONTRACTOR SHALL COMPLETE RESISTIVITY TESTING IN ACCORDANCE WITH OTRM 064 AND 264 AND ADJUST COUNTERPOISE INSTALLATION ACCORDINGLY.
4. THIS DRAWING SUPERSEDES THE LINE 380 PORTION ON DRAWINGS R-8228-2, R-7738-1A, AND R-7952.
5. PARCEL DATA, DATED 2/24/17, ALONG WITH UNDERGROUND UTILITIES, DATED 7/3/14, PROVIDED BY CORNERSTONE ENERGY SERVICES INC.
6. RIGHT OF WAY AND PARCEL BOUNDARIES PROVIDED BY DOUCET SURVEY INC., DATED 8/18/16.

RULING SPAN = 465' (STR 2 TO STR 8)

RULING SPAN = 435' (STR 8 TO STR 12)

RULING SPAN = 412' (STR 12 TO STR 19)

795 ACSR 26/7 DRAKE @ 4,500 LBS. NESC HEAVY, 212°F
4/0 ACSR 6/1 PENGUIN @ 2,500 LBS. NESC HEAVY, 120°F



NO.	DESCRIPTION	DATE	DRWN	CHKD	APPRV.
E	ISSUED FOR SEC AMENDMENT	8/30/17	SCF	KMS	APJ
D	ISSUED FOR BID WO# T127641	8/29/17	SCF	KMS	APJ
C	ISSUED FOR 100% REVIEW WO# T127641	04/27/17	RWP	KMS	APJ
B	ISSUED FOR SEC AMENDMENT WO# T127641	07/10/17	SCF	KMS	APJ
A	ISSUED FOR 100% REVIEW WO# T127641	11/30/16	SCF	KMS	APJ

FIBER OPTIC CABLE
CONDUCTOR 795 ACSR 26/7 DRAKE (34.5kV)
GROUND OR NEUTRAL 4/0 ACSR 6/1 PENGUIN

EVERSOURCE ENERGY

D E

PACKERS FALLS S/S TO MADBURY S/S
34.5kV DISTRIBUTION LINE
MILE SHEET

DATE:08/03/2016

SCALE: H 1"=200', V 1"=20'

DES: EDR CHK:KMS
DRN: SCF APR: APJ

TOWN: DURHAM
TRANSMISSION LINE: 380
MILE NO: 1
DISCIPLINE/SHT NO.
SHEET 1 OF 4
038044001

8/30/2017 10:11 AM – sfisher – \\fretsfs1\Line Projects\133095\00\DWG\03 Line\Plan & Profile\Ref\02_IFSECA_DWGS\380\038044001 – IFSECA-2017_08_30.dwg – 038044001 1-4

ES VER: 11/2015

DURHAM, N. H.

THIS PLAN FOR REFERENCE ONLY. NO REPRESENTATION OR WARRANTY IS MADE AS TO LOCATION OF BOUNDARIES OR OTHER POINTS OF REFERENCE

N

P.I. STA 99+52.78 STR 30 DEF <19°48'56" RT

P.I. STA 77+87.78 STR 24 DEF <16°15'50" RT

P.I. STA 75+31.82 STR 23 DEF <55°57'10" RT

P.I. STA 71+22.78 STR 21 DEF <91°08'38" RT

P.I. STA 73+02.18 STR 22 DEF <66°06'24" LT

P.I. STA 69+83.38 STR 20 DEF <90°31'07" LT

P.I. STA 85+51.25 STR 26 DEF <9°05'51" LT

P.I. STA 101+79.14 STR 31 DEF <19°27'03" LT

UNIVERSITY OF NEW HAMPSHIRE EAA-10529 & EAA-10530 LL 221

UNIVERSITY OF NEW HAMPSHIRE OFF LL 221.07

UNIVERSITY OF NEW HAMPSHIRE EAN-10530 LL 222

UNIVERSITY OF NEW HAMPSHIRE LL 221.01

UNIVERSITY OF NEW HAMPSHIRE EAN-266 LL 227

PUBLIC SERVICE OF NEW HAMPSHIRE DDN-8, DDN-9 & DDN-10 LL 233

DURHAM S/S (PROPOSED TO BE REMOVED BY OTHERS)

OYSTER RIVER

WATERWORKS RD

MILL RD

SOUTH DR

COVOLOS RD

MAIN ST

MATCH LINE STA 52+80

MATCH LINE STA 105+60

PAN AM RAILROAD

380 LINE 34.5 KV (DBL. CKT. F107)

380 LINE 34.5kV

F107 LINE 115kV

380 LINE 34.5kV (DBL. CKT. F107)

UNDERGROUND SEWER LINE

UNDERGROUND WATER LINE

UNDERGROUND F107 LINE 115kV

DURHAM SEWER LINE

JUSTICE, DAVID G. NON-LOCUS LL 230

SCHLIE, PAUL & ROBYN EAN-533 LL 229

PEACE, SUSAN EAN-265 LL 226

TENPAS, TIMOTHY LL 226.01

TOWN OF DURHAM D-E2903 LL 228

TOWN OF DURHAM EAN-265 LL 224

795 ACSR 26/7 DRAKE @ 4,500 LBS. NESC HEAVY, 212'F
4/0 ACSR 6/1 PENGUIN @ 2,500 LBS. NESC HEAVY, 120'F
(STR 2 TO STR 27.5)
336.4 KCMIL 18/1 MERLIN
(STR 27.5 TO STR 38)

RULING SPAN = 412' (STR 12 TO STR 19)
RULING SPAN = 139' (STR 20 TO STR 21)
RULING SPAN = 179' (STR 21 TO STR 22)
RULING SPAN = 256' (STR 23 TO STR 24)
RULING SPAN = 109' (STR 19 TO STR 20)
RULING SPAN = 229' (STR 22 TO STR 23)
RULING SPAN = 429' (STR 24 TO STR 26)
RULING SPAN = 347' (STR 26 TO STR 27.5)

NOTES:
1. NEUTRAL STANDARD GROUND CLEARANCE 18' (DTR 01.115).
2. SEE DRAWING F10743001 FOR TRANSMISSION DATA.
3. COUNTERPOISE LOCATIONS ARE APPROXIMATE AND SHALL BE VERIFIED IN THE FIELD. CONTRACTOR SHALL COMPLETE RESISTIVITY TESTING IN ACCORDANCE WITH OTRM 064 AND 264 AND ADJUST COUNTERPOISE INSTALLATION ACCORDINGLY.
4. THIS DRAWING SUPERSEDES THE LINE 380 PORTION ON DRAWINGS R-8228-2, R-7738-1A, AND R-7952.
5. PARCEL DATA, DATED 2/24/17, ALONG WITH UNDERGROUND UTILITIES, DATED 7/3/14, PROVIDED BY CORNERSTONE ENERGY SERVICES INC.
6. RIGHT OF WAY AND PARCEL BOUNDARIES PROVIDED BY DOUCET SURVEY INC., DATED 8/18/16.

200 100 0 200 400 600
GRAPHIC SCALE
1" = 200'

ST-1-UB, 88.5' CL H9 | ST-1-UB, 93.5' CL H9 | DTR 10.511, 39.5' CLASS | DTR 10.511, 44' CLASS H1 | SPDE-DAUB, 100' | SPDE-DAUB, 80' | DTR 10.518, 38.5' CLASS H3 7 GUY WIRES | SPDE-DAUB, 90' | SPDE-DAUB, 100' | ST-1-UB, 93.5' CL H9 | SA-2-UB, 83.5' CL H3 5 GUY WIRES | ST-1-UB, 84' CL H9 | SPDE-DAUB, 95'

FIBER
F107 115kV CONDUCTORS
CONDUCTORS
NEUTRAL
18' CLEARANCE

NO.	DESCRIPTION	DATE	DRWN	APPRV.
E	ISSUED FOR SEC AMENDMENT	8/30/17	SCF	APJ
D	ISSUED FOR BID WO# 1127641	8/29/17	SCF	KMS
C	ISSUED FOR 100% REVIEW WO# 1127641	04/27/17	RWP	KMS
B	ISSUED FOR SEC AMENDMENT WO# 1127641	07/10/16	SCF	KMS
A	ISSUED FOR 100% REVIEW WO# 1127641	05/13/16	SCF	KMS
NO.	REVISION	DATE	DRWN	APPRV.

FIBER OPTIC CABLE: 795 ACSR 26/7 DRAKE (34.5kV)
CONDUCTOR: 336.4 KCMIL 18/1 MERLIN
GROUND OR NEUTRAL: 4/0 ACSR 6/1 PENGUIN

EVERSOURCE ENERGY

PACKERS FALLS S/S TO MADBURY S/S
34.5kV DISTRIBUTION LINE
MILE SHEET

DATE: 08/03/2016
SCALE: H: 1"=200', V: 1"=20'

DES: EDR | CHK: KMS
DRW: SCF | APR: APJ
TOWN: DURHAM
TRANSMISSION LINE: 380
MILE NO: 2
DISCIPLINE/SHT NO.
SHEET 2 OF 4
038044001

8/30/2017 10:11 AM – sfisher – \\Vefs1\Vine\Projects\133065\02\DWG\03 Line\Plan & Profile\Rel\02_PSECA_DWGS_380\038044001 – PSECA-2017_08_30.dwg – 038044001 2-4

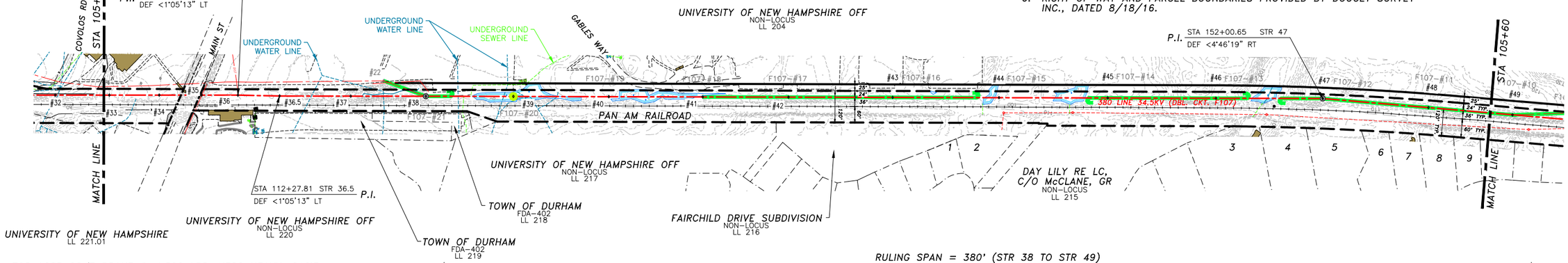
DURHAM, N. H.

PARCELS:
1. GAROFALO, PIERO G. & DUBOIS-GAR, LL 216.02
2. KARL A. VAN ASSELT LIV REV TRUST, LL 216.01
3. PETER M. EJARQUE REVOCABLE TRUST, NON-LOCUS LL 214
4. CORVINI, MARGUERITE, NON-LOCUS LL 213
5. GIROUX, DAVID L. & BROWN, GRET, NON-LOCUS LL 212
6. O'SHEA, KEVIN M. & LEIGHSA A., NON-LOCUS LL 211
7. VASILE, THOMAS & KATHLEEN K., NON-LOCUS LL 210
8. LUFT, KAROLA, NON-LOCUS LL 209
9. SKOTKO, BRADLEY & SMITH, HEATHE, NON-LOCUS LL 208

NOTES:
1. NEUTRAL STANDARD GROUND CLEARANCE 18' (DTR 01.115).
2. SEE DRAWING F10743001 FOR TRANSMISSION DATA.
3. COUNTERPOISE LOCATIONS ARE APPROXIMATE AND SHALL BE VERIFIED IN THE FIELD. CONTRACTOR SHALL COMPLETE RESISTIVITY TESTING IN ACCORDANCE WITH OTRM 064 AND 264 AND ADJUST COUNTERPOISE INSTALLATION ACCORDINGLY.
4. THIS DRAWING SUPERSEDES THE LINE 380 PORTION ON DRAWINGS R-8228-2, R-7738-1A, AND R-7952.
5. PARCEL DATA, DATED 2/24/17, ALONG WITH UNDERGROUND UTILITIES, DATED 7/3/14, PROVIDED BY CORNERSTONE ENERGY SERVICES INC.
6. RIGHT OF WAY AND PARCEL BOUNDARIES PROVIDED BY DOUCET SURVEY INC., DATED 8/18/16.

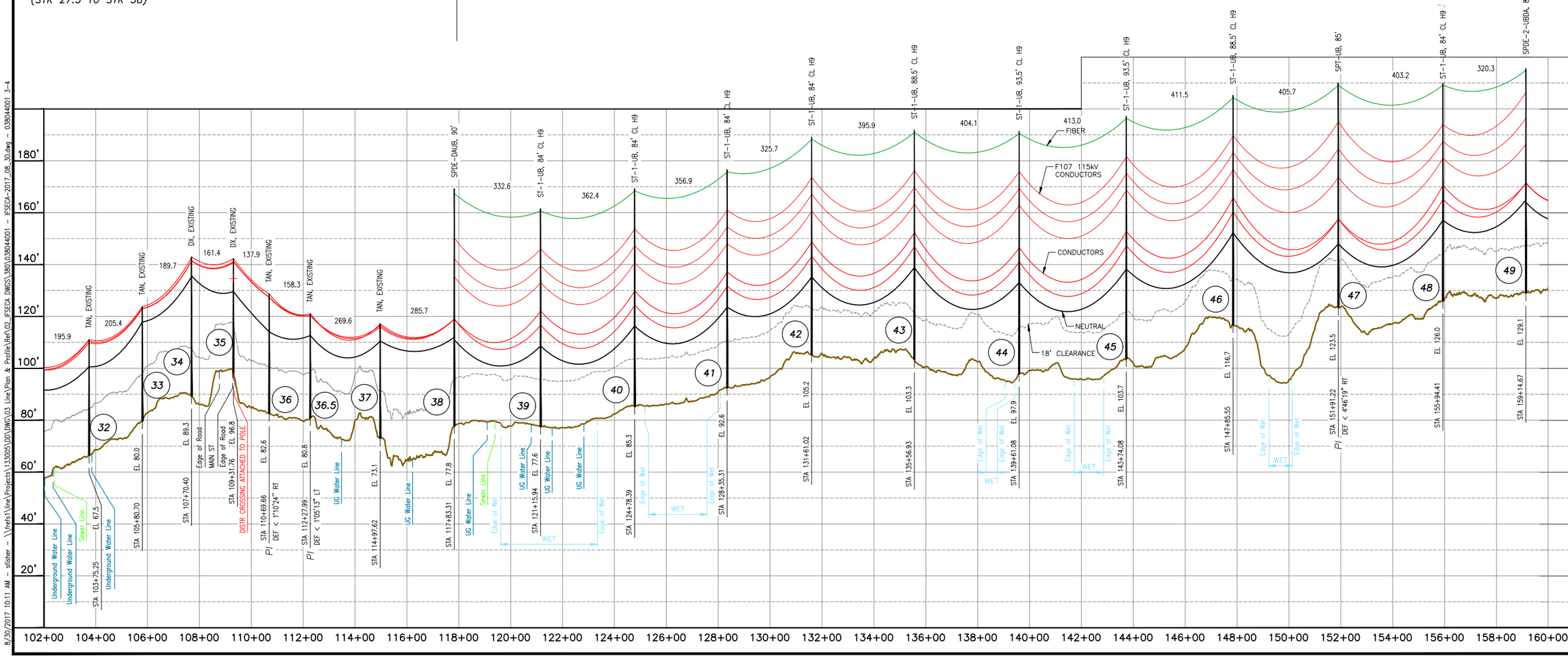
THIS PLAN FOR REFERENCE ONLY. NO REPRESENTATION OR WARRANTY IS MADE AS TO LOCATION OF BOUNDARIES OR OTHER POINTS OF REFERENCE

200 100 0 200 400 600
GRAPHIC SCALE
1" = 200'



795 ACSR 26/7 DRAKE @ 4,500 LBS. NESC HEAVY, 212'F
4/0 ACSR 6/1 PENGUIN @ 2,500 LBS. NESC HEAVY, 120'F
(STR 38 TO STR 50)
336.4 KCMIL 18/1 MERLIN
(STR 27.5 TO STR 38)

RULING SPAN = 380' (STR 38 TO STR 49)



NO.	DESCRIPTION	DATE	DRWN	APPRV.
E	ISSUED FOR SEC AMENDMENT	8/30/17	SCF	APJ
D	ISSUED FOR BID WO# 1127641	6/29/17	SCF	APJ
C	ISSUED FOR TOOE REVIEW WO# 1127641	04/27/17	RWP	APJ
B	ISSUED FOR SEC AMENDMENT	07/10/17	SCF	APJ
A	ISSUED FOR TOOE REVIEW WO# 1127641	11/15/16	KMS	APJ

795 ACSR 26/7 DRAKE (34.5kV)
4/0 ACSR 6/1 PENGUIN (120kV)
FIBER OPTIC CABLE
CONDUCTOR
GROUND OR NEUTRAL

EVERSOURCE ENERGY

D E

PACKERS FALLS S/S TO MADBURY S/S
34.5kV DISTRIBUTION LINE
MILE SHEET

DATE: 08/03/2016
SCALE: H 1"=200', V 1"=20'
DES: EDR CHK: KMS
DRW: SCF APP: APJ
TOWN: DURHAM
TRANSMISSION LINE: 380
MILE NO: 3
DISCIPLINE/SHT NO.
SHEET 3 OF 4
038044001

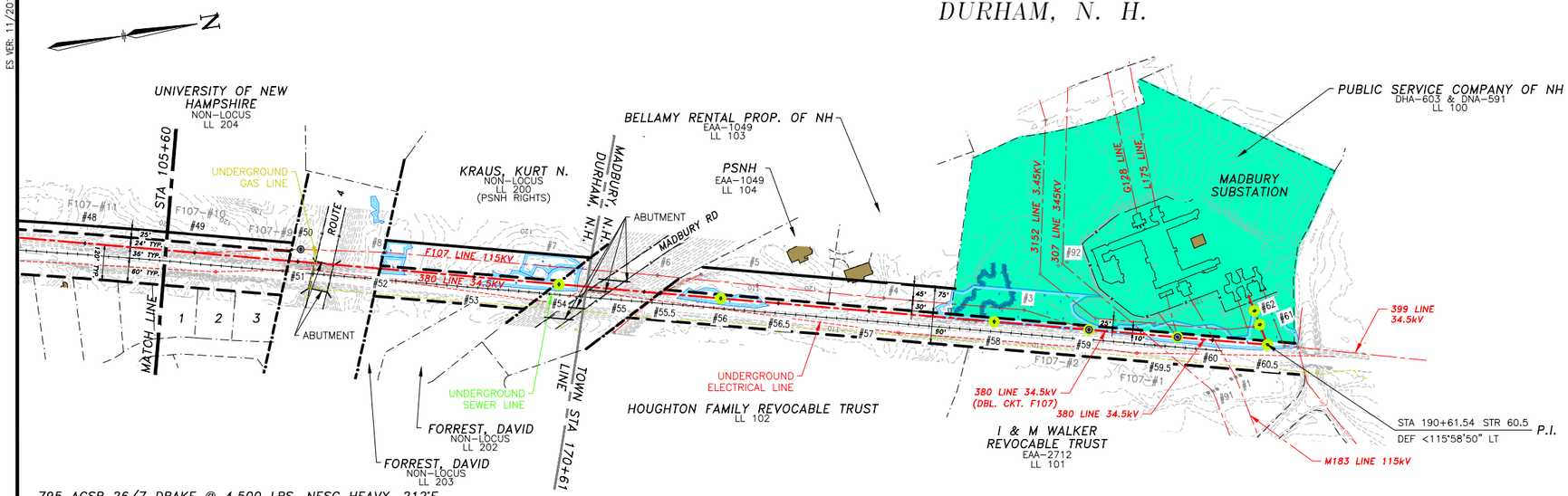
ES VER: 11/2015

8/30/2017 10:11 AM - sfisher - \\rafs1\Line\Projects\133005\20\DWG\03 Line\Plan & Profile\Ref\02_IFSECA DWGS\380\038044001 - IFSECA-2017_08_30.dwg - 038044001 3-4

ES VER: 11/2015

DURHAM, N. H.

THIS PLAN FOR REFERENCE ONLY. NO REPRESENTATION OR WARRANTY IS MADE AS TO LOCATION OF BOUNDARIES OR OTHER POINTS OF REFERENCE



795 ACSR 26/7 DRAKE @ 4,500 LBS. NESC HEAVY, 212°F
4/0 ACSR 6/1 PENGUIN @ 2,500 LBS. NESC HEAVY, 120°F
(STR 48 TO STR 49 & STR 59 TO 59.5)
336.4 KCMIL 18/1 MERLIN
(STR 49 TO STR 59 & STR 59.5 TO MADBURY S/S)

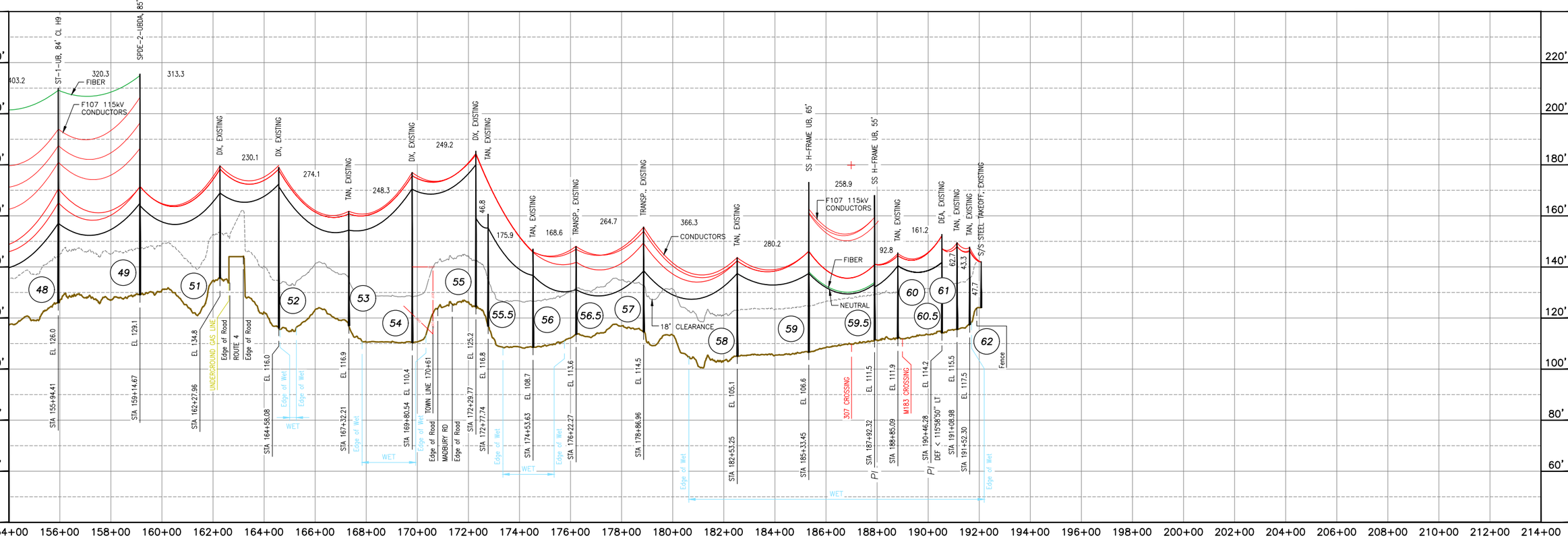
PARCELS:
1. ROBERT CALAMARI TRUST, NON-LOCUS LL 207
2. HENRI J. RICHARD REV TRUST, NON-LOCUS LL 206
3. DETURK, MARK S. & MARY J., NON-LOCUS LL 205

RULING SPAN = 380'
(STR 38 TO STR 49)

RULING SPAN = 258'
(STR 59 TO STR 59.5)

NOTES:
1. NEUTRAL STANDARD GROUND CLEARANCE 18' (DTR 01.115).
2. SEE DRAWING F10743001 FOR TRANSMISSION DATA.
3. COUNTERPOISE LOCATIONS ARE APPROXIMATE AND SHALL BE VERIFIED IN THE FIELD. CONTRACTOR SHALL COMPLETE RESISTIVITY TESTING IN ACCORDANCE WITH OTRM 064 AND 264 AND ADJUST COUNTERPOISE INSTALLATION ACCORDINGLY.
4. THIS DRAWING SUPERSEDES THE LINE 380 PORTION ON DRAWINGS R-8228-2, R-7738-1A, AND R-7952.
5. PARCEL DATA, DATED 2/24/17, ALONG WITH UNDERGROUND UTILITIES, DATED 7/3/14, PROVIDED BY CORNERSTONE ENERGY SERVICES INC.
6. RIGHT OF WAY AND PARCEL BOUNDARIES PROVIDED BY DOUCET SURVEY INC., DATED 8/18/16.

200 100 0 200 400 600
GRAPHIC SCALE
1" = 200'



NO.	REVISION	DATE	DRWN	APPRV.
E	ISSUED FOR SEC AMENDMENT	8/30/17	SCF	APJ
D	ISSUED FOR BID WO# 1127641	8/29/17	SCF	KMS
C	ISSUED FOR 100% REVIEW WO# 1127641	04/27/17	RWP	KMS
B	ISSUED FOR SEC AMENDMENT WO# 1127641	01/10/17	SCF	KMS
A	ISSUED FOR 100% REVIEW WO# 1127641	07/18/16	SCF	APJ

	FIBER OPTIC CABLE		795 ACSR 26/7 DRAKE (34.5kV)
	CONDUCTOR		336.4 KCMIL 18/1 MERLIN
	GROUND OR NEUTRAL		4/0 ACSR 6/1 PENGUIN

EVERSOURCE ENERGY

D E

PACKERS FALLS S/S TO MADBURY S/S
34.5kV DISTRIBUTION LINE
MILE SHEET

DATE: 08/03/2016

SCALE: H 1"=200', V 1"=20'

DES: EDR | CHK: KMS
DRW: SCF | APR: APJ

TOWN: DURHAM
TRANSMISSION LINE: 380
MILE NO: 4
DISCIPLINE/SHT NO.
SHEET 4 OF 4
038044001

8/30/2017 10:11 AM - sfisher - \\refs1\Line\Projects\133005\00\DWG\03 Line\Plan & Profile\Ref\A.02_EFSECA_DWGS_380\038044001 - EFSECA-2017_08_30.dwg - 038044001 4-4

ES VER: 11/2015

3162 PLAN AND PROFILE LEGEND:

- FENCE
- STONEWALL
- LIMITS OF WET
- EDGE OF WET DELINEATION
- TOPOGRAPHICAL CONTOURS WITH 10' INTERVALS
- TOPOGRAPHICAL CONTOURS WITH 2' INTERVALS
- UNDERGROUND WATER LINE
- UNDERGROUND GAS LINE
- RIGHT OF WAY LINE
- RAILROAD RIGHT OF WAY LINE
- DENOTES TAX MAP BOUNDARY LINE
- DENOTES LINE COUNTERPOISE
- BUILDINGS
- FEE PROPERTY
- 3162 STRUCTURE (CONSTRUCTION STR NO. (PERMIT STR NO.))
- 3162 STRUCTURE IN WET (CONSTRUCTION STR NO. (PERMIT STR NO.))

LEGEND:

- 3162 LINE
- 10 — 3162 CONSTRUCTION STRUCTURE NUMBER
  REFERENCE MILESHEETS FOR CORRESPONDING PERMITTING STRUCTURE NUMBERS
- INDICATES APPROXIMATE LIMITS OF SUBSTATION

GRAPHIC SCALE
1" = 1000'
1000 500 0 1000 2000 3000

NO.	DESCRIPTION	DES	CHK	APV
C	ISSUED FOR SEC AMENDMENT	SCF	KMS	APJ
B	ISSUED FOR BID W/# T127041	SCF	KMS	APJ
A	ISSUED FOR WORKING W/# T127041	SCF	KMS	APJ

8/30/17 8/29/17 8/29/17 DATE

PACKERS FALLS S/S TO STR 56
34.5kV DISTRIBUTION LINE
KEYSHEET

DES: EDR CHK: KMS
DRW: SCF APR: APJ
TOWN: DURHAM
TRANSMISSION LINE: 3162
MILE NO.
DISCIPLINE/SHT NO.
SHEET 1 OF 1
316244101

EVERSOURCE ENERGY

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ES VER: 11/2015

DURHAM, N. H.

THIS PLAN FOR REFERENCE ONLY. NO REPRESENTATION OR WARRANTY IS MADE AS TO LOCATION OF BOUNDARIES OR OTHER POINTS OF REFERENCE

GRAPHIC SCALE
1" = 200'

PUBLIC SERVICE COMPANY OF NEW HAMPSHIRE
LL 221.09

380 LINE 34.5kV
3162 LINE 34.5kV
377 LINE 34.5kV
3191 LINE 34.5kV
3152 LINE 34.5kV (DBL. CKT. F107)
3152 LINE 34.5kV
F107 115kV LINE
PROPOSED SINGLE DISTRIBUTION PHASE TAP

P.I. STA 0+69.81 STR 1 DEF <90°46'00" RT
PACKERS FALLS S/S
P.I. STA 3+85.29 STR 3 DEF <90°17'44" RT
P.I. STA 5+66.16 STR 4 DEF <107°34'40" LT
P.I. STA 30+73.28 STR 11 DEF <1°29'55" LT
P.I. STA 34+54.74 STR 12 DEF <1°10'05" RT
P.I. STA 43+04.33 STR 15 DEF <14°59'07" RT
P.I. STA 49+64.29 STR 19 DEF <0°51'35" LT

STATE OF NEW HAMPSHIRE FISH & GAME
EAN–530
LL 232

STATE PUBLIC LAND CROSSING
SEE DRAWINGS F10799001 & F10799002

STATE OF NEW HAMPSHIRE, FISH & GAME
EAN–512
LL 238

PRATT, ALBERT N., & GENGARELLY, LARA M.
EAN–509/NON–LOCUS
LL 234

ANN G. KNIGHTLY REVOCABLE TRUST
EAN–509/NON–LOCUS
LL 235

GREGG, BRADFORD & MARY
EAN–509
LL 236

MORIARTY, HEIRS OF BERTHA; C/O
EAN–512
LL 237

GARY L. LANSINGER REVOCABLE TRUST
DE2903
LL 241

STA 52+80

ROUTE 108/NEWMARKET RD

STATE OF NEW HAMPSHIRE, FISH & GAME
LL 520

ANDERSON, MARK L. & DIANE R.
EAN–508
LL 239

GANTZ, BENJAMIN L. & ALEXANDRA
EAN–520
LL 240

LONGMARSH RD

MATCH LINE

NOTES:
1. SEE DRAWING NO. F10743001 FOR TRANSMISSION DATA.
2. NEUTRAL STANDARD GROUND CLEARANCE 18' (DTR 04.115).
3. COUNTERPOISE LOCATIONS ARE APPROXIMATE AND SHALL BE VERIFIED IN THE FIELD. CONTRACTOR SHALL COMPLETE RESISTIVITY TESTING IN ACCORDANCE WITH OTRM 064 AND 264 AND ADJUST COUNTERPOISE INSTALLATION ACCORDINGLY.
4. PARCEL DATA, DATED 2/24/17, ALONG WITH UNDERGROUND UTILITIES, DATED 7/3/14, PROVIDED BY CORNERSTONE ENERGY SERVICES INC.
5. RIGHT OF WAY AND PARCEL BOUNDARIES PROVIDED BY DOUCET SURVEY INC., DATED 8/18/16.

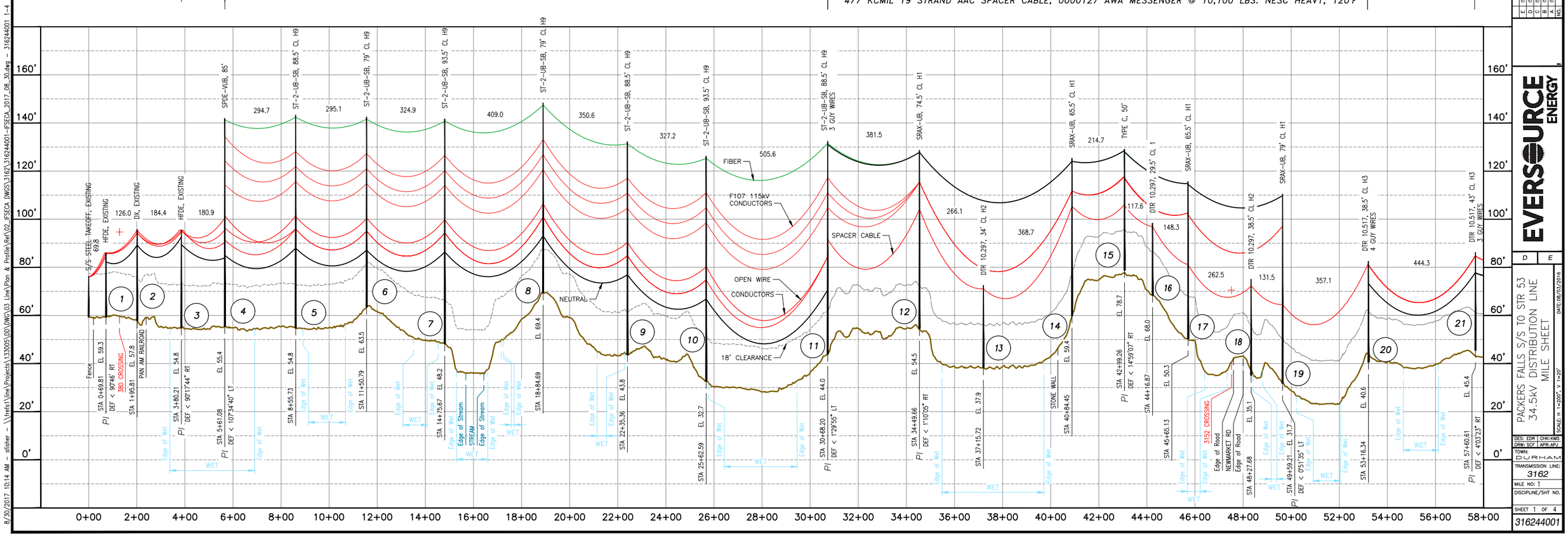
477 ACSR 18/1 PELICAN @ 3,500 LBS. NESC HEAVY, 212'F
4/0 ACSR 6/1 PENGUIN @ 2,500 LBS. NESC HEAVY, 120'F

RULING SPAN = 181' (STR 3 TO STR 4)
RULING SPAN = 380' (STR 4 TO STR 11)
RULING SPAN = 301' (STR 11 TO STR 20)
RULING SPAN = 444' (STR 20 TO STR 21)

477 KCMIL 19 STRAND AAC SPACER CABLE, 0000127 AWA MESSENGER @ 10,100 LBS. NESC HEAVY, 120'F

NO.	REVISION	DATE	DRWN	APPRV.
E	ISSUED FOR SEC AMENDMENT	8/30/17	SCF	APJ
D	ISSUED FOR BID WO# 1127641	8/29/17	SCF	APJ
C	ISSUED FOR 100% REVIEW WO# 1127641	04/27/17	RWP	KMS
B	ISSUED FOR SEC AMENDMENT	07/10/17	SCF	KMS
A	ISSUED FOR 100% REVIEW WO# 1127641	11/08/16	SCF	KMS

FIBER OPTIC CABLE
CONDUCTOR 477 KCMIL 19 STRAND AAC SPACER CABLE
GROUND OR NEUTRAL 4/0 ACSR 6/1 PENGUIN



DES: EDR	CHK:KMS
DRW: SCF	APR:APJ
TOWN: DURHAM	
TRANSMISSION LINE: 3162	
MILE NO: 1	
DISCIPLINE/SHT NO.	
SHEET 1 OF 4	
316244001	

EVERSOURCE ENERGY

D E

PACKERS FALLS S/S TO STR 53
34.5kV DISTRIBUTION LINE
MILE SHEET

DATE:08/03/2016

SCALE: H 1=200', V 1=20'

8/30/2017 10:14 AM – sfisher – \\rafs1\Line\Projects\33005\DD\DWG\03_Line\Plan & Profile\Ref\02_IFSECA_DWGS\3162\316244001_IFSECA_2017_08_30.dwg – 316244001 1-4

DURHAM, N. H.

NOTES:
1. SEE DRAWING NO. F10743001 FOR TRANSMISSION DATA.
2. NEUTRAL STANDARD GROUND CLEARANCE 18' (DTR 04.115).
3. COUNTERPOISE LOCATIONS ARE APPROXIMATE AND SHALL BE VERIFIED IN THE FIELD. CONTRACTOR SHALL COMPLETE RESISTIVITY TESTING IN ACCORDANCE WITH OTRM 064 AND 264 AND ADJUST COUNTERPOISE INSTALLATION ACCORDINGLY.
4. PARCEL DATA, DATED 2/24/17, ALONG WITH UNDERGROUND UTILITIES, DATED 7/3/14, PROVIDED BY CORNERSTONE ENERGY SERVICES INC.
5. RIGHT OF WAY AND PARCEL BOUNDARIES PROVIDED BY DOUCET SURVEY INC., DATED 8/18/16.

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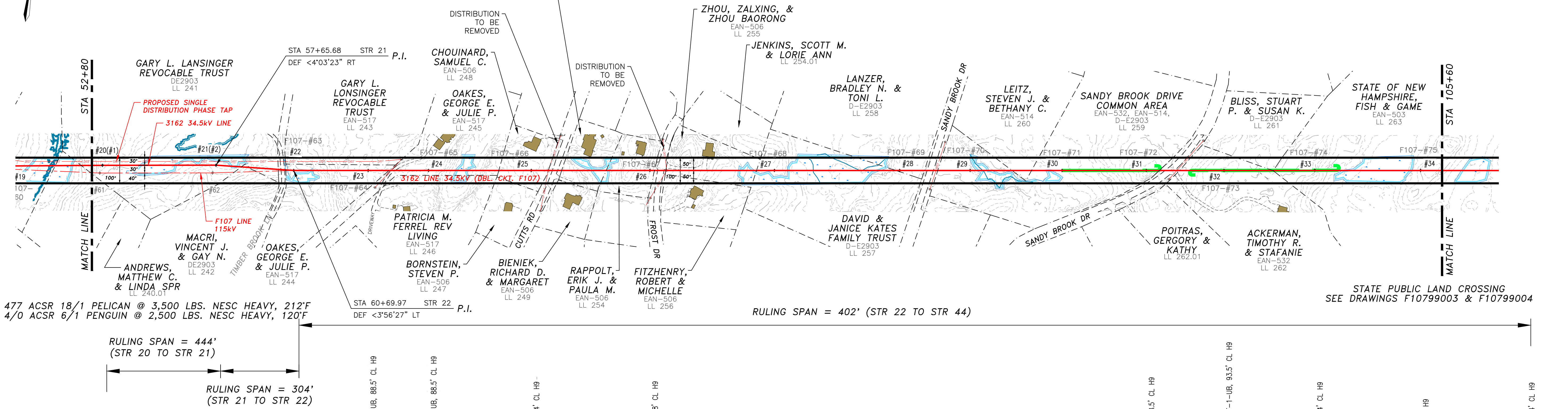
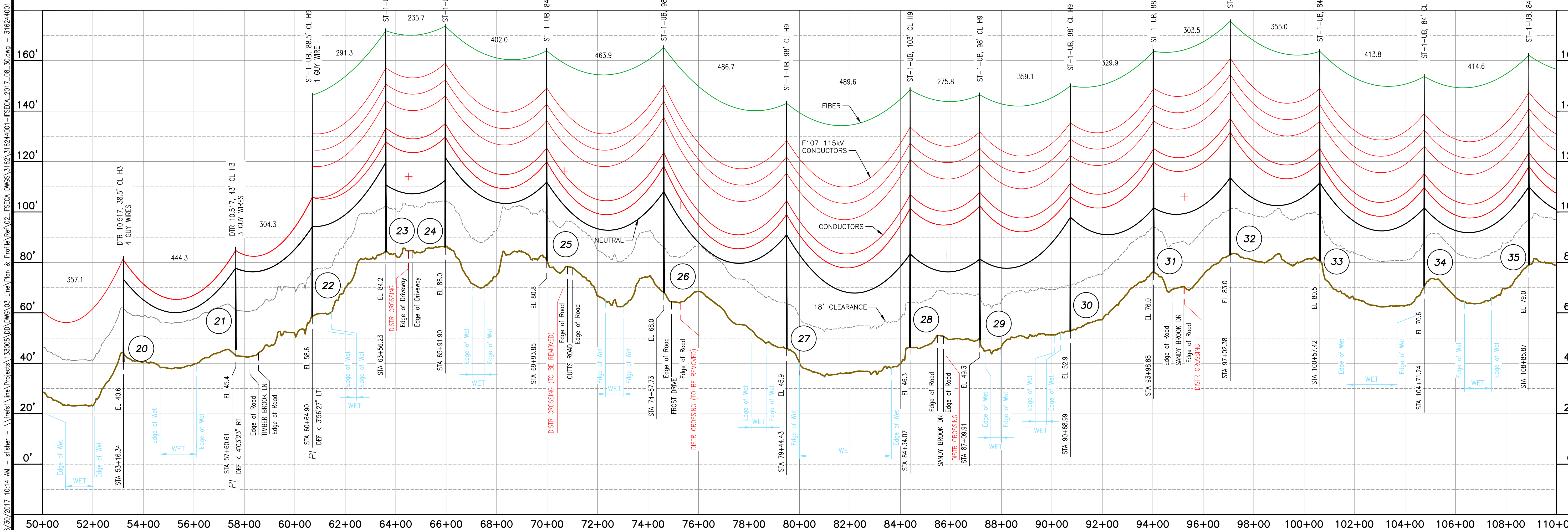
GRAPHIC SCALE 1" = 200' (200 100 0 200 400 600)





NO.	REVISION	DATE	DRWN	CHKD	APPRV.
E	ISSUED FOR SEC AMENDMENT	8/30/17	SCF	KMS	APJ
D	ISSUED FOR BID WO# T11276A1	6/29/17	SCF	KMS	APJ
C	ISSUED FOR 100% REVIEW WO# T11276A1	04/27/17	RWP	KMS	APJ
B	ISSUED FOR SEC AMENDMENT	01/10/17	SCF	KMS	APJ
A	ISSUED FOR 70% REVIEW WO# T11276A1	11/08/16	SCF	KMS	APJ

FIBER OPTIC CABLE	
CONDUCTOR	477 ACSR 18/1 PELICAN (34.5kV)
CONDUCTOR	
GROUND OR NEUTRAL	4/0 ACSR 6/1 PENGUIN

EVERSOURCE ENERGY

D E

PACKERS FALLS S/S TO STR 53
34.5kV DISTRIBUTION LINE
MILE SHEET

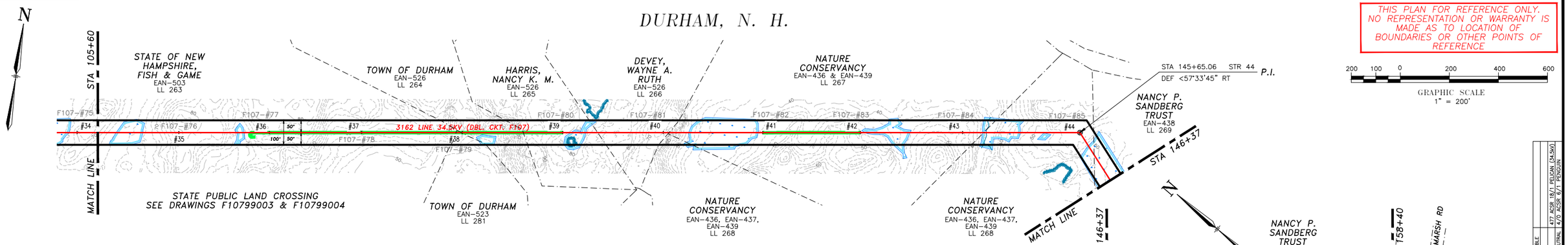
DATE: 08/03/2016
SCALE: H 1=200", V 1=20'

DES: EDR CHK: KMS
DRW: SCF APR: APJ
TOWN: DURHAM
TRANSMISSION LINE: 3162
MILE NO: 2
DISCIPLINE/SHT NO.
SHEET 2 OF 4
316244001

ES VER: 11/2015

DURHAM, N. H.

THIS PLAN FOR REFERENCE ONLY. NO REPRESENTATION OR WARRANTY IS MADE AS TO LOCATION OF BOUNDARIES OR OTHER POINTS OF REFERENCE

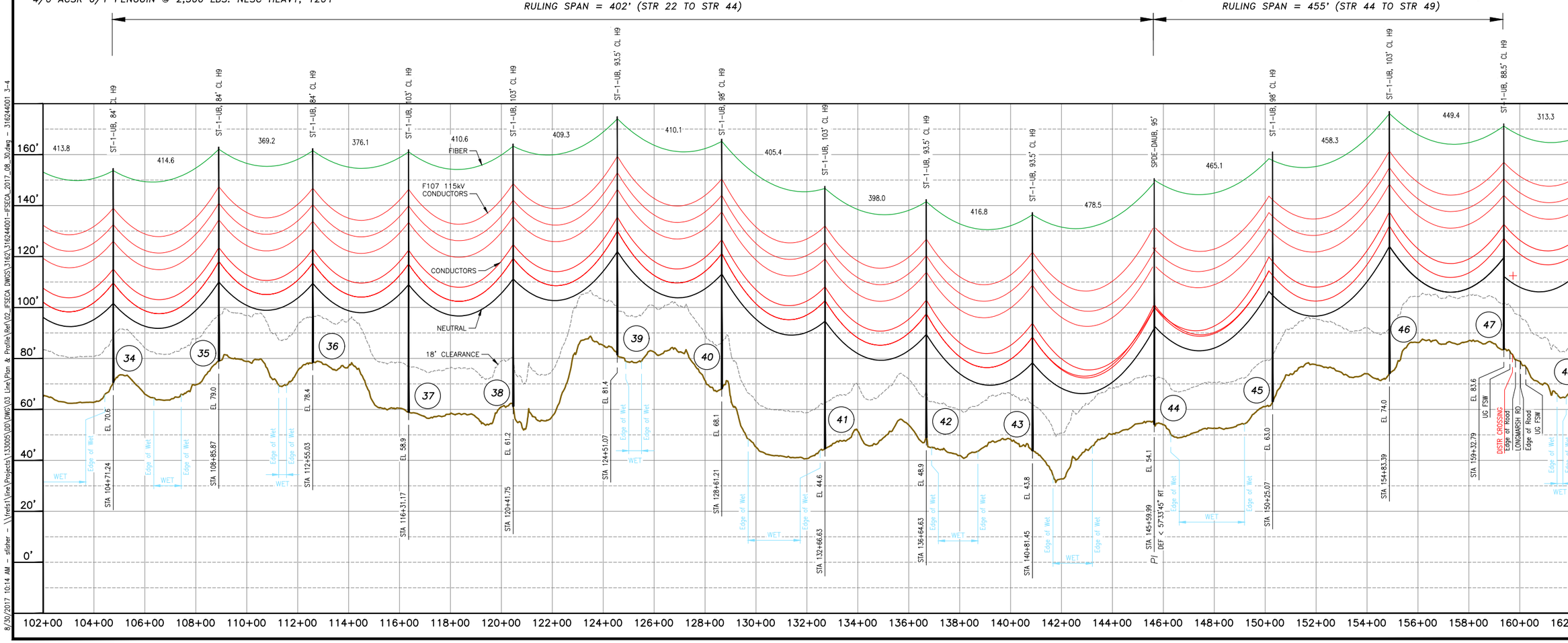


NOTES:
1. SEE DRAWING NO. F10743001 FOR TRANSMISSION DATA.
2. NEUTRAL STANDARD GROUND CLEARANCE 18' (DTR 04.115).
3. COUNTERPOISE LOCATIONS ARE APPROXIMATE AND SHALL BE VERIFIED IN THE FIELD. CONTRACTOR SHALL COMPLETE RESISTIVITY TESTING IN ACCORDANCE WITH OTRM 064 AND 264 AND ADJUST COUNTERPOISE INSTALLATION ACCORDINGLY.
4. PARCEL DATA, DATED 2/24/17, ALONG WITH UNDERGROUND UTILITIES, DATED 7/3/14, PROVIDED BY CORNERSTONE ENERGY SERVICES INC.
5. RIGHT OF WAY AND PARCEL BOUNDARIES PROVIDED BY DOUCET SURVEY INC., DATED 8/18/16.

477 ACSR 18/1 PELICAN @ 3,500 LBS. NESC HEAVY, 212'F
4/0 ACSR 6/1 PENGUIN @ 2,500 LBS. NESC HEAVY, 120'F

RULING SPAN = 402' (STR 22 TO STR 44)

RULING SPAN = 455' (STR 44 TO STR 49)



NO.	DESCRIPTION	DATE	DRWN	CHKD	APPRV.
E	ISSUED FOR SEC AMENDMENT	8/30/17	SCF	KMS	APJ
D	ISSUED FOR BID WO# 1127641	8/29/17	SCF	KMS	APJ
C	ISSUED FOR 100% REVIEW WO# 1127641	04/27/17	RWP	KMS	APJ
B	ISSUED FOR SEC AMENDMENT WO# 1127641	01/10/17	SCF	KMS	APJ
A	ISSUED FOR 100% REVIEW WO# 1127641	11/30/16	SCF	KMS	APJ

FIBER OPTIC CABLE
CONDUCTOR 477 ACSR 18/1, PELICAN (34.5kV)
GROUND OR NEUTRAL 4/0 ACSR 6/1 PENGUIN

EVERSOURCE ENERGY

D E

PACKERS FALLS S/S TO STR 53
34.5kV DISTRIBUTION LINE
MILE SHEET

DATE:06/03/2016

SCALE: H 1=200', V 1=20'

DES: EDR CHK:KMS
DRW: SCF APR: APJ

TOWN: DURHAM
TRANSMISSION LINE: 3162
MILE NO: 3
DISCIPLINE/SHT NO.
SHEET 3 OF 4
316244001

8/30/2017 10:14 AM – sfisher – \\fnfs1\line\Projects\330051.00\DWG\03 Line\Plan & Profile\Ver\02_IFSECA DWGS\3162\316244001–IFSECA_2017_08_30.dwg – 316244001 3–4

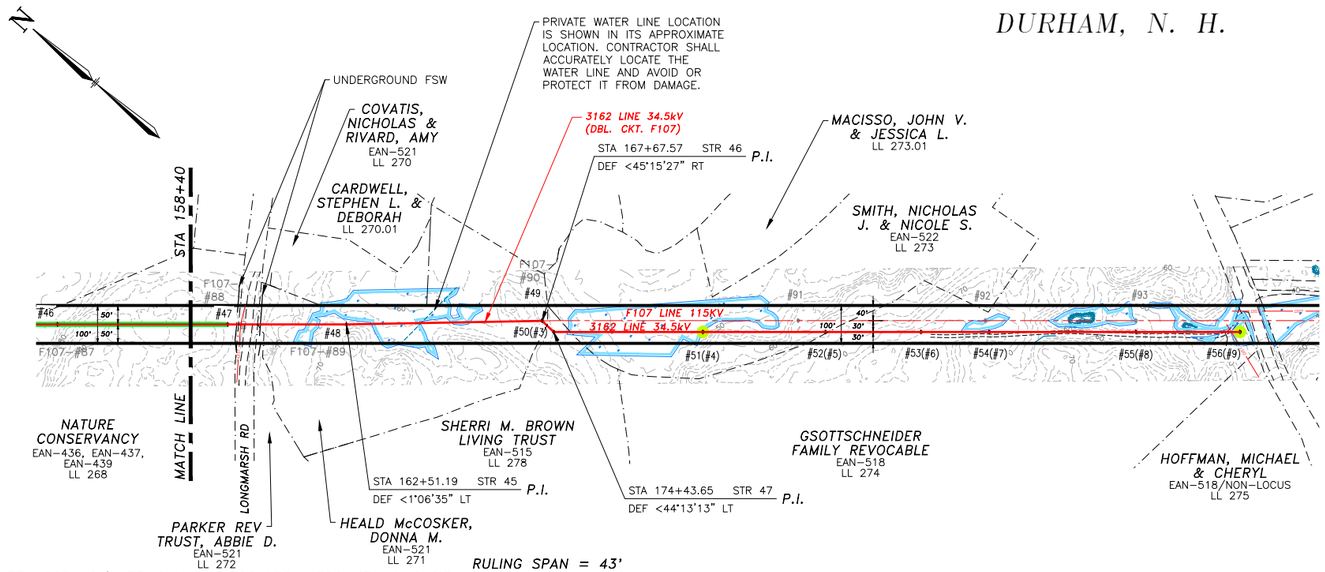
ES VER: 11/2015

DURHAM, N. H.

THIS PLAN FOR REFERENCE ONLY. NO REPRESENTATION OR WARRANTY IS MADE AS TO LOCATION OF BOUNDARIES OR OTHER POINTS OF REFERENCE

200 100 0 200 400 600

GRAPHIC SCALE
1" = 200'

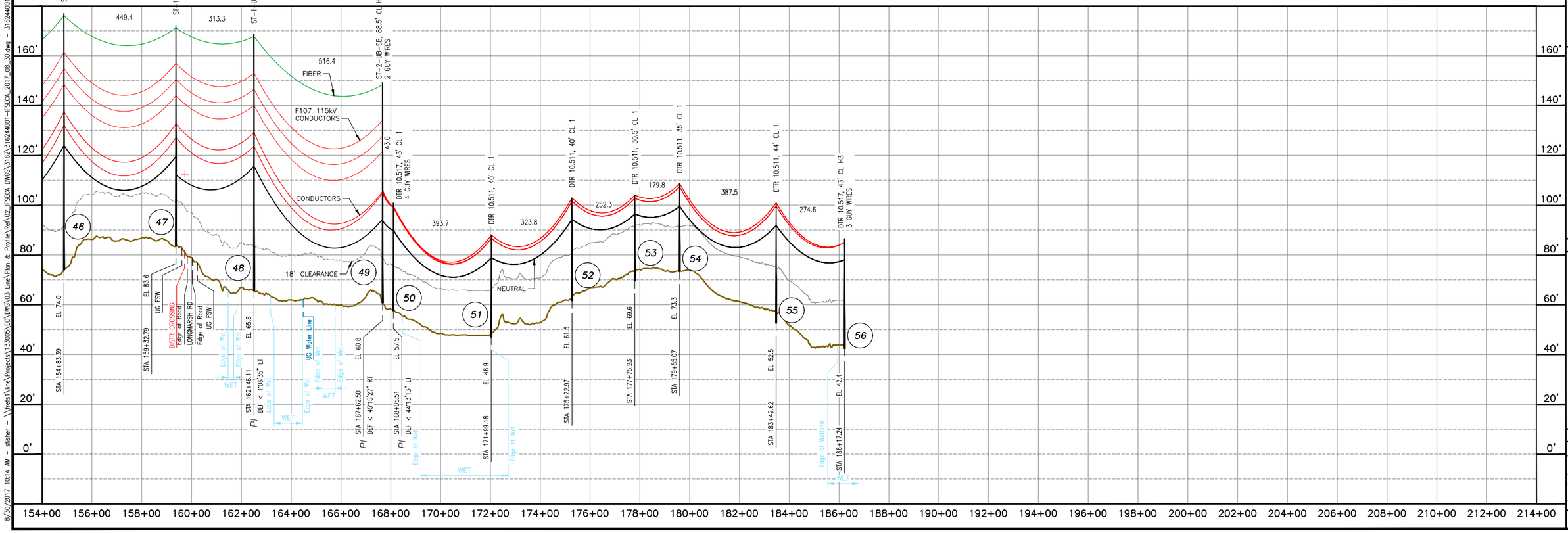


477 ACSR 18/1 PELICAN @ 3,500 LBS. NESC HEAVY, 212'F
4/0 ACSR 6/1 PENGUIN @ 2,500 LBS. NESC HEAVY, 120'F

RULING SPAN = 455' (STR 44 TO STR 49)

RULING SPAN = 43' (STR 49 TO STR 50)

RULING SPAN = 329' (STR 50 TO STR 56)



NOTES:
1. SEE DRAWING NO. F10743001 FOR TRANSMISSION DATA.
2. NEUTRAL STANDARD GROUND CLEARANCE 18' (DTR 04.115).
3. COUNTERPOISE LOCATIONS ARE APPROXIMATE AND SHALL BE VERIFIED IN THE FIELD. CONTRACTOR SHALL COMPLETE RESISTIVITY TESTING IN ACCORDANCE WITH OTRM 064 AND 264 AND ADJUST COUNTERPOISE INSTALLATION ACCORDINGLY.
4. PARCEL DATA, DATED 2/24/17, ALONG WITH UNDERGROUND UTILITIES, DATED 7/3/14, PROVIDED BY CORNERSTONE ENERGY SERVICES INC.
5. RIGHT OF WAY AND PARCEL BOUNDARIES PROVIDED BY DOUCET SURVEY INC., DATED 8/18/16.

NO.	REVISION	DATE	DRWN	CHKD	APPRV.
F	ISSUED FOR SEC AMENDMENT	8/30/17	SCF	KMS	APJ
E	ADDED PRIVATE WATER LINE, WO# T1276A1	7/26/17	SCF	KMS	APJ
D	ISSUED FOR BID WO# T1276A1	6/29/17	SCF	KMS	APJ
C	ISSUED FOR TOOE REVIEW WO# T1276A1	04/27/17	RWP	KMS	APJ
B	ISSUED FOR SEC AMENDMENT	01/10/17	SCF	KMS	APJ
A	ISSUED FOR TOOE REVIEW WO# T1276A1	11/7/16	SCF	KMS	APJ

FIBER OPTIC CABLE
CONDUCTOR
GROUND OR NEUTRAL
477 ACSR 18/1 PELICAN (34.5kV)
4/0 ACSR 6/1 PENGUIN

EVERSOURCE ENERGY

D F

DATE: 08/03/2016

PACKERS FALLS S/S TO STR 53
34.5kV DISTRIBUTION LINE
MILE SHEET

SCALE: H 1"=200', V 1"=20'

DES: EDR CHK: KMS
DRW: SCF APR: APJ

TOWN: DURHAM
TRANSMISSION LINE: 3162
MILE NO: 4
DISCIPLINE/SHT NO.
SHEET 4 OF 4
316244001

8/30/2017 10:14 AM – sfisher – \\Trefs1\Vne\Projects\133005\DD\DWG\03 Line\Plan & Profile\Ref\02_PFSECA DWGS\3162\316244001-PFSECA_2017_08_30.dwg – 316244001 4-4

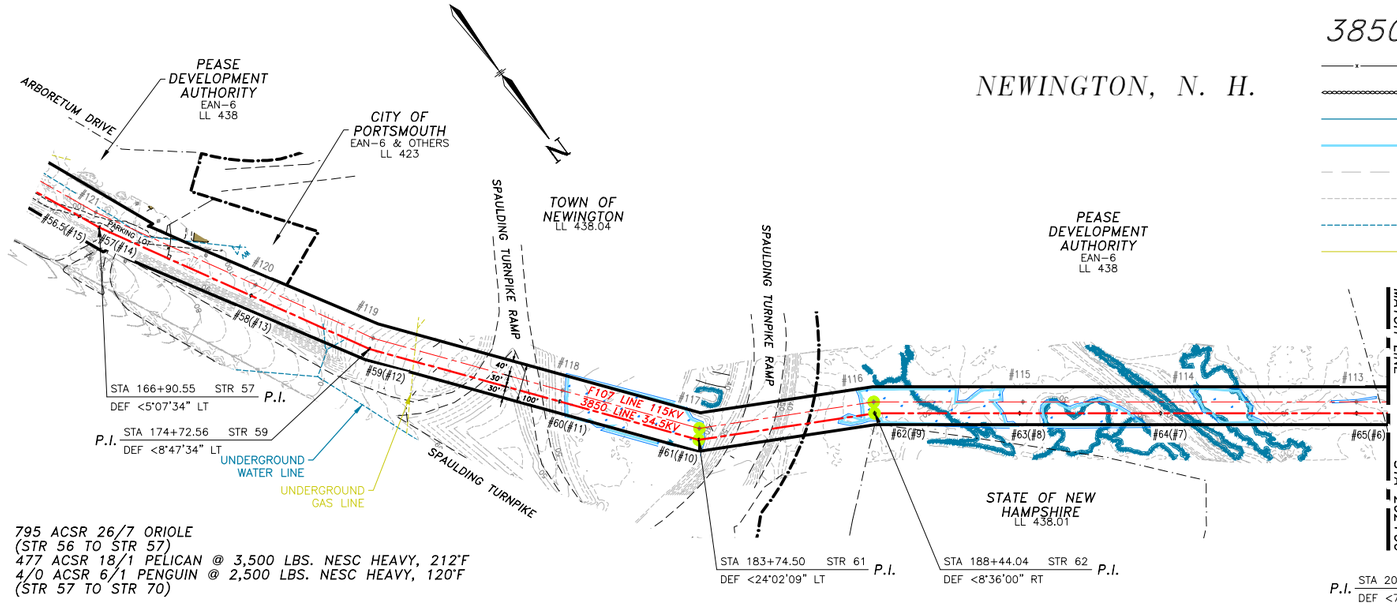
ES VER: 11/2015

THIS PLAN FOR REFERENCE ONLY. NO REPRESENTATION OR WARRANTY IS MADE AS TO LOCATION OF BOUNDARIES OR OTHER POINTS OF REFERENCE

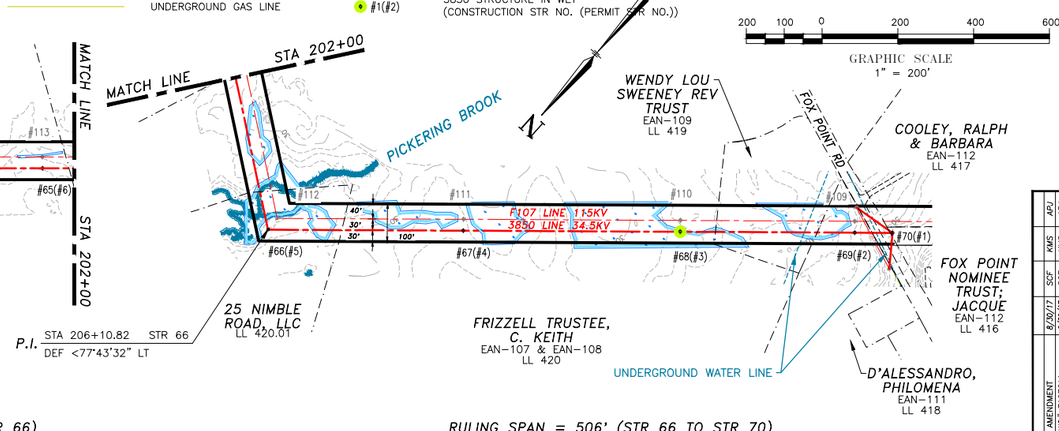
3850 PLAN AND PROFILE LEGEND:

- FENCE
- STONEWALL
- LIMITS OF WET
- EDGE OF WET DELINEATION
- TOPOGRAPHICAL CONTOURS WITH 10' INTERVALS
- TOPOGRAPHICAL CONTOURS WITH 2' INTERVALS
- UNDERGROUND WATER LINE
- UNDERGROUND GAS LINE
- RIGHT OF WAY LINE
- RAILROAD RIGHT OF WAY LINE
- DENOTES TAX MAP BOUNDARY LINE
- DENOTES LINE COUNTERPOISE
- BUILDINGS
- FEE PROPERTY
- 3850 STRUCTURE (CONSTRUCTION STR NO. (PERMIT STR NO.))
- 3850 STRUCTURE IN WET (CONSTRUCTION STR NO. (PERMIT STR NO.))

NEWINGTON, N. H.



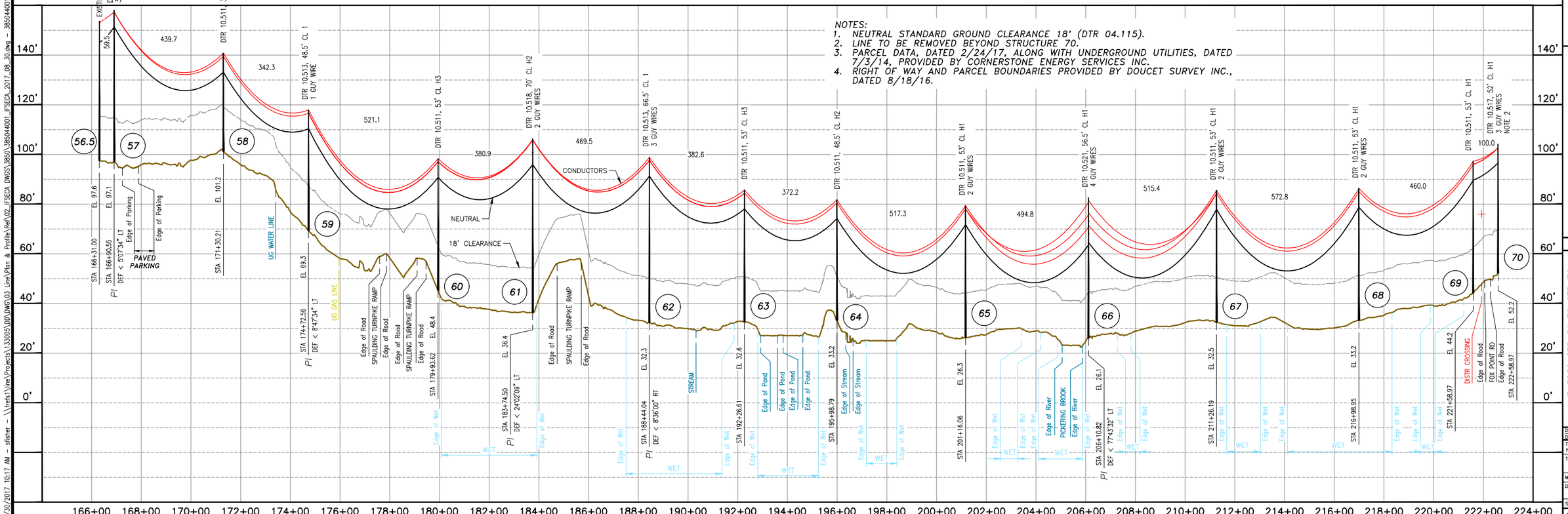
795 ACSR 26/7 ORIOLE
(STR 56 TO STR 57)
477 ACSR 18/1 PELICAN @ 3,500 LBS. NESC HEAVY, 212'F
4/0 ACSR 6/1 PENGUIN @ 2,500 LBS. NESC HEAVY, 120'F
(STR 57 TO STR 70)



RULING SPAN = 437' (STR 57 TO STR 61)

RULING SPAN = 459' (STR 61 TO STR 66)

RULING SPAN = 506' (STR 66 TO STR 70)



NOTES:
1. NEUTRAL STANDARD GROUND CLEARANCE 18' (DTR 04.115).
2. LINE TO BE REMOVED BEYOND STRUCTURE 70.
3. PARCEL DATA, DATED 2/24/17, ALONG WITH UNDERGROUND UTILITIES, DATED 7/3/14, PROVIDED BY CORNERSTONE ENERGY SERVICES INC.
4. RIGHT OF WAY AND PARCEL BOUNDARIES PROVIDED BY DOUCET SURVEY INC., DATED 8/18/16.

NO.	REVISION	DATE	DRWN	CHKD	APPRV.
E.	ISSUED FOR SEC AMENDMENT	8/30/17	SCF	KMS	APJ
D	ISSUED FOR BID WO# 1127641	8/29/17	SCF	KMS	APJ
C	ISSUED FOR 100% REVIEW WO# 1127641	04/27/17	RWP	KMS	APJ
B	ISSUED FOR SEC AMENDMENT	07/10/17	SCF	KMS	APJ
A	ISSUED FOR 90% REVIEW WO# 1127641	03/17/17	SCF	KMS	APJ

FIBER OPTIC CABLE 477 ACSR 18/1 PELICAN (34.5kV)
CONDUCTOR 4/0 ACSR 6/1 PENGUIN
GROUND OR NEUTRAL

EVERSOURCE ENERGY

D E

LINE 3850 STR 56 TO STR 70
34.5kV DISTRIBUTION LINE
MILE SHEET

DATE: 08/03/2016

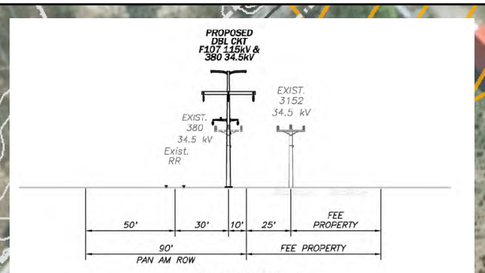
SCALE: H 1"=200', V 1"=20'

DES: EDR CHK: KMS
DRW: SCF APR: APJ

TOWN: NEWINGTON
TRANSMISSION LINE: 3850
MILE NO: 1
DISCIPLINE/SHT NO.
SHEET 1 OF 1
385044001

8/30/2017 10:17 AM – sfisher – \\refs1\Line\Projects\133065\DD\DWG\03 Line\Plan & Profile\Ref\02_PSECA_DWGS\3850\385044001_PSECA_2017_08_30.dwg – 385044001

Wetland ID	Impact Type	Area (Sq. Ft.)
MW1 (PSS1)	Temporary	321
MW2 (PEM1/PSS1)	Temporary	28940
MW2 (PEM1/PSS1)	Permanent (Str. F107-2)	66
MW2 (PEM1/PSS1)	Permanent (Str. F107-3)	20
MW2 (PEM1/PSS1)	Permanent (Str. F107-1)	113

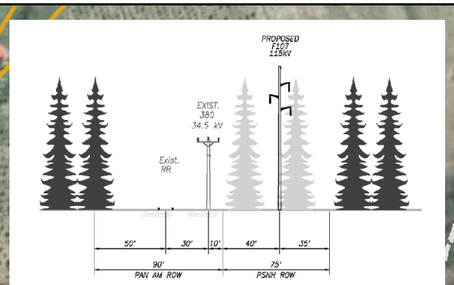


SECTION 1

MADBURY S/S PROPOSED LINE F107 TO START OF ADDITIONAL EASEMENT

STR. 1 – STR. 2

(400' ±)



SECTION 2

PROPOSED F107 SINGLE CIRCUIT START OF ADDITIONAL EASEMENT TO ROUTE 4

STR. 3 – STR. 9

(2100' ±)

Parcel boundary and owner data were acquired from municipal databases as of May 2016.

Service Layer Credits: Copyright:© 2014 Esri, granit.edu aerial photos 2015.

Date : 9/14/2017

Project No: 22860.003

Drawn By: dpelletier

- Town Boundary
- Approximate Parcel Boundary
- PSNH Fee Area
- Project Corridor
- Work Pad

Roads
- Local
- Not Maintained
- Private
- State
- Railroad

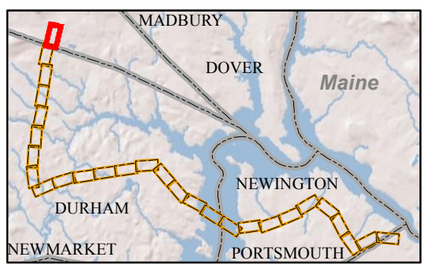
- Existing Str (Remain)
- Existing Str (Removed/Modified)
- Access Roads
- Underground Cable
- Silt Curtain
- Silt Fence, Hay Bale, Erosion Control Mix Berm
- Straw Wattle
- Wetland
- Prime Wetland
- Wetland Impact (PERM)
- Wetland Impact (TEMP)

- Stream Centerline
- Stream Top of Bank
- Temporary Culvert
- Stonewall alignment
- Temporary Mat Bridge
- NH DOT Right-of-way
- Historical Sites
- Designated River Buffer 250'
- Conservation Lands
- 100 Year Floodplain

Structures
- Direct Embed
- Drilled Pier
- Relocated Distribution
- Steep Slope BMPs
- Tree Clearing
- Stream Buffer
- 2ft Contour
- Tidal Buffer Zone
- Highest Observable Tide Line/Reference Line (4ft Contour)
- Mean Lower Low Water

0 75 150 300 Feet

1 inch = 150 feet



EVERSOURCE ENERGY

NORMANDEAU ASSOCIATES
ENVIRONMENTAL CONSULTANTS

Seacoast Reliability Project

Revised Environmental Maps

STATE OF NEW HAMPSHIRE
SARAH D. ALLEN
No. 083
CERTIFIED WETLAND SCIENTIST

9/1/2017

Path: J:\Projects\PSNH_F107\MXD\SRP_MapSet_AugSupplement.mxd

LL# 201
State of New Hampshire

Madbury Rd

LL# 102
Houghton Family Revocable Trust

Match 1

LL# 202
Forrest, David

LL# 203
Forrest, David

LL# 204.01
Town of Durham

NHDOT LAROW

LL# 205
Deturk, Mark S. & Mary J.

LL# 206
Henri J. Richard Rev Trust

LL# 207
Robert Calamari Trust

LL# 208
Skotko, Bradley & Smith, Heather

LL# 209
Luft, Karola

LL# 210
Vasile, Thomas & Kathleen K.

LL# 211
O'shea, Kevin M. & Leighsa A.

LL# 212
Giroux, David L. & Browne, Gretchen S.

LL# 213
Corvini, Marguerite

LL# 214
Peter M. Ejarque Revocable Trust, C/O Herman Ejarque

LL# 215
Day Lily Re LC, c/o McClane, Graf ET AL

LL# 105.01
Boston and Maine Railroad

NHDOT ROW

LL# 201.08
Boston and Maine Railroad

Fiber Optic Underground Cable

LL# 204.02
Boston and Maine Railroad

DS92
R4SB4

DW91
PSS1

DW94
PSS1

F107-7

DW94
PFO1

DW93
PSS1

F107-9

DW93
PFO1

F107-11

F107-12

F107-13

F107-10

LL# 104
Public Service Company of NH

F107-6

Match 2

LL# 105
Town of Madbury and Town of Durham

DW105
PFO1

Piscataqua Rd

Underground Gas Line

LL# 200
Kraus, Kurt N.

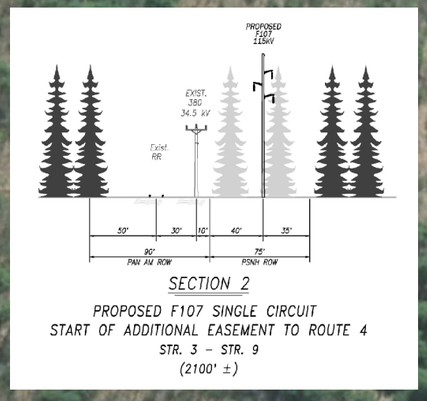
LL# 204
University of New Hampshire
Office of the President

MADBURY
DURHAM

LL#

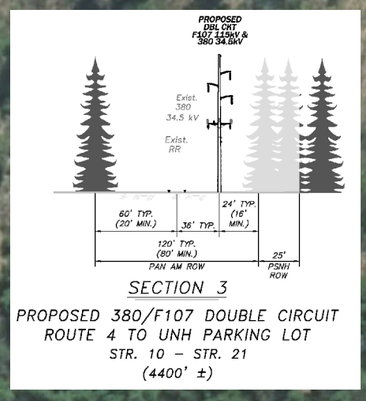
Beech Hill Rd

Wetland ID	Impact Type	Area (Sq. Ft.)
DS92 (R4SB4)	Temporary	42
DW105 (PFO1)	Temporary	153
DW91 (PSS1)	Temporary	1240
DW93 (PFO1)	Temporary	1376
DW93 (PFO1)	Permanent (Str. F107-9)	6
DW93 (PSS1)	Temporary	501
DW94 (PFO1)	Temporary	3169
DW94 (PFO1)	Permanent (Str. F107-7)	20
DW94 (PSS1)	Temporary	1792



SECTION 2

PROPOSED F107 SINGLE CIRCUIT
START OF ADDITIONAL EASEMENT TO ROUTE 4
STR. 3 – STR. 9
(2100' ±)



SECTION 3

PROPOSED 380/F107 DOUBLE CIRCUIT
ROUTE 4 TO UNH PARKING LOT
STR. 10 – STR. 21
(4400' ±)

Parcel boundary and owner data were acquired from municipal databases as of May 2016.

Service Layer Credits: Copyright:© 2014 Esri, granit.edu aerial photos 2015.

Date : 9/14/2017

Project No: 22860.003

Drawn By: dpelletier

- Town Boundary
- Approximate Parcel Boundary
- PSNH Fee Area
- Project Corridor
- Work Pad

Roads
- Local
- Not Maintained
- Private
- State
- Railroad

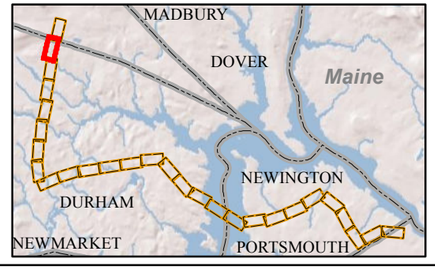
- Existing Str (Remain)
- Existing Str (Removed/Modified)
- Access Roads
- Underground Cable
- Silt Curtain
- Silt Fence, Hay Bale, Erosion Control Mix Berm
- Straw Wattle
- Wetland
- Prime Wetland
- Wetland Impact (PERM)
- Wetland Impact (TEMP)

- Stream Centerline
- Stream Top of Bank
- Temporary Culvert
- Stonewall alignment
- Temporary Mat Bridge
- NH DOT Right-of-way
- Historical Sites
- Designated River Buffer 250'
- Conservation Lands
- 100 Year Floodplain

Structures
- Direct Embed
- Drilled Pier
- Relocated Distribution
- Steep Slope BMPs
- Tree Clearing
- Stream Buffer
- 2ft Contour
- Tidal Buffer Zone
- Highest Observable Tide Line/Reference Line (4ft Contour)
- Mean Lower Low Water

0 75 150 300 Feet

1 inch = 150 feet



EVERSOURCE ENERGY

Seacoast Reliability Project

Revised Environmental Maps

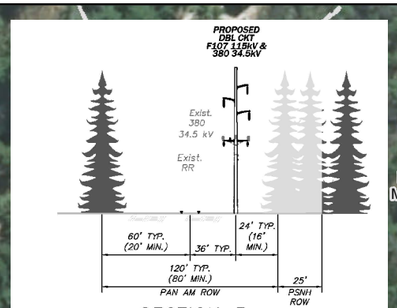
NORMANDEAU ASSOCIATES
ENVIRONMENTAL CONSULTANTS

STATE OF NEW HAMPSHIRE
SARAH D. ALLEN
No. 083
CERTIFIED WETLAND SCIENTIST

9/1/2017

Path: J:\Projects\PSNH_F107\MXD\SRP_MapSet_AugSupplement.mxd

Wetland ID	Impact Type	Area (Sq. Ft.)
DS92 (R4SB4)	Temporary	42
DW77 (PSS1)	Temporary	1711
DW79 (PSS1)	Temporary	842
DW80 (PSS1)	Temporary	935
DW91 (PSS1)	Temporary	1240



SECTION 3

PROPOSED 380/F107 DOUBLE CIRCUIT
ROUTE 4 TO UNH PARKING LOT
STR. 10 – STR. 21
(4400' ±)

LL# 215.01
Peter M. Ejarque Revocable Trust, C/O Herman Ejarque

LL# 214
Peter M. Ejarque Revocable Trust, C/O Herman Ejarque

LL# 215
Day Lily Re LC, c/o McClane, Graf ET AL

LL# 215.13
Leach, David C. & Catherine K.

LL# 215.14
Fairchild Drive Association

LL# 216.01
Karl A. Van Asselt Liv Rev Trust
Houle Margaret G.

LL# 216.02
Garofalo, Piero G. & Dubois-Garofalo, Karen S.

LL# 216.03
Pirie Family Rev Trust, J & L

LL# 216.04
Davis, Wendell P. & Pamela K.

LL# 216.05
Hutchinson, Eric R. & Ashley C.

LL# 216.06
Holt, Mary S.

LL# 216.07
Dunphy, Philip P. & Avery, Robin J.

LL# 216.08
Charlotte A. R. Welsh Rev Trust & Carden N. Welsh Rev Trust

LL# 216.09
Lewis, Kathleen S. & Stephen E.

LL# 216
Fairchild Drive Subdivision

LL# 217.01
Willoughby, Darlene J.

LL# 217
University of New Hampshire
Office of the President

LL# 213
Corvini, Marguerite

LL# 204.02
Boston and Maine Railroad

LL# 204
University of New Hampshire
Office of the President

Fairchild Dr
Rocky Ln
Davis Ave
Gables Way

Fiber Optic Underground Cable

DS92
R4SB4

DW91
PSS1

F107-14
F107-15
F107-16
F107-17
F107-18
F107-19

DW80
PSS1

DW79
PSS1

DW78
PSS1

DW77
PSS1

Matchline 2
Matchline 3

Parcel boundary and owner data were acquired from municipal databases as of May 2016.

Service Layer Credits: Copyright:© 2014 Esri, granit.edu aerial photos 2015.

Date : 9/14/2017
Project No: 22860.003
Drawn By: dpelletier

Town Boundary
Approximate Parcel Boundary
PSNH Fee Area
Project Corridor
Work Pad

Roads
Local
Not Maintained
Private
State
Railroad

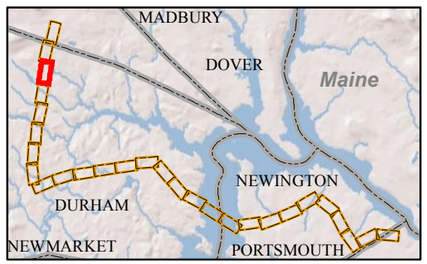
Existing Str (Remain)
Existing Str (Removed/Modified)
Access Roads
Underground Cable
Silt Curtain
Silt Fence, Hay Bale, Erosion Control Mix Berm
Straw Wattle
Wetland
Prime Wetland
Wetland Impact (PERM)
Wetland Impact (TEMP)

Stream Centerline
Stream Top of Bank
Temporary Culvert
Stonewall alignment
Temporary Mat Bridge
NH DOT Right-of-way
Historical Sites
Designated River Buffer 250'
Conservation Lands
100 Year Floodplain

Structures
Direct Embed
Drilled Pier
Relocated Distribution
Steep Slope BMPs
Tree Clearing
Stream Buffer
2ft Contour
Tidal Buffer Zone
Highest Observable Tide Line/Reference Line (4ft Contour)
Mean Lower Low Water

0 75 150 300 Feet

1 inch = 150 feet



EVERSOURCE ENERGY

NORMANDEAU ASSOCIATES
ENVIRONMENTAL CONSULTANTS

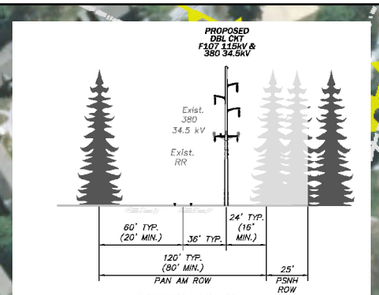
Seacoast Reliability Project

Revised Environmental Maps

STATE OF NEW HAMPSHIRE
SARAH D. ALLEN
No. 083
CERTIFIED WETLAND SCIENTIST
9/1/2017

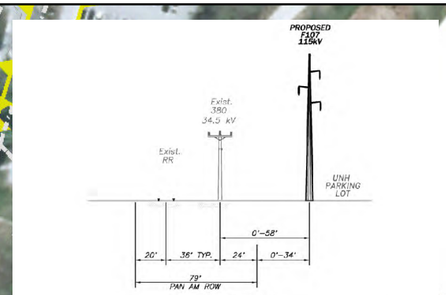
Path: J:\Projects\PSNH_F107\MXD\SRP_MapSet_AugSupplement.mxd

Wetland ID	Impact Type	Area (Sq. Ft.)
DW76 (PSS1)	Temporary	4321
DW76 (PSS1)	Permanent (Str. F107-21)	20
DW77 (PSS1)	Temporary	1711



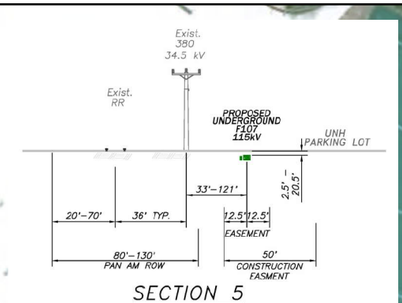
SECTION 3

PROPOSED 380/F107 DOUBLE CIRCUIT ROUTE 4 TO UNH PARKING LOT
STR. 10 – STR. 21
(4400' ±)



SECTION 4

PROPOSED F107 SINGLE CIRCUIT UNH PARKING LOT TO PROPOSED F107 UNDERGROUND TRANSITION
STR. 22 – STR. 23
(200' ±)



SECTION 5

PROPOSED F107 UNDERGROUND UNH PARKING LOT
(2100' ±)

Parcel boundary and owner data were acquired from municipal databases as of May 2016.

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Date : 9/14/2017

Project No: 22860.003

Drawn By: dpelletier

- Town Boundary
- Approximate Parcel Boundary
- PSNH Fee Area
- Project Corridor
- Work Pad

Roads
- Local
- Not Maintained
- Private
- State
- Railroad

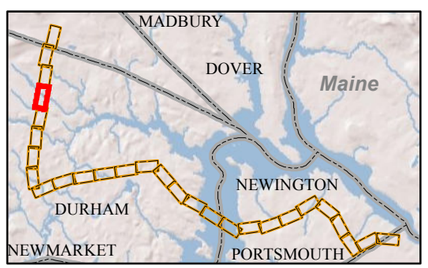
- Existing Str (Remain)
- Existing Str (Removed/Modified)
- Access Roads
- Underground Cable
- Silt Curtain
- Silt Fence, Hay Bale, Erosion Control Mix Berm
- Straw Wattle
- Wetland
- Prime Wetland
- Wetland Impact (PERM)
- Wetland Impact (TEMP)

- Stream Centerline
- Stream Top of Bank
- Temporary Culvert
- Stonewall alignment
- Temporary Mat Bridge
- NH DOT Right-of-way
- Historical Sites
- Designated River Buffer 250'
- Conservation Lands
- 100 Year Floodplain

Structures
- Direct Embed
- Drilled Pier
- Relocated Distribution
- Steep Slope BMPs
- Tree Clearing
- Stream Buffer
- 2ft Contour
- Tidal Buffer Zone
- Highest Observable Tide Line/Reference Line (4ft Contour)
- Mean Lower Low Water

0 75 150 300 Feet

1 inch = 150 feet



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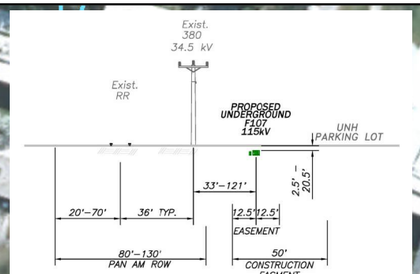
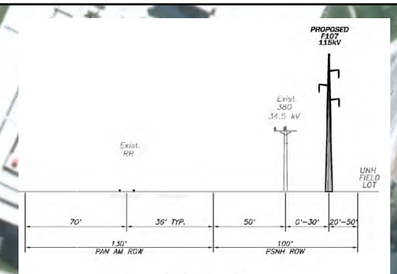
Wetland ID	Impact Type	Area (Sq. Ft.)
DS61 (R2UB3)	Temporary	33
DS74 (R2UB2)	Temporary	146
DW65 (PEM)	Temporary	3917
DW65 (PEM)	Permanent (Str. F107-25)	7
DW67 (PEM)	Temporary	5086
DW67 (PEM)	Permanent (Str. F107-24)	14
DW69 (PEM)	Temporary	53
DW74 (PFO1/PSS1)	Temporary	1166



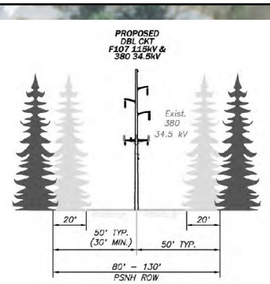
SECTION 5

PROPOSED F107 UNDERGROUND
UNH PARKING LOT
(2100' ±)



SECTION 6

PROPOSED F107 SINGLE CIRCUIT
PROPOSED F107 UNDERGROUND TRANSITION
TO PROPOSED 380/F107 DOUBLE CIRCUIT
STR. 24 – STR. 25
(300' ±)



SECTION 7

PROPOSED 380/F107 DOUBLE CIRCUIT
UNH TO RAILROAD CROSSING
STR. 26 – STR. 30
(2400' ±)

Parcel boundary and owner data were acquired from municipal databases as of May 2016.

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Date : 9/14/2017

Project No: 22860.003

Drawn By: dpelletier

- Town Boundary
- Approximate Parcel Boundary
- PSNH Fee Area
- Project Corridor
- Work Pad

Roads
- Local
- Not Maintained
- Private
- State
- Railroad

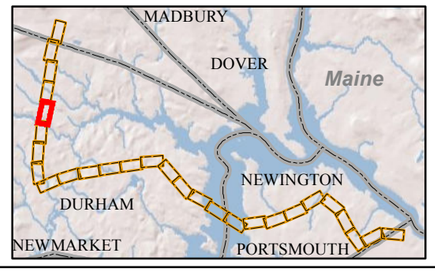
- Existing Str (Remain)
- Existing Str (Removed/Modified)
- Access Roads
- Underground Cable
- Silt Curtain
- Silt Fence, Hay Bale, Erosion Control Mix Berm
- Straw Wattle
- Wetland
- Prime Wetland
- Wetland Impact (PERM)
- Wetland Impact (TEMP)

- Stream Centerline
- Stream Top of Bank
- Temporary Culvert
- Stonewall alignment
- Temporary Mat Bridge
- NH DOT Right-of-way
- Historical Sites
- Designated River Buffer 250'
- Conservation Lands
- 100 Year Floodplain

Structures
- Direct Embed
- Drilled Pier
- Relocated Distribution
- Steep Slope BMPs
- Tree Clearing
- Stream Buffer
- 2ft Contour
- Tidal Buffer Zone
- Highest Observable Tide Line/Reference Line (4ft Contour)
- Mean Lower Low Water

0 75 150 300 Feet

1 inch = 150 feet



EVERSOURCE ENERGY

Seacoast Reliability Project

Revised Environmental Maps

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ENVIRONMENTAL CONSULTANTS

STATE OF NEW HAMPSHIRE
SARAH D. ALLEN
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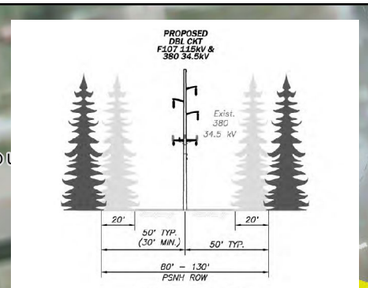
CERTIFIED WETLAND SCIENTIST

9/1/2017

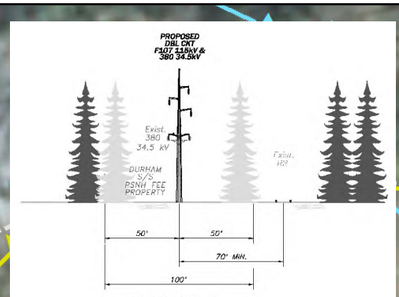
Path: J:\Projects\PSNH_F107\MXD\SRP_MapSet_AugSupplement.mxd

Wetland ID	Impact Type	Area (Sq. Ft.)
DW49 (PEM/PSS)	Temporary	3172
DS61 (R2UB3)	Temporary	33
DS51 (R2UB2)	Temporary	20



SECTION 7

PROPOSED 380/F107 DOUBLE CIRCUIT
UNH TO RAILROAD CROSSING
STR. 26 – STR. 30
(2400' ±)



SECTION 8

PROPOSED 380/F107 DOUBLE CIRCUIT
RAILROAD CROSSING TO DURHAM S/S
STR. 31 – STR. 32
(400' ±)

LL# 222
University of New Hampshire
Office of the President

F107-31

LL# 222.02
Boston and
Maine Railroad

F107-28

DS61B
R2UB3

DS61
R2UB3

DW63
PSS/PEM

DS61A
R2UB3

DW59
PEM/PUB

DW55
PSS

DS53
OHW
R2UB2

DS51
R2UB2

DW49
PEM/PSS

F107-29

F107-30

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Date : 9/14/2017

Project No: 22860.003

Drawn By: dpelletier

- Town Boundary
- Approximate Parcel Boundary
- PSNH Fee Area
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- Work Pad

Roads
- Local
- Not Maintained
- Private
- State
- Railroad

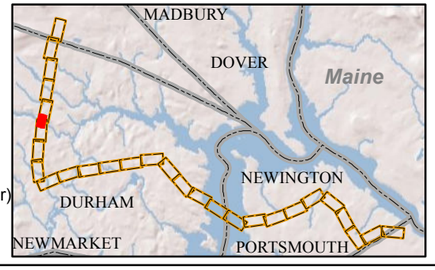
- Existing Str (Remain)
- Existing Str (Removed/Modified)
- Access Roads
- Underground Cable
- Silt Curtain
- Silt Fence, Hay Bale, Erosion Control Mix Berm
- Straw Wattle
- Wetland
- Prime Wetland
- Wetlands Impact

- Stream Centerline
- Stream Top of Bank
- Temporary Culvert
- Stonewall
- Temporary Mat Bridge
- NH DOT Right-of-way
- Historical Sites
- Designated River Buffer 250'
- Conservation Lands

Structures
- Direct Embed
- Drilled Pier
- Relocated Distribution
- 100 Year Floodplain
- Steep Slope BMPs
- Tree Clearing
- Stream Buffer
- 2ft Contour
- Highest Observable Tide Line/Reference Line (4ft Contour)

0 30 60 120 Feet

1 inch = 60 feet



EVERSOURCE ENERGY

Seacoast Reliability Project

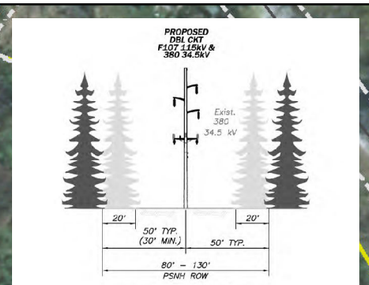
Revised Environmental Maps

NORMANDEAU ASSOCIATES
ENVIRONMENTAL CONSULTANTS

STATE OF NEW HAMPSHIRE
SARAH D. ALLEN
No. 083
CERTIFIED WETLAND SCIENTIST
9/1/2017

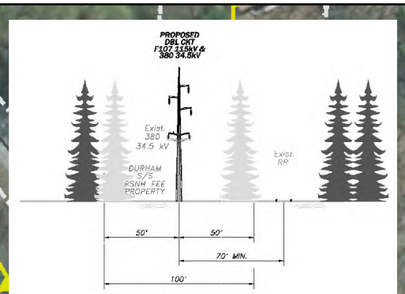
Path: J:\Projects\PSNH_F107\MXD\SRP_MapSet_AugSupplement_pg5A.mxd

Wetland ID	Impact Type	Area (Sq. Ft.)
DS39 (R2UB2)	Temporary	207
DS51 (R2UB2)	Temporary	20
DW37 (PEM/PSS)	Temporary	1420
DW41 (PEM/PSS/PUB)	Temporary	18175
DW41 (PEM/PSS/PUB)	Permanent (Str. F107-36)	20
DW49 (PEM/PSS)	Temporary	3172



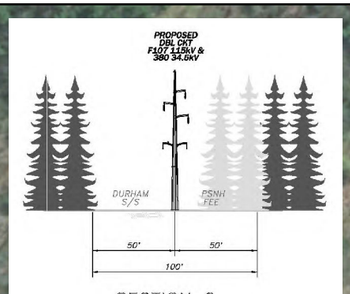
SECTION 7

PROPOSED 380/F107 DOUBLE CIRCUIT UNH TO RAILROAD CROSSING
STR. 26 – STR. 30
(2400' ±)



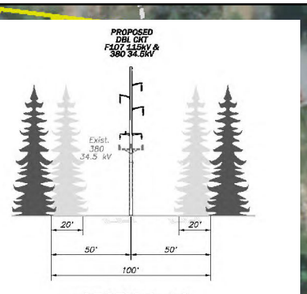
SECTION 8

PROPOSED 380/F107 DOUBLE CIRCUIT RAILROAD CROSSING TO DURHAM S/S
STR. 31 – STR. 32
(400' ±)



SECTION 9

PROPOSED F107 SINGLE CIRCUIT ALONG DURHAM S/S
STR. 32 – STR. 33
(200' ±)



SECTION 10

PROPOSED 380/F107 DOUBLE CIRCUIT DURHAM S/S TO PACKERS FALLS S/S
STR. 34 – STR. 48
(6800' ±)

LL# 230.01 Harding, Edwin K. & Sheila D.
LL# 230 Justice, David C.
LL# 229 Schlie, Paul & Robyn
LL# 227 University of New Hampshire Office of the President
LL# 222 University of New Hampshire Office of the President
LL# 224 Town of Durham
LL# 226.01 Byrne Family Rev. Living Trust
LL# 226 Peace, Susan
LL# 233 Public Service Company of NH
LL# 225 Public Service Company of NH
LL# 222.02 Boston and Maine Railroad
LL# 225.01 Town of Durham
LL# 228 Town of Durham
LL# 231 University of New Hampshire Office of the President
LL# 221 University of New Hampshire Office of the President
LL# 221.02 Krug, Brian A. & Christina R.
LL# 221.03 Luther, Thomas E. & Smedile, Linda E.
LL# 221.04 Riccardi, Paul
LL# 221.05 Trufant, Peter W. & Laurel W. & Trufant, Eric C. & Jocelyn L.
LL# 221.06 Glover, Michael A. & Carol J.
LL# 221.07 University of New Hampshire Office of the President
LL#
380-1
380-2
380-3
F107-29
F107-30
F107-31
F107-32
F107-33
F107-34
F107-35
F107-36
DW37 PEM/PSS
DW41 PEM/PSS/PUB
DW49 PEM/PSS
DW55 PSS
DW59 PEM/PUB
DS39 R2UB2
DS51 R2UB2
DS53 OHW R2UB2
DS6 R2UB2
Map 5A
Matchline 5
Matchline 6
Demeritt Cir
Mill Rd
Hemlock Way
Hemlock Way

Parcel boundary and owner data were acquired from municipal databases as of May 2016.

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Date : 9/14/2017
Project No: 22860.003
Drawn By: dpelletier

- Town Boundary
- Approximate Parcel Boundary
- PSNH Fee Area
- Project Corridor
- Work Pad

Roads
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- Existing Str (Remain)
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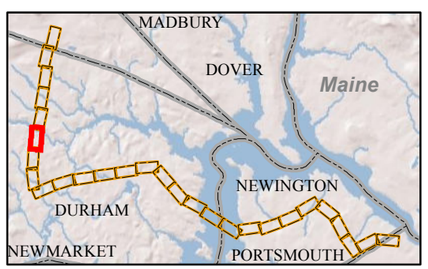
- Underground Cable
- Silt Curtain
- Silt Fence, Hay Bale, Erosion Control Mix Berm
- Straw Wattle
- Wetland
- Prime Wetland
- Wetland Impact (PERM)
- Wetland Impact (TEMP)

- Stream Centerline
- Stream Top of Bank
- Temporary Culvert
- Stonewall alignment
- Temporary Mat Bridge
- NH DOT Right-of-way
- Historical Sites
- Designated River Buffer 250'
- Conservation Lands
- 100 Year Floodplain

Structures
- Direct Embed
- Drilled Pier
- Relocated Distribution
- Steep Slope BMPs
- Tree Clearing
- Stream Buffer
- 2ft Contour
- Tidal Buffer Zone
- Highest Observable Tide Line/Reference Line (4ft Contour)
- Mean Lower Low Water

0 75 150 300 Feet

1 inch = 150 feet



EVERSOURCE ENERGY

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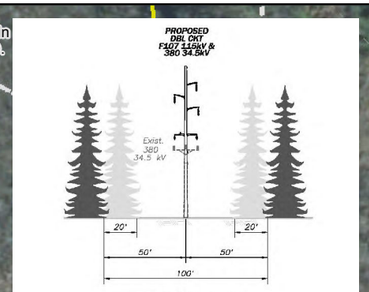
NORMANDEAU ASSOCIATES
ENVIRONMENTAL CONSULTANTS

STATE OF NEW HAMPSHIRE
SARAH D. ALLEN
No. 083
CERTIFIED WETLAND SCIENTIST
9/1/2017

Path: J:\Projects\PSNH_F107\MXD\SRP_MapSet_AugSupplement.mxd

Wetland ID	Impact Type	Area (Sq. Ft.)
		1066
DW41 (PEM/PSS/PUB)	Temporary	18175
DW47 (PEM/PSS)	Temporary	4018



SECTION 10

PROPOSED 380/F107 DOUBLE CIRCUIT
DURHAM S/S TO PACKERS FALLS S/S
STR. 34 – STR. 48
(6800' ±)

LL# 230.01
dwin
a D.

LL# 230
Justice,
David G.

LL# 231
University of New Hampshire
Office of the President

LL# 229
Schlie, Paul
& Robyn

DW41
PEM/PSS/PUB

F107-37

DW43
PSS/PFO

F107-38

F107-39

DW45
PSS

F107-40

DW47
PEM/PSS

F107-41

F107-42

Matchline 6

Matchline 7

LL# 221.07
University of New Hampshire
Office of the President

LL# 221.08
James O. Horrigan
Family Trust

LL#

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- Silt Fence, Hay Bale, Erosion Control Mix Berm
- Straw Wattle
- Wetland
- Prime Wetland
- Wetland Impact (PERM)
- Wetland Impact (TEMP)

- Stream Centerline
- Stream Top of Bank
- Temporary Culvert
- Stonewall alignment
- Temporary Mat Bridge
- NH DOT Right-of-way
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- Designated River Buffer 250'
- Conservation Lands
- 100 Year Floodplain

Structures
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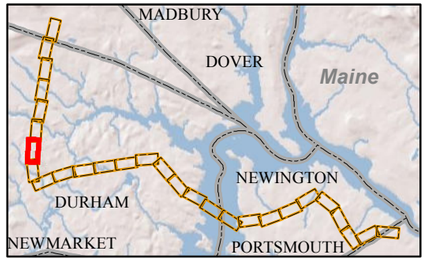
- Drilled Pier
- Relocated Distribution
- Steep Slope BMPs
- Tree Clearing
- Stream Buffer
- 2ft Contour
- Tidal Buffer Zone
- Highest Observable Tide Line/Reference Line (4ft Contour)
- Mean Lower Low Water

0 75 150 300 Feet

1 inch = 150 feet



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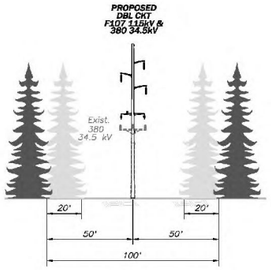
9/1/2017

Path: J:\Projects\PSNH_F107\MXD\SRP_MapSet_AugSupplement.mxd

Wetland ID	Impact Type	Area (Sq. Ft.)
DS60 (R2UB3)	Temporary	130
DW58 (PSS1/PEM4)	Temporary	8060



SECTION 10

PROPOSED 380/F107 DOUBLE CIRCUIT
DURHAM S/S TO PACKERS FALLS S/S
STR. 34 – STR. 48
(6800' ±)

LL# 231
University of New Hampshire
Office of the President

LL# 232
State of New Hampshire
Fish & Game

LL# 221.08
James O. Horrigan
Family Trust

F107-42 F107-43 F107-44 F107-45 F107-46 F107-47

DW58
PSS1/PEM4

DS60
R2UB3

DW56
PEM1/PSS1

Matchine 7

Matchine 8

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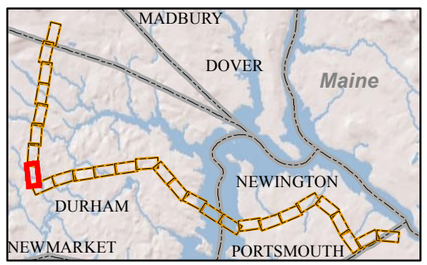
- Silt Fence, Hay Bale, Erosion Control Mix Berm
- Straw Wattle
- Wetland
- Prime Wetland
- Wetland Impact (PERM)
- Wetland Impact (TEMP)

- Stream Centerline
- Stream Top of Bank
- Temporary Culvert
- Stonewall alignment
- Temporary Mat Bridge
- NH DOT Right-of-way
- Historical Sites
- Designated River Buffer 250'
- Conservation Lands
- 100 Year Floodplain

Structures
- Direct Embed
- Drilled Pier
- Relocated Distribution
- Steep Slope BMPs
- Tree Clearing
- Stream Buffer
- 2ft Contour
- Tidal Buffer Zone
- Highest Observable Tide Line/Reference Line (4ft Contour)
- Mean Lower Low Water

0 75 150 300 Feet

1 inch = 150 feet



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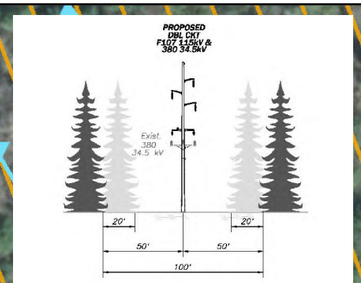
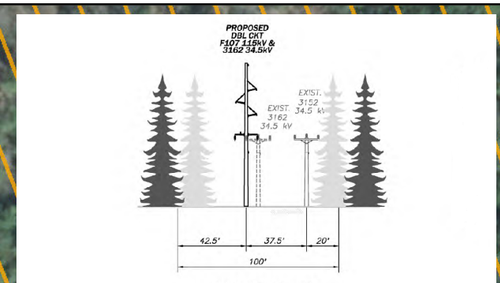
Path: J:\Projects\PSNH_F107\MXD\SRP_MapSet_AugSupplement.mxd

Wetland ID	Impact Type	Area (Sq. Ft.)
DS35 (R2UB4)	Temporary	79
DS46 (R2UB2/4)	Temporary	100
DW101 (PEM1/SS1E)	Temporary	4019
DW33 (PEM/PSS)	Temporary	5436
DW44 (PEM1)	Temporary	1437
DW48 (PSS/PEM)	Temporary	1176
DW50 (PEM1)	Temporary	1
DW52 (PSS1/PFO1/PEM1)	Temporary	807
DW54 (PSS1)	Temporary	2739
DW56 (PEM1/PSS1)	Temporary	13910
DW56 (PEM1/PSS1)	Permanent (Str. F107-48)	20



SECTION 10

PROPOSED 380/F107 DOUBLE CIRCUIT
DURHAM S/S TO PACKERS FALLS S/S
STR. 34 – STR. 48
(6800' ±)



SECTION 11

PROPOSED 3162/F107 DOUBLE CIRCUIT
PACKERS FALLS S/S TO F107 H-FRAME CONFIGURATION
STR. 49 – STR. 56
(2900' ±)

LL# 221.08 James O. Horrigan Family Trust
LL# 221.09 Public Service Company of NH
LL# 221.10 Boston and Maine Railroad Crossing into Pac Boston and Maine Railroad
LL# 221.11 Public Service Company of NH
LL# 221.12 Boston and Maine Railroad
LL# 234 Blinn, Roger J. & Kathleen
LL# 234.01 May, Michael & Terri
LL# 235 Ann G. Knightly Revocable Trust
LL# 236 Gregg, Bradford & Mary
LL# 236.01 Gregg, Bradford & Mary
LL# 236.02 Lockhardt III, William & Lockhardt, Jill
LL#
Bennett Rd
Matchline 8
Matchline 9
F107-47
F107-48
F107-49
F107-50
F107-51
F107-52
F107-53
F107-54
F107-55
DW101 PEM1/SS1E
DW104 PSS1/EM1E
DW56 PEM1/PSS1
DW54 PSS1
DW44 PEM1
DW48 PSS/PEM
PSS49 R2UB2/4
DW50 PEM1
DW52 PSS1/PFO1/PEM1
DW33 PEM/PSS
DS35 R2UB4

Parcel boundary and owner data were acquired from municipal databases as of May 2016.

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Date : 9/14/2017
Project No: 22860.003
Drawn By: dpelletier

- Town Boundary
- Approximate Parcel Boundary
- PSNH Fee Area
- Project Corridor
- Work Pad

Roads
- Local
- Not Maintained
- Private
- State
- Railroad

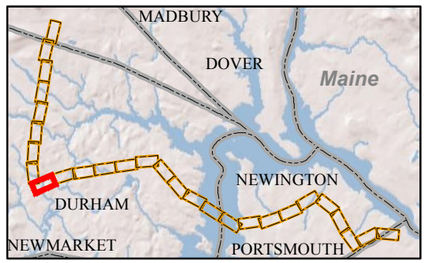
- Existing Str (Remain)
- Existing Str (Removed/Modified)
- Access Roads
- Underground Cable
- Silt Curtain
- Silt Fence, Hay Bale, Erosion Control Mix Berm
- Straw Wattle
- Wetland
- Prime Wetland
- Wetland Impact (PERM)
- Wetland Impact (TEMP)

- Stream Centerline
- Stream Top of Bank
- Temporary Culvert
- Stonewall alignment
- Temporary Mat Bridge
- NH DOT Right-of-way
- Historical Sites
- Designated River Buffer 250'
- Conservation Lands
- 100 Year Floodplain

Structures
- Direct Embed
- Drilled Pier
- Relocated Distribution
- Steep Slope BMPs
- Tree Clearing
- Stream Buffer
- 2ft Contour
- Tidal Buffer Zone
- Highest Observable Tide Line/Reference Line (4ft Contour)
- Mean Lower Low Water

0 75 150 300 Feet

1 inch = 150 feet



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Seacoast Reliability Project

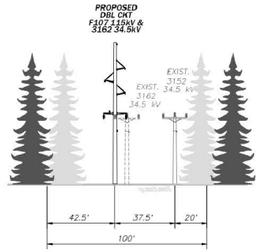
Revised Environmental Maps

NORMANDEAU ASSOCIATES
ENVIRONMENTAL CONSULTANTS

STATE OF NEW HAMPSHIRE
SARAH D. ALLEN
No. 083
CERTIFIED WETLAND SCIENTIST
9/1/2017

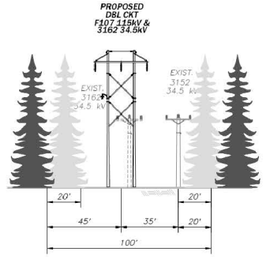
Path: J:\Projects\PSNH_F107\MXD\SRP_MapSet_AugSupplement.mxd

Wetland ID	Impact Type	Area (Sq. Ft.)
DW100 (PEM1E)	Temporary	1915
DW29 (PEM/PSS)	Temporary	1251
DW31 (PEM)	Temporary	8940
DW31 (PEM)	Permanent (Str. HEN 1)	20
DW33 (PEM/PSS)	Temporary	5436



SECTION 11

PROPOSED 3162/F107 DOUBLE CIRCUIT
PACKERS FALLS S/S TO ROUTE 108
STR. 49 – STR. 56
(2900' ±)



SECTION 12

PROPOSED 3162/F107 DOUBLE CIRCUIT
ROUTE 108 CROSSING
STR. 57 – STR. 61
(1500' ±)

LL# 238
State of New Hampshire
Fish & Game

LL# 239
Anderson, Mark
I. & Diane R.

LL# 241
Gary L. Lonsinger Revocable Trust & Nancy
L. Lonsinger Revocable Trust

LL# 232
State of New Hampshire
Fish & Game

Matchline 9

HEN 1
HEN 2
HEN 3
F107-56
F107-57
F107-58
F107-59
F107-60
F107-61
F107-62
DW31
PEM
DW29
PEM/PSS
DW33
PEM/PSS
DW100
PEM1E
DW1
PEM1/PSS1
DS3
R2UB2
DS35
R2UB4
3162-1

LL# 237
Moriarty, Heirs of Bertha
C/O Thomas B. Moriarty Jr.

LL# 238.02
Town of
Durham

NHDOT ROW
Bennett Rd
Newmarket Rd
Longmarsh Rd

LL# 240
Gantz, Benjamin
L. & Alexandra M.

LL# 240.01
Andrews, Matthew C.

LL#

Parcel boundary and owner data were acquired from municipal databases as of May 2016.

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Date : 9/14/2017

Drawn By: dpelletier

Project No: 22860.003

Town Boundary
Approximate Parcel Boundary
PSNH Fee Area
Project Corridor
Work Pad

Roads
Local
Not Maintained
Private
State
Railroad

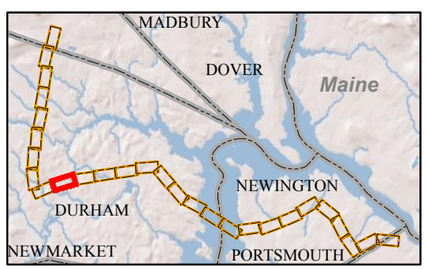
Existing Str (Remain)
Existing Str (Removed/Modified)
Access Roads
Underground Cable
Silt Curtain
Silt Fence, Hay Bale, Erosion Control Mix Berm
Straw Wattle
Wetland
Prime Wetland
Wetland Impact (PERM)
Wetland Impact (TEMP)

Stream Centerline
Stream Top of Bank
Temporary Culvert
Stonewall alignment
Temporary Mat Bridge
NH DOT Right-of-way
Historical Sites
Designated River Buffer 250'
Conservation Lands
100 Year Floodplain

Structures
Direct Embed
Drilled Pier
Relocated Distribution
Steep Slope BMPs
Tree Clearing
Stream Buffer
2ft Contour
Tidal Buffer Zone
Highest Observable Tide Line/Reference Line (4ft Contour)
Mean Lower Low Water

0 75 150 300 Feet

1 inch = 150 feet



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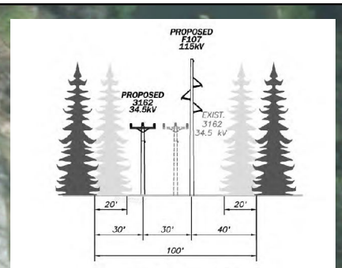
SARAH D. ALLEN
No. 083
CERTIFIED WETLAND SCIENTIST

9/1/2017

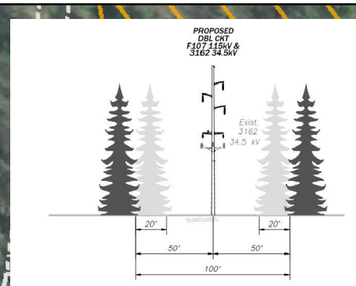
Path: J:\Projects\PSNH_F107\MXD\SRP_MapSet_AugSupplement.mxd

Wetland ID	Impact Type	Area (Sq. Ft.)
	Temporary	739
DW5 (PSS1)	Temporary	230
DW7 (PSS1)	Temporary	667



SECTION 13

PROPOSED F107 SINGLE CIRCUIT & PROPOSED 3162 SINGLE CIRCUIT ROUTE 108 TO TIMBER BROOK LANE
STR. 62 – STR. 63
(1100' ±)



SECTION 14

PROPOSED 3162/F107 DOUBLE CIRCUIT TIMBER BROOK LANE TO F107/3162 CIRCUIT SPLIT
STR. 64 – STR. 91
(12000' ±)

Date : 9/14/2017

Project No: 22860.003

Drawn By: dpelletier

Town Boundary
Approximate Parcel Boundary
PSNH Fee Area
Project Corridor
Work Pad

Roads
Local
Not Maintained
Private
State
Railroad

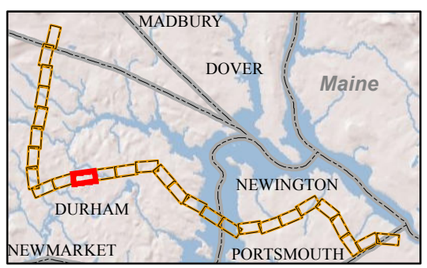
Existing Str (Remain)
Existing Str (Removed/Modified)
Access Roads
Underground Cable
Silt Curtain
Silt Fence, Hay Bale, Erosion Control Mix Berm
Straw Wattle
Wetland
Prime Wetland
Wetland Impact (PERM)
Wetland Impact (TEMP)

Stream Centerline
Stream Top of Bank
Temporary Culvert
Stonewall alignment
Temporary Mat Bridge
NH DOT Right-of-way
Historical Sites
Designated River Buffer 250'
Conservation Lands
100 Year Floodplain

Structures
Direct Embed
Drilled Pier
Relocated Distribution
Steep Slope BMPs
Tree Clearing
Stream Buffer
2ft Contour
Tidal Buffer Zone
Highest Observable Tide Line/Reference Line (4ft Contour)
Mean Lower Low Water

0 75 150 300 Feet

1 inch = 150 feet



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SARAH D. ALLEN
No. 083
CERTIFIED WETLAND SCIENTIST

9/1/2017

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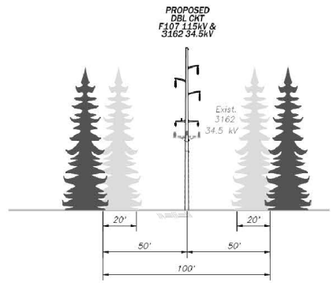
Wetland ID	Impact Type	Area (Sq. Ft.)
DW13 (PSS1/PEM1)	Temporary	1942
DW17 (PSS1/PEM1)	Temporary	42



SECTION 14

PROPOSED 3162/F107 DOUBLE CIRCUIT
TIMBER BROOK LANE TO F107/3162 CIRCUIT SPLIT
STR. 64 – STR. 91
(12000' ±)

Parcel boundary and owner data were acquired from municipal databases as of May 2016.

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Date : 9/14/2017

Project No: 22860.003

Drawn By: dpelletier

Town Boundary
Approximate Parcel Boundary
PSNH Fee Area
Project Corridor
Work Pad

Roads
Local
Not Maintained
Private
State
Railroad

Existing Str (Remain)
Existing Str (Removed/Modified)
Access Roads
Underground Cable
Silt Curtain
Silt Fence, Hay Bale, Erosion Control Mix Berm
Straw Wattle
Wetland
Prime Wetland
Wetland Impact (PERM)
Wetland Impact (TEMP)

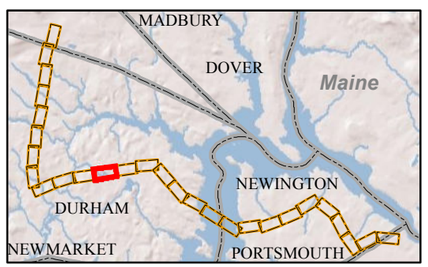
Stream Centerline
Stream Top of Bank
Temporary Culvert
Stonewall alignment
Temporary Mat Bridge
NH DOT Right-of-way
Historical Sites
Designated River Buffer 250'
Conservation Lands
100 Year Floodplain

N W E S

Structures
Direct Embed
Drilled Pier
Relocated Distribution
Steep Slope BMPs
Tree Clearing
Stream Buffer
2ft Contour
Tidal Buffer Zone
Highest Observable Tide Line/Reference Line (4ft Contour)
Mean Lower Low Water

0 75 150 300 Feet

1 inch = 150 feet



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SARAH D. ALLEN
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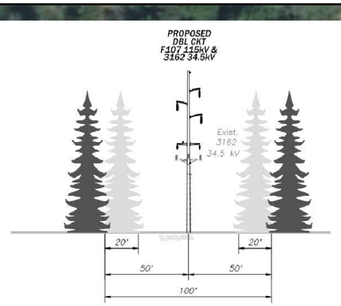
9/1/2017

Path: J:\Projects\PSNH_F107\MXD\SRP_MapSet_AugSupplement.mxd

Wetland ID	Impact Type	Area (Sq. Ft.)
DW21 (PSS/PEM)	Temporary	3241
DW25 (PEM/PSS)	Temporary	1399
DW27 (PSS1E/PEM1F)	Temporary	53
DW40 (PSS1/PEM1)	Temporary	630



SECTION 14

PROPOSED 3162/F107 DOUBLE CIRCUIT
TIMBER BROOK LANE TO F107/3162 CIRCUIT SPLIT
STR. 64 – STR. 91
(12000' ±)

LL# 264.01
Town of Durham

LL# 264.03
William R. & Pamela J.
MacDonald Family Rev Trust

LL# 264.04
Goyette, Robert A.
& Alison M.

LL# 264
Town of
Durham

LL# 266
Devey, Wayne
A. & Ruth

LL# 265
Harris,
Nancy K. M.

LL# 261.01
Andrea M. Dupont
Rev Liv Trust

LL# 261
Bliss, Stuart P. &
Susan K.

LL# 263
State of New Hampshire
Fish & Game

Machine 11

Machine 13

F107-75

DW21
PSS/PEM

F107-76

DW25
PEM/PSS

F107-77

DW27
PSS1E/PEM1F

F107-78

F107-79

F107-80

DW42
PSS1/PFO1

F107-81

DW40
PSS1/PEM1

LL# 262
Ackerman, Timothy
R. & Stafanie A.

LL# 263.02
Calitri,
Scot M.

LL# 281
Town of
Durham

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Date : 9/14/2017

Project No: 22860.003

Drawn By: dpelletier

Town Boundary
Approximate Parcel Boundary
PSNH Fee Area
Project Corridor
Work Pad

Roads
Local
Not Maintained
Private
State
Railroad

Existing Str (Remain)
Existing Str (Removed/Modified)
Access Roads
Underground Cable
Silt Curtain
Silt Fence, Hay Bale, Erosion Control Mix Berm
Straw Wattle
Wetland
Prime Wetland
Wetland Impact (PERM)
Wetland Impact (TEMP)

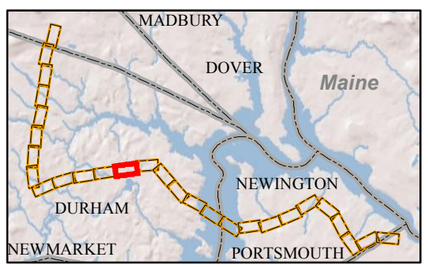
Stream Centerline
Stream Top of Bank
Temporary Culvert
Stonewall alignment
Temporary Mat Bridge
NH DOT Right-of-way
Historical Sites
Designated River Buffer 250'
Conservation Lands
100 Year Floodplain

N W E S

Structures
Direct Embed
Drilled Pier
Relocated Distribution
Steep Slope BMPs
Tree Clearing
Stream Buffer
2ft Contour
Tidal Buffer Zone
Highest Observable Tide Line/Reference Line (4ft Contour)
Mean Lower Low Water

0 75 150 300 Feet

1 inch = 150 feet



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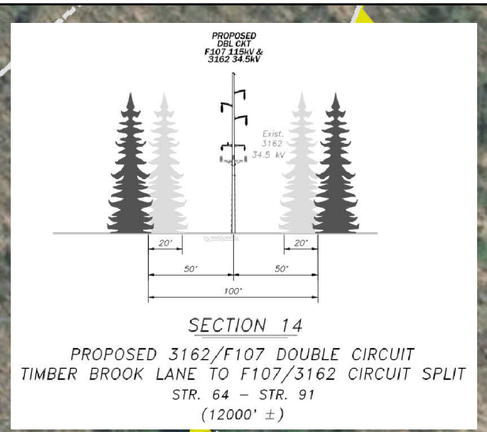
STATE OF NEW HAMPSHIRE
SARAH D. ALLEN
No. 083
CERTIFIED WETLAND SCIENTIST

9/1/2017

Path: J:\Projects\PSNH_F107\MXD\SRP_MapSet_AugSupplement.mxd

Wetland ID	Impact Type	Area (Sq. Ft.)
DS32 (R4SB4)	Temporary	47
DS32 (R4SB4)	Temporary	4
DS34 (n/a)	Temporary	2
DS34 (n/a)	Temporary	4
DW24 (PSS1E/PEM1E)	Temporary	7267
DW26 (PEM1J)	Temporary	245
DW28 (PEM1J)	Temporary	643
DW30 (PSS1E/PEM1J)	Temporary	857
DW36 (PSS1/PFO1)	Temporary	1104
DW38 (PSS1/PFO1)	Temporary	4089
DW40 (PSS1/PEM1)	Temporary	630



SECTION 14

PROPOSED 3162/F107 DOUBLE CIRCUIT
TIMBER BROOK LANE TO F107/3162 CIRCUIT SPLIT
STR. 64 – STR. 91
(12000' ±)

LL# 505
Ely, Robert
C. & Heidi S.

LL# 504
Ely, Robert
C. & Heidi S.

Durham Point Rd

LL# 503
Grieve, David S.
& Hornyak-Grieve, Linda M.

LL# 267
Nature
Conservancy

LL# 266
Devey, Wayne
A. & Ruth

Matchinos 63

LL# 269
Nancy P.
Sandberg Trust

F107-81
DW40
PSS1/PEM1
F107-82
DW38
PSS1/PFO1
F107-83
F107-84
DW36
PSS1/PFO1
F107-85
DW30
PSS1E/PEM1J
DW28
PEM1J
DW26
PEM1J
F107-86
DW24
PSS1E/PEM1E
F107-87

LL# 268
Nature
Conservancy

LL# 264
Town of Durham

LL# 281
Town of
Durham

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Date : 9/14/2017

Project No: 22860.003

Drawn By: dpelletier

- Town Boundary
- Approximate Parcel Boundary
- PSNH Fee Area
- Project Corridor
- Work Pad

Roads
- Local
- Not Maintained
- Private
- State
- Railroad

- Existing Str (Remain)
- Existing Str (Removed/Modified)
- Access Roads
- Underground Cable
- Silt Curtain
- Silt Fence, Hay Bale, Erosion Control Mix Berm
- Straw Wattle
- Wetland
- Prime Wetland
- Wetland Impact (PERM)
- Wetland Impact (TEMP)

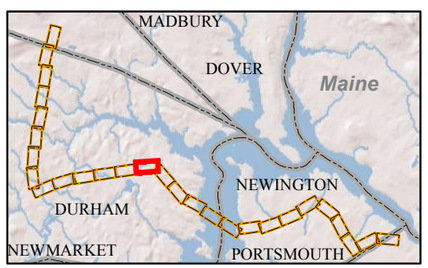
- Stream Centerline
- Stream Top of Bank
- Temporary Culvert
- Stonewall alignment
- Temporary Mat Bridge
- NH DOT Right-of-way
- Historical Sites
- Designated River Buffer 250'
- Conservation Lands
- 100 Year Floodplain

Structures
- Direct Embed
- Drilled Pier
- Relocated Distribution
- Steep Slope BMPs
- Tree Clearing
- Stream Buffer
- 2ft Contour
- Tidal Buffer Zone
- Highest Observable Tide Line/Reference Line (4ft Contour)
- Mean Lower Low Water

N W E S

0 75 150 300 Feet

1 inch = 150 feet



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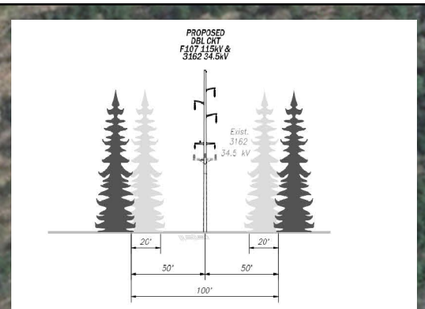
Revised Environmental Maps

STATE OF NEW HAMPSHIRE
SARAH D. ALLEN
No. 083
CERTIFIED WETLAND SCIENTIST

9/1/2017

Path: J:\Projects\PSNH_F107\MXD\SRP_MapSet_AugSupplement.mxd

Wetland ID	Impact Type	Area (Sq. Ft.)
DW18 (PSS1E/PEM1E)	Temporary	4531
DW18 (PSS1E/PEM1E)	Permanent (Str. 3162-4)	9
DW22 (PSS1E/PFO14E)	Temporary	3129
DW24 (PSS1E/PEM1E)	Temporary	7267



SECTION 14

PROPOSED 3162/F107 DOUBLE CIRCUIT
TIMBER BROOK LANE TO F107/3162 CIRCUIT SPLIT
STR. 64 – STR. 91
(12000' ±)

LL# 269
Nancy P. Sandberg
Trust

LL# 269.01
Hayes, Timothy
P. & Kathleen R.

LL# 268.01
Town of
Durham

LL# 270.02
Langley,
David

LL# 270.03
Langley,
David

LL# 270.01
Cardwell, Stephen
L. & Deborah L.

LL# 273.02
McMahon, Gregory
& Melinda

LL# 273.01
Macisso, John
V. & Jessica L.

LL# 270
Covatis,
Nicholas & Rivard, Amy

LL# 273
Smith, Nicholas
J. & Nicole S.

LL# 271
Heald McCosker,
Donna M.

LL# 268
Nature
Conservancy

LL# 272
Parker Rev
Trust, Abbie D.

LL# 272.01
Parker Rev Trust,
Abbie D.

LL# 274
Csottschneider Family
Revocable Trust

LL# 288
Sherri M. Brown Living
Trust

Longmarsh Rd

Matchline 14

Matchline 15

DW24
PSS1E/PEM1E

DW22
PSS1E/PFO14E

DW18
PSS1E/PEM1E

F107-87

F107-88

F107-89

F107-90

F107-91

3162-3

3162-4

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Date : 9/14/2017

Project No: 22860.003

Drawn By: dpelletier

- Town Boundary
- Approximate Parcel Boundary
- PSNH Fee Area
- Project Corridor
- Work Pad

Roads
- Local
- Not Maintained
- Private
- State
- Railroad

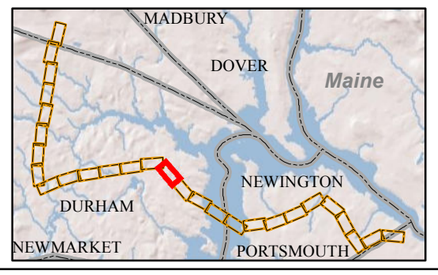
- Existing Str (Remain)
- Existing Str (Removed/Modified)
- Access Roads
- Underground Cable
- Silt Curtain
- Silt Fence, Hay Bale, Erosion Control Mix Berm
- Straw Wattle
- Wetland
- Prime Wetland
- Wetland Impact (PERM)
- Wetland Impact (TEMP)

- Stream Centerline
- Stream Top of Bank
- Temporary Culvert
- Stonewall alignment
- Temporary Mat Bridge
- NH DOT Right-of-way
- Historical Sites
- Designated River Buffer 250'
- Conservation Lands
- 100 Year Floodplain

Structures
- Direct Embed
- Drilled Pier
- Relocated Distribution
- Steep Slope BMPs
- Tree Clearing
- Stream Buffer
- 2ft Contour
- Tidal Buffer Zone
- Highest Observable Tide Line/Reference Line (4ft Contour)
- Mean Lower Low Water

0 75 150 300 Feet

1 inch = 150 feet



EVERSOURCE ENERGY

Seacoast Reliability Project

Revised Environmental Maps

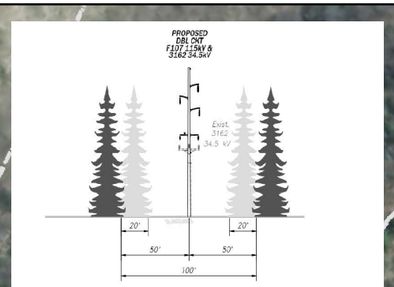
NORMANDEAU ASSOCIATES
ENVIRONMENTAL CONSULTANTS

STATE OF NEW HAMPSHIRE
SARAH D. ALLEN
No. 083
CERTIFIED WETLAND SCIENTIST

9/1/2017

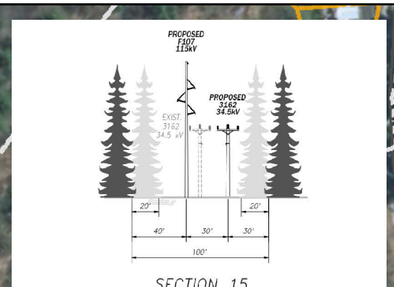
Path: J:\Projects\PSNH_F107\MXD\SRP_MapSet_AugSupplement.mxd

Wetland ID	Impact Type	Area (Sq. Ft.)
DS8 (n/a)	Temporary	16
DW10 (PSS1E/PEM1J)	Temporary	376
DW12 (PSS1E/PEM1E)	Temporary	822
DW14 (PEM1J/PSS1E)	Temporary	3255
DW14 (PEM1J/PSS1E)	Permanent (Str. 3162-9)	20
DW16 (PEM1E)	Temporary	64
DW18 (PSS1E/PEM1E)	Temporary	4531
DW18 (PSS1E/PEM1E)	Permanent (Str. 3162-4)	9
DW20 (PEM1J)	Temporary	1872
DW20 (PEM1J)	Permanent (Str. F107-94)	17
DW6 (PEM1E/PSS1E)	Temporary	3857



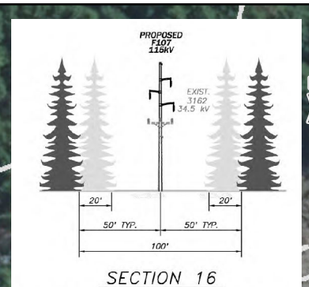
SECTION 14

PROPOSED 3162/F107 DOUBLE CIRCUIT
TIMBER BROOK LANE TO F107/3162 CIRCUIT SPLIT
STR. 64 – STR. 91
(12000' ±)



SECTION 15

PROPOSED F107 SINGLE CIRCUIT &
PROPOSED 3162 SINGLE CIRCUIT
F107/3162 CIRCUIT SPLIT TO DURHAM POINT ROAD
STR. 93 – STR. 96
(1900' ±)



SECTION 16

PROPOSED F107 SINGLE CIRCUIT
DURHAM POINT ROAD TO
PROPOSED F107 UNDERGROUND
STR. 97 – STR. 101
(2600' ±)

Parcel boundary and owner data were acquired from municipal databases as of May 2016.

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Date : 9/14/2017

Project No: 22860.003

Drawn By: dpelletier

- Town Boundary
- Approximate Parcel Boundary
- PSNH Fee Area
- Project Corridor
- Work Pad

Roads
- Local
- Not Maintained
- Private
- State
- Railroad

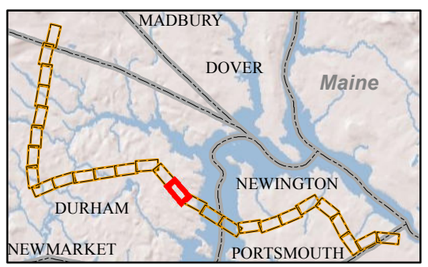
- Existing Str (Remain)
- Existing Str (Removed/Modified)
- Access Roads
- Underground Cable
- Silt Curtain
- Silt Fence, Hay Bale, Erosion Control Mix Berm
- Straw Wattle
- Wetland
- Prime Wetland
- Wetland Impact (PERM)
- Wetland Impact (TEMP)

- Stream Centerline
- Stream Top of Bank
- Temporary Culvert
- Stonewall alignment
- Temporary Mat Bridge
- NH DOT Right-of-way
- Historical Sites
- Designated River Buffer 250'
- Conservation Lands
- 100 Year Floodplain

Structures
- Direct Embed
- Drilled Pier
- Relocated Distribution
- Steep Slope BMPs
- Tree Clearing
- Stream Buffer
- 2ft Contour
- Tidal Buffer Zone
- Highest Observable Tide Line/Reference Line (4ft Contour)
- Mean Lower Low Water

0 75 150 300 Feet

1 inch = 150 feet



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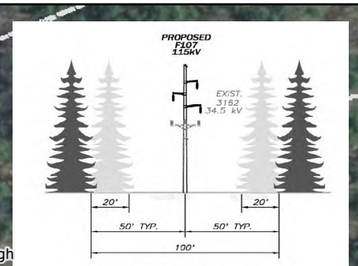
9/1/2017

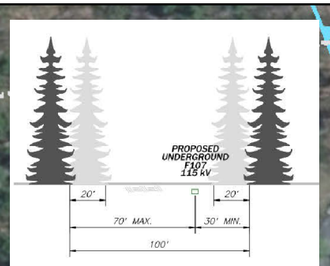
Path: J:\Projects\PSNH_F107\MXD\SRP_MapSet_AugSupplement.mxd

Wetland ID	Impact Type	Area (Sq. Ft.)
DNW2 (E2EM)	Temporary	943
DNW2 (E2RS)	Temporary	67
DNW2 (E2US)	Temporary	104502
DNW2 (E2US)	Permanent	2269
DNW2 (E2US)	Temporary	10790
DNW2 (E2US)	Permanent	37
DNW2 (E2US)	Permanent	38
DW2 (PEM1E)	Temporary	7636
DW2 (PEM1E)	Permanent (Str. F107-99)	20
DW2 (PEM1E)	Permanent (Str. F107-100)	10
DW4 (PEM1J)	Temporary	1325
DW6 (PEM1E/PSS1E)	Temporary	3857



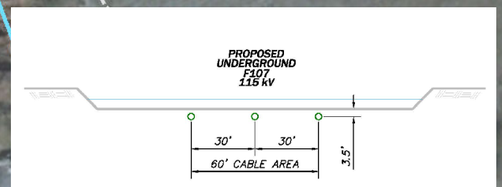
SECTION 16

PROPOSED F107 SINGLE CIRCUIT DURHAM POINT ROAD TO PROPOSED F107 UNDERGROUND STR. 97 – STR. 101 (2600' ±)



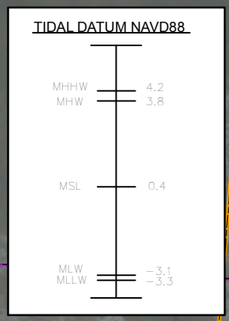
SECTION 17

PROPOSED LINE F107 UNDERGROUND TO LITTLE BAY STR. 101 – LITTLE BAY (360' ±)



SECTION 18

PROPOSED LINE F107 UNDERGROUND MUDFLATS AT LITTLE BAY (2200' ±)



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Date : 9/14/2017

Project No: 22860.003

Drawn By: dpelletier

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Roads
- Local
- Not Maintained
- Private
- State
- Railroad

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- Existing Str (Removed/Modified)
- Access Roads
- Underground Cable
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- Straw Wattle
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- Wetland Impact (TEMP)

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- Stream Top of Bank
- Temporary Culvert
- Stonewall alignment
- Temporary Mat Bridge
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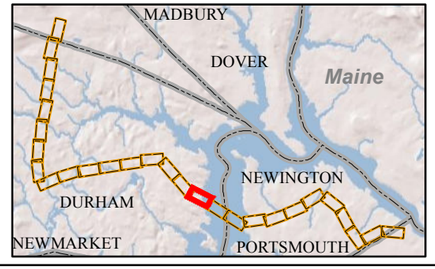
- Historical Sites
- Designated River Buffer 250'
- Conservation Lands
- 100 Year Floodplain

Structures
- Direct Embed
- Drilled Pier
- Relocated Distribution
- Steep Slope BMPs
- Tree Clearing
- Stream Buffer
- 2ft Contour
- Tidal Buffer Zone
- Highest Observable Tide Line/Reference Line (4ft Contour)
- Mean Lower Low Water

0 75 150 300 Feet

1 inch = 150 feet



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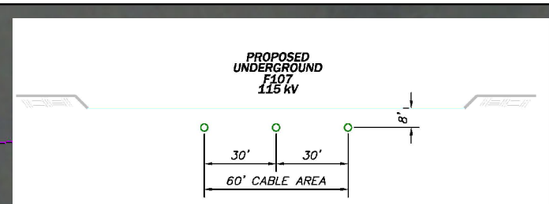
9/1/2017

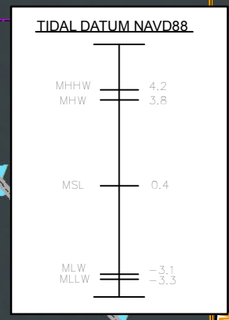
Path: J:\Projects\PSNH_F107\MXD\SRP_MapSet_AugSupplement.mxd

Wetland ID	Impact Type	Area (Sq. Ft.)
DNW2 (E1UB)	Temporary	49832
DNW2 (E2US)	Temporary	104502



SECTION 19

PROPOSED LINE F107
UNDERGROUND LITTLE BAY
(3100' ±)



Cable Area
NH AUID
NHEST600030904-06-19
Matchline 17
Barge Laydown
DNW2
E2US
Jet Plow Burial
Matchline 18
DNW2 E1UB
NH AUID
NHEST600030904-06-10
Cable Area
LL# 279
Decapo,
Thomas A.

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- Silt Fence, Hay Bale, Erosion Control Mix Berm
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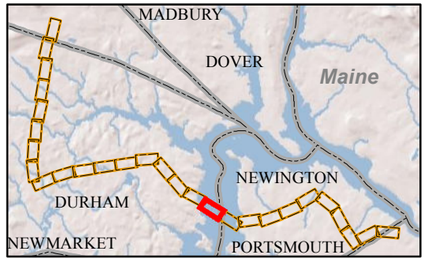
- 2ft Contour
- Tidal Buffer Zone
- Highest Observable Tide Line/Reference Line (4ft Contour)
- Mean Lower Low Water

0 75 150 300 Feet

1 inch = 150 feet



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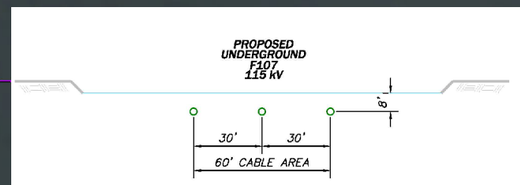
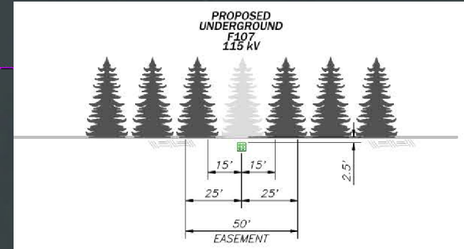
Wetland ID	Impact Type	Area (Sq. Ft.)
DNW2 (E1UB)	Temporary	76926
DNW2 (E1UB)	Permanent	640
DNW2 (E1UB)	Temporary	49832
DNW2 (E2EM)	Temporary	513
DNW2 (E2RS)	Temporary	248
DNW2 (E2US)	Temporary	26166
DNW2 (E2US)	Permanent	4106
DNW2 (E2US)	Permanent	160
DNW2 (E2US)	Permanent	1395



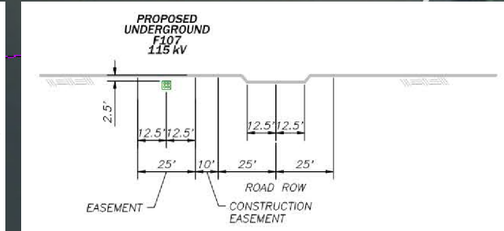
SECTION 19

PROPOSED LINE F107 UNDERGROUND LITTLE BAY (3100' ±)



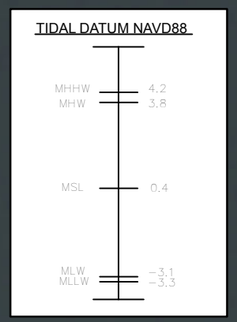
SECTION 20

PROPOSED LINE F107 UNDERGROUND LITTLE BAY TO GUNDALOW LANDING (450' ±)



SECTION 21A

PROPOSED LINE F107 UNDERGROUND GUNDALOW LANDING TO LITTLE BAY ROAD (400' ±)



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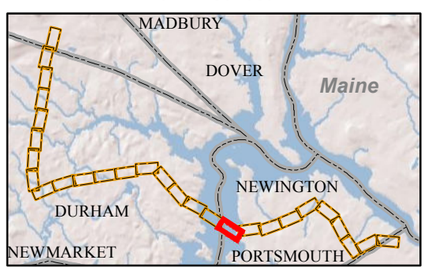
- 2ft Contour
- Tidal Buffer Zone
- Highest Observable Tide Line/Reference Line (4ft Contour)
- Mean Lower Low Water

0 75 150 300 Feet

1 inch = 150 feet



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9/1/2017

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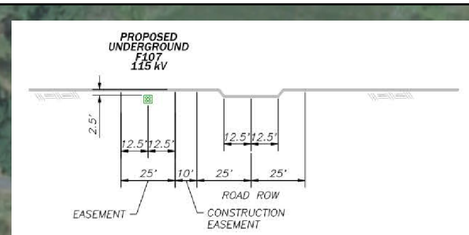
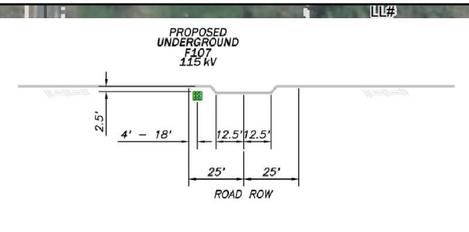
Wetland ID	Impact Type	Area (Sq. Ft.)
NS8 (R4SB4)	Temporary	84
NW4 (PSS1E/PFO14E)	Temporary	1900
NW6 (PSS1C)	Temporary	2817
NW6 (PSS1C)	Permanent (Str. F107-105)	20
Vernal Pool Envelope	Temporary	7377



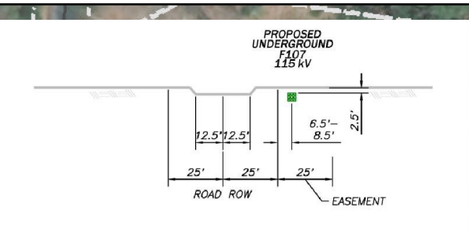
SECTION 21A

PROPOSED LINE F107 UNDERGROUND GUNDALOW LANDING TO LITTLE BAY ROAD (400' ±)



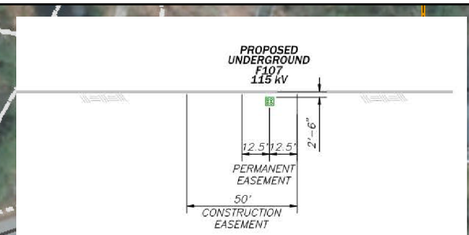
SECTION 21B

PROPOSED LINE F107 UNDERGROUND GUNDALOW LANDING TO LITTLE BAY ROAD (270' ±)



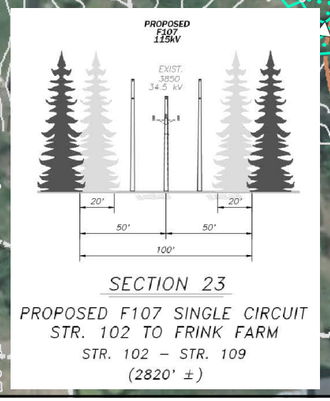
SECTION 21C

PROPOSED LINE F107 UNDERGROUND GUNDALOW LANDING TO LITTLE BAY ROAD (340' ±)



SECTION 22

PROPOSED LINE F107 UNDERGROUND LITTLE BAY ROAD TO STR. 102 (430' ±)



SECTION 23

PROPOSED F107 SINGLE CIRCUIT STR. 102 TO FRINK FARM

STR. 102 – STR. 109 (2820' ±)

Matchline 19

Matchline 20

Gundalow Lndg

Little Bay Rd

Brickyard Way

LL# 400.01 Ross, Douglas A. & Angelita R.

LL# 400 Beswick, Paul R. 2008 Trust Ne Beswick, Paul R.

LL# 400.02 Smith, Jeffrey W.

LL# 400.04 Town of Newington

LL# 401 Crowley Joyce Revoc. Trust Crowley, M. & Joyce K. Ttees

LL# 401.01 Philbrick Susan Revocable Trust

LL# 402 Vietas, Lawrence W. & Suzanne M.

LL# 402.01 Hebert Family 2012 Rev Trust Hebert, Denis & Ann Trustees

LL# 402.02 Town of Newington

LL# 403 Hamelin, Richard P.

LL# 403.01 Davis, Peter K. & Linda B.

LL# 403.04 Jacuch, Michael R. & Alexandra

LL# 403.06 Como, Richard A. & Como, Lynn M.

LL# 404 Raymond, Robert P. & Pernaa, Mary Jane

LL# 404.01 Town of Newington

LL# 403.05 Dell Isola, Robert K. & Glaister, Nin

LL# 405 Town of Newington - Flynn Pit

LL# 405.01 Callahan, Martin J. & Teresa B.

LL# 405.02 Scharff, Robert C. & Judith L.

LL# 405.03 Macdonald, Peter J. & Kim P.

LL# 405.04 Kowalsky, Andrew J. Trust, Kowalsky, Andrew J. Trustee

LL# 405.05 Quinn, Steven C. & Donna L.

LL# 405.06 Lemieux, John L. & Marie A.

LL# 406 Pickering, Curtis J.

Vernal Pool 100ft Envelope Impact Area

NW4 PSS1E/PFO14E

NW4 PUB3

NW6 PSS1C

NS8 R4SB4

F107-102

F107-104

F107-105

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Work Pad

Roads
Local
Not Maintained
Private
State
Railroad

Existing Str (Remain)
Existing Str (Removed/Modified)
Access Roads
Underground Cable
Silt Curtain
Silt Fence, Hay Bale, Erosion Control Mix Berm
Straw Wattle
Wetland
Prime Wetland
Wetland Impact (PERM)
Wetland Impact (TEMP)

Stream Centerline
Stream Top of Bank
Temporary Culvert
Stonewall alignment
Temporary Mat Bridge
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Historical Sites
Designated River Buffer 250'
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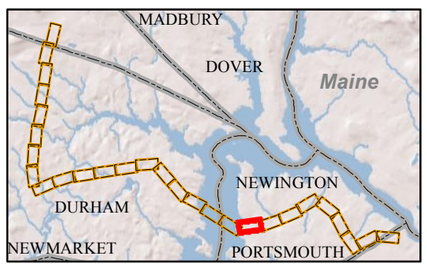
Stream Buffer
2ft Contour
Tidal Buffer Zone
Highest Observable Tide Line/Reference Line (4ft Contour)
Mean Lower Low Water

0 75 150 300 Feet

1 inch = 150 feet



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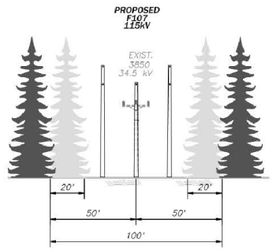
9/1/2017

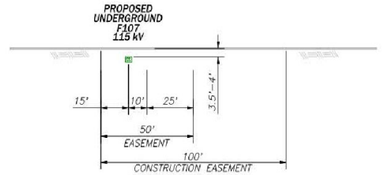
Path: J:\Projects\PSNH_F107\MXD\SRP_MapSet_AugSupplement.mxd

Wetland ID	Impact Type	Area (Sq. Ft.)
NS107 (R2UB3)	Temporary	148
NS14 (n/a)	Temporary	42
NW10 (PSS1E/PEM1E/PFO1B)	Temporary	3507
NW12 (PSS1E/PEM1E)	Temporary	3310
NW16 (PEM1F/PSS1E)	Temporary	16035
NW16 (PEM1F/PSS1E)	Permanent (Str. F107-109)	19



SECTION 23

PROPOSED F107 SINGLE CIRCUIT
STR. 102 TO FRINK FARM
STR. 102 – STR. 109
(2820' ±)



SECTION 24

PROPOSED LINE F107 UNDERGROUND
HISTORIC DISTRICT
STR. 109 – HANNAH LANE
(2420' ±)

LL# 408.01
Hislop, David & Margaret
Revocable Trust 1999

LL# 408.03
Boynton Family Rev Trust
Boynton, Jeffrey & Jill Ttees

LL# 410
Frink Family Trust of 2004
Frink, John D. & Helen Trustees, Ryder Family Revoc Trust

LL# 405.05
Quinn, Steven
C. & Donna L.

Machine 20

F107-106

NW10
PSS1E/PEM1E/PFO1B

F107-107

F107-108

NW12
PSS1E/PEM1E

NS14
R/P

Temporary Dewatering Area

F107-109

Stream Diversion,
See Detail Sheet

NS107
R2UB3

NW16
PEM1F/PSS1E

Machine 21

LL# 406
Pickering,
Curtis J.

LL# 406
Pickering,
Curtis J.

LL# 407
Poulin, Michael
V. & Judith A.

LL# 408
Pickering, Lulu Arline
Gilbert, William A.

LL# 406.03
Estes, Ralph
G. & Sheryl A.

LL# 406.02
Gordon, Susan

LL# 409
Pickering,
Lulu A.

Parcel boundary and owner data were acquired from municipal databases as of May 2016.

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Town of Newington

Date : 9/14/2017

Project No: 22860.003

Drawn By: dpelletier

- Town Boundary
- Approximate Parcel Boundary
- PSNH Fee Area
- Project Corridor
- Work Pad

Roads
- Local
- Not Maintained
- Private
- State
- Railroad

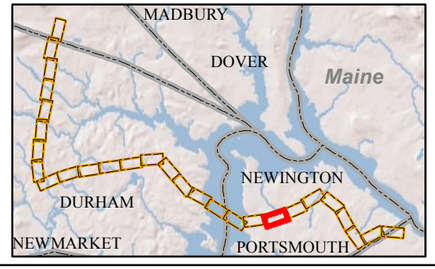
- Existing Str (Remain)
- Existing Str (Removed/Modified)
- Access Roads
- Underground Cable
- Silt Curtain
- Silt Fence, Hay Bale, Erosion Control Mix Berm
- Straw Wattle
- Wetland
- Prime Wetland
- Wetland Impact (PERM)
- Wetland Impact (TEMP)

- Stream Centerline
- Stream Top of Bank
- Temporary Culvert
- Stonewall alignment
- Temporary Mat Bridge
- NH DOT Right-of-way
- Historical Sites
- Designated River Buffer 250'
- Conservation Lands
- 100 Year Floodplain

Structures
- Direct Embed
- Drilled Pier
- Relocated Distribution
- Steep Slope BMPs
- Tree Clearing
- Stream Buffer
- 2ft Contour
- Tidal Buffer Zone
- Highest Observable Tide Line/Reference Line (4ft Contour)
- Mean Lower Low Water

0 75 150 300 Feet

1 inch = 150 feet



EVERSOURCE ENERGY

NORMANDEAU ASSOCIATES
ENVIRONMENTAL CONSULTANTS

Seacoast Reliability Project

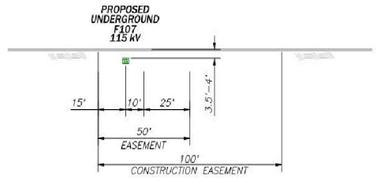
Revised Environmental Maps

STATE OF NEW HAMPSHIRE
SARAH D. ALLEN
No. 083
CERTIFIED WETLAND SCIENTIST

9/1/2017

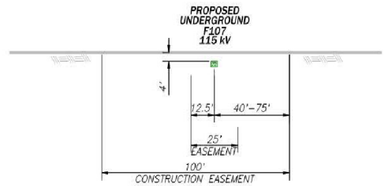
Path: J:\Projects\PSNH_F107\MXD\SRP_MapSet_AugSupplement.mxd

Wetland ID	Impact Type	Area (Sq. Ft.)
NW18 (PEM1J/PSS1J)	Temporary	2200
NW20 (PEM1J)	Temporary	1658
NW22 (PFO1E/PSS1E)	Temporary	3057
NW24 (PEM1F/PSS1E/PFO1E)	Temporary	5988



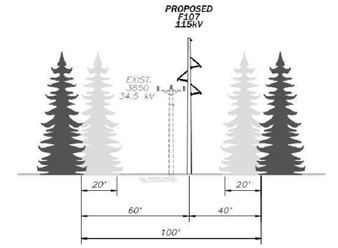
SECTION 24

PROPOSED LINE F107 UNDERGROUND
HISTORIC DISTRICT
STR. 109 – HANNAH LANE
(2420' ±)



SECTION 24A

PROPOSED LINE F107 UNDERGROUND
HISTORIC DISTRICT
HANNAH LANE – STR. 113
(250' ±)



SECTION 25

PROPOSED F107 SINGLE CIRCUIT
HANNAH LANE TO FOX POINT ROAD
STR. 113 – STR. 114
(720' ±)

LL# 417.08 Town of Newington
LL# 415.01 Town of Newington
LL# 415.02 Gregg, David C.
Matchline 22
LL# 415 Dennett Farm, LLC.
LL# 416 Fox Point Nominee Trust Jacques Ttees, Stephen G. & Valerie A.
LL# 411.02 Winn Jr., Philip John
LL# 411.01 Sabine, Stephen E. & Brenda J.
LL# 410.01 Hourihan, Thomas F. & Jane H.
Old Post Rd
Nimble Hill Rd
LL# 412 Lee, John & Gina
LL# 413 Bagley, Paul L. & Sheryl A.
NW20 PEM1J
NW18 PEM1J/PSS1J
NW24 PEM1F/PSS1E/PFO1E
F107-113
NW22 PFO1E/PSS1E
Matchline 21
LL# 411 Abbott, Blanche & Clifford A.
LL# 410 Frink Family Trust of 2004 Frink, John D. & Helen Trustees, Ryder Family Revoc Trust
LL# 410.02 Town of Newington
LL# 414 Bush, Steven J. & Carol A.
Hannah Ln
LL# 417.06 Blonigen, Robert P. & Brenda
LL# 414.01 Cooke, Russell J. & Margaret C.
LL# 417.04 Leedberg, Troy T. & Lily E.
LL# 417.07 Sharifipour, Bhaman
LL# 408.12 Butterworth, James & Charlotte
Little Bay Rd

Parcel boundary and owner data were acquired from municipal databases as of May 2016.

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Date : 9/14/2017
Project No: 22860.003
Drawn By: dpelletier

- Town Boundary
- Approximate Parcel Boundary
- PSNH Fee Area
- Project Corridor
- Work Pad

Roads
- Local
- Not Maintained
- Private
- State
- Railroad

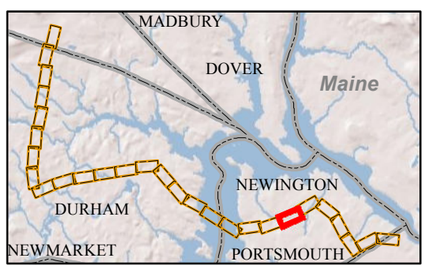
- Existing Str (Remain)
- Existing Str (Removed/Modified)
- Access Roads
- Underground Cable
- Silt Curtain
- Silt Fence, Hay Bale, Erosion Control Mix Berm
- Straw Wattle
- Wetland
- Prime Wetland
- Wetland Impact (PERM)
- Wetland Impact (TEMP)

- Stream Centerline
- Stream Top of Bank
- Temporary Culvert
- Stonewall alignment
- Temporary Mat Bridge
- NH DOT Right-of-way
- Historical Sites
- Designated River Buffer 250'
- Conservation Lands
- 100 Year Floodplain

Structures
- Direct Embed
- Drilled Pier
- Relocated Distribution
- Steep Slope BMPs
- Tree Clearing
- Stream Buffer
- 2ft Contour
- Tidal Buffer Zone
- Highest Observable Tide Line/Reference Line (4ft Contour)
- Mean Lower Low Water

0 75 150 300 Feet

1 inch = 150 feet



EVERSOURCE ENERGY

NORMANDEAU ASSOCIATES
ENVIRONMENTAL CONSULTANTS

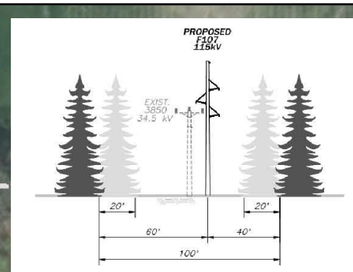
Seacoast Reliability Project

Revised Environmental Maps

STATE OF NEW HAMPSHIRE
SARAH D. ALLEN
No. 083
CERTIFIED WETLAND SCIENTIST
9/1/2017

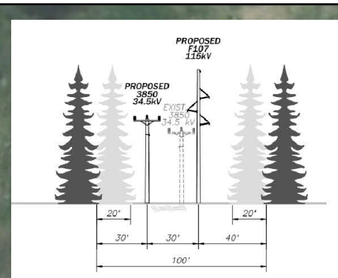
Path: J:\Projects\PSNH_F107\MXD\SRP_MapSet_AugSupplement.mxd

Wetland ID	Impact Type	Area (Sq. Ft.)
NW17 (PSS1)	Temporary	4507
NW19 (PEM1)	Temporary	388
NW19 (PEM1)	Permanent (Str. F107-120)	0
NW21 (PEM1)	Temporary	252
NW26 (PSS1E)	Temporary	1530
NW28 (PEM1J)	Temporary	5391
NW28 (PEM1J)	Permanent (Str. 3850-2)	20
NW30 (PEM1J)	Temporary	3056
NW32 (PEM1J)	Temporary	2319
NW34 (PSS1E/PUBb)	Temporary	6464
NW34 (PSS1E/PUBb)	Permanent (Str. F107-119)	11



SECTION 25

PROPOSED F107 SINGLE CIRCUIT
HANNAH LANE TO FOX POINT ROAD
STR. 113 – STR. 114
(720' ±)



SECTION 26

PROPOSED F107 SINGLE CIRCUIT
FOX POINT ROAD TO ARBORETUM DRIVE
STR. 115 – STR. 128
(5600' ±)

LL# 418.01
Wong, Jim H. & Ruth H.

LL# 418
D'alessandro, Philomena

LL# 416
Fox Point Nominee Trust
Jacques Ttees, Stephen G. & Valerie A.

LL# 419
Wendy Lou Sweeney Rev Trust, : Sweeny Trustee, Wendy Lou

LL# 420.01
25 Nimble Road, LLC

LL# 420
Frizzell Trustee, C. Keith & Frizzell, Sara F.

LL# 420
Frizzell Trustee, C. Keith & Frizzell, Sara F.

LL# 415
Dennett Farm, LLC.

LL# 417
Cooley, Ralph & Barbara

LL# 414
Bush, Steven J. & Carol A.

LL# 417.04
Leedberg, Troy T. & Lily E.

LL# 417.02
Frank, Family Rev Trust Of 2007
Frank, Vincent & Shirley Trustees

LL# 438
Pease Development Authority

3850-0.5
3850-1
3850-2
3850-4
3850-5
3850-6
F107-114
F107-115
F107-116
F107-118
F107-119
F107-120
NW24 PEM1F/PSS1E/PFO1E
NW26 PSS1E
NW28 PEM1J
NW30 PEM1J
NW32 PEM1J
NW34 PSS1E/PUBb
NW21 PEM1
NW19 PEM1

Parcel boundary and owner data were acquired from municipal databases as of May 2016.

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Date : 9/14/2017
Project No: 22860.003
Drawn By: dpelletier

Town Boundary
Approximate Parcel Boundary
PSNH Fee Area
Project Corridor
Work Pad

Roads
Local
Not Maintained
Private
State
Railroad

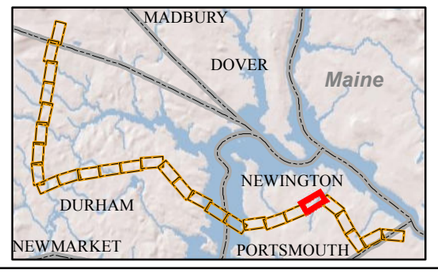
Existing Str (Remain)
Existing Str (Removed/Modified)
Access Roads
Underground Cable
Silt Curtain
Silt Fence, Hay Bale, Erosion Control Mix Berm
Straw Wattle
Wetland
Prime Wetland
Wetland Impact (PERM)
Wetland Impact (TEMP)

Stream Centerline
Stream Top of Bank
Temporary Culvert
Stonewall alignment
Temporary Mat Bridge
NH DOT Right-of-way
Historical Sites
Designated River Buffer 250'
Conservation Lands
100 Year Floodplain

Structures
Direct Embed
Drilled Pier
Relocated Distribution
Steep Slope BMPs
Tree Clearing
Stream Buffer
2ft Contour
Tidal Buffer Zone
Highest Observable Tide Line/Reference Line (4ft Contour)
Mean Lower Low Water

0 75 150 300 Feet

1 inch = 150 feet



EVERSOURCE ENERGY

NORMANDEAU ASSOCIATES
ENVIRONMENTAL CONSULTANTS

Seacoast Reliability Project

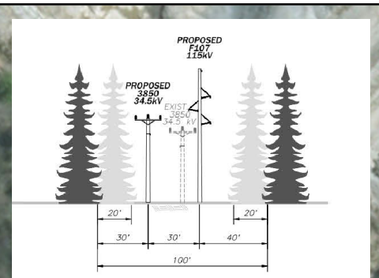
Revised Environmental Maps

STATE OF NEW HAMPSHIRE
SARAH D. ALLEN
No. 083
CERTIFIED WETLAND SCIENTIST

9/1/2017

Path: J:\Projects\PSNH_F107\MXD\SRP_MapSet_AugSupplement.mxd

Wetland ID	Impact Type	Area (Sq. Ft.)
NS50 (R4SB2)	Temporary	327
NW11 (PSS1/PEM1)	Temporary	13147
NW11 (PSS1/PEM1)	Permanent (Str. F107-123)	113
NW11 (PSS1/PEM1)	Permanent (Str. 3850-9)	20
NW13 (PEM1/POW)	Temporary	211
NW17 (PSS1)	Temporary	4507
NW9 (PEM1)	Temporary	12399
NW9 (PEM1)	Permanent (Str. F107-124)	113
NW9 (PEM1)	Permanent (Str. 3850-10)	20



SECTION 26

PROPOSED F107 SINGLE CIRCUIT
FOX POINT ROAD TO ARBORETUM DRIVE
STR. 115 – STR. 128
(5600' ±)

NHDOT LARROW

LL# 438.01
State of New Hampshire

Spaulding Tpke SB Exit 3
Off ramp (Woodbury Ave)

Spaulding Tpke S

Spaulding Tpke N

LL# 423.01
Wal-Mart Stores, INC.
#2398 Property Tax Department Ms 0555

Underground Gas Lines

NS51
R3RB2

NW17
PSS1

3850-7

F107-121

NS50
R4SB2

NW13
PEM1/POW

3850-8

F107-122

NW11
PSS1/PEM1

3850-9

F107-123

NHDOT CARROW

3850-10

F107-124

NW9
PEM1

3850-11

F107-125

LL# 438
Pease Development Authority

3850-12

F107-126

Matchline 23

Railroad Brook Restoration was completed (by others) after topographic survey was performed.

Parcel boundary and owner data were acquired from municipal databases as of May 2016.

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Date : 9/14/2017

Project No: 22860.003

Drawn By: dpelletier

- Town Boundary
- Approximate Parcel Boundary
- PSNH Fee Area
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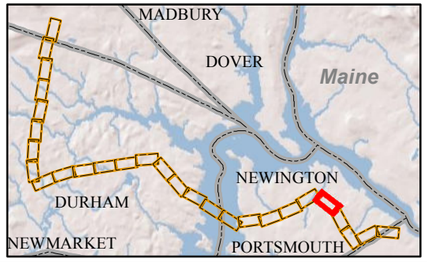
- Stream Top of Bank
- Temporary Culvert
- Stonewall alignment
- Temporary Mat Bridge
- NH DOT Right-of-way
- Historical Sites
- Designated River Buffer 250'
- Conservation Lands
- 100 Year Floodplain

Structures
- Direct Embed
- Drilled Pier
- Relocated Distribution
- Steep Slope BMPs
- Tree Clearing
- Stream Buffer
- 2ft Contour
- Tidal Buffer Zone
- Highest Observable Tide Line/Reference Line (4ft Contour)
- Mean Lower Low Water

0 75 150 300 Feet

1 inch = 150 feet



EVERSOURCE ENERGY

Seacoast Reliability Project

Revised Environmental Maps

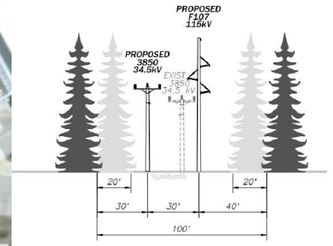
NORMANDEAU ASSOCIATES
ENVIRONMENTAL CONSULTANTS

STATE OF NEW HAMPSHIRE
SARAH D. ALLEN
No. 083
CERTIFIED WETLAND SCIENTIST

9/1/2017

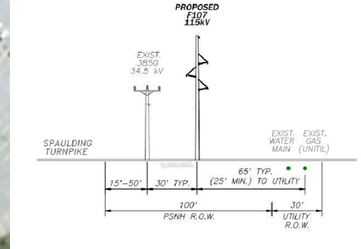
Path: J:\Projects\PSNH_F107\MXD\SRP_MapSet_AugSupplement.mxd

Wetland ID	Impact Type	Area (Sq. Ft.)



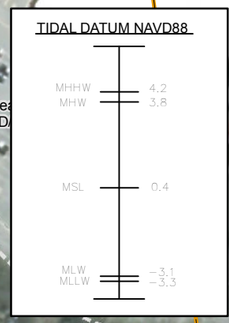
SECTION 26

PROPOSED F107 SINGLE CIRCUIT
FOX POINT ROAD TO ARBORETUM DRIVE
STR. 115 – STR. 128
(5600' ±)



SECTION 27

PROPOSED F107 SINGLE CIRCUIT
ARBORETUM DRIVE TO R.O.W. REDUCTION
STR. 129 – STR. 132
(2500' ±)



LL# 423.01
Wal-Mart Stores, INC.,#2398 Property
Tax Department Ms 0555

LL# 423.02
Horizon Trust Of NH,
C/O Mcguire Group

LL# 423.03
Holy Trinity
Lutheran Church

LL# 423.04
Mmc
Fox Run LLC

Spaulding Tpke N

Spaulding Tpke S

Spaulding Tpke NB Exit 2 Off ramp (Fox Run Rd)

Matchline 25

3850-12

F107-126

3850-13

F107-127

NHDOT LAROW

LL# 423
City of
Portsmouth

F107-128

F107-129

F107-130

F107-131

NW44
PEM1E

LL# 438
Pease Development
Authority

Arboretum Dr

NHDOT Undetermined

NHDOT ROW

Underground Gasoline

Parcel boundary and owner data were acquired from municipal databases as of May 2016.

Service Layer Credits: Copyright:© 2014 Esri, granit.edu aerial photos 2015.

Date : 9/14/2017

Project No: 22860.003

Drawn By: dpelletier

- Town Boundary
- Approximate Parcel Boundary
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- Work Pad

Roads
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- State
- Railroad

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- Existing Str (Removed/Modified)
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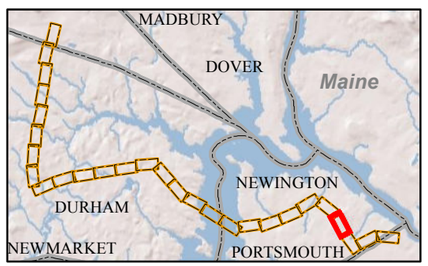
- Silt Fence, Hay Bale, Erosion Control Mix Berm
- Straw Wattle
- Wetland
- Prime Wetland
- Wetland Impact (PERM)
- Wetland Impact (TEMP)

- Stream Centerline
- Stream Top of Bank
- Temporary Culvert
- Stonewall alignment
- Temporary Mat Bridge
- NH DOT Right-of-way
- Historical Sites
- Designated River Buffer 250'
- Conservation Lands
- 100 Year Floodplain

Structures
- Direct Embed
- Drilled Pier
- Relocated Distribution
- Steep Slope BMPs
- Tree Clearing
- Stream Buffer
- 2ft Contour
- Tidal Buffer Zone
- Highest Observable Tide Line/Reference Line (4ft Contour)
- Mean Lower Low Water

0 75 150 300 Feet

1 inch = 150 feet



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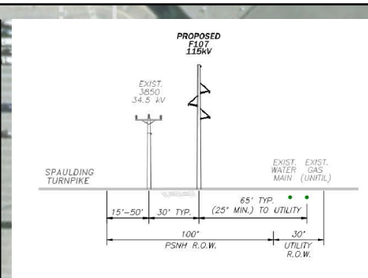
CERTIFIED WETLAND SCIENTIST

9/1/2017

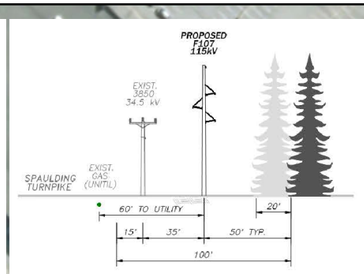
Path: J:\Projects\PSNH_F107\MXD\SRP_MapSet_AugSupplement.mxd

Wetland ID	Impact Type	Area (Sq. Ft.)
NW1 (PEM1/SS1)	Permanent (Str. F107-135)	20
NW1 (PEM1/SS1)	Temporary	6583
NW3 (PEM1/SS1)	Temporary	1256
NW3 (PEM1/SS1)	Temporary	4885
NW3 (PEM1/SS1)	Permanent (Str. F107-133)	20
NW43 (PEM1E)	Temporary	4101
NW43 (PEM1E)	Permanent (Str. F107-138)	0
NW45 (PEM1/SS1B)	Temporary	14112



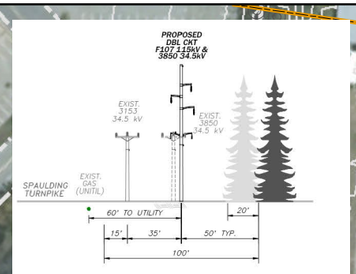
SECTION 27

PROPOSED F107 SINGLE CIRCUIT ARBORETUM DRIVE TO R.O.W. REDUCTION
STR. 129 – STR. 132
(2500' ±)



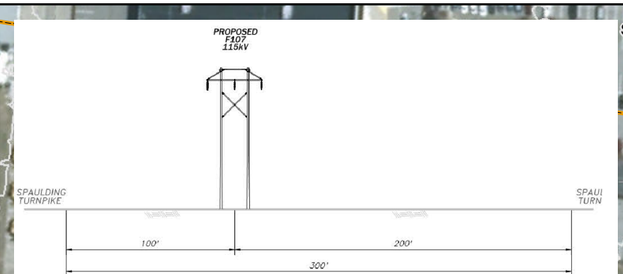
SECTION 28

PROPOSED F107 SINGLE CIRCUIT R.O.W. REDUCTION TO LINE 3850 TAP
STR. 133 – STR. 135
(850' ±)



SECTION 29

PROPOSED 3850/F107 DOUBLE CIRCUIT LINE 3153 ENTERS R.O.W. TO SPAULDING TURNPIKE CROSSING
STR. 135 – STR. 137
(700' ±)



SECTION 30

PROPOSED F107 SINGLE CIRCUIT SPAULDING TURNPIKE CROSSING TO LINE E194 CROSSING
STR. 138 – STR. 140
(1500' ±)

LL# 423.06
J.C. Penney Co. Inc.

LL# 424.05
Mmc Fox Run Llc

LL# 424
Sbaf Running Fox, Inc C/O Keypoint Partners, LLC

LL#

Manchline 25

Spaulding Tpke NB Exit 1 On ramp (Gosling Rd)

Spaulding Tpke N

Spaulding Tpke SB Exit 1 Off ramp (Gosling Rd)

Spaulding Tpke S

LL# 438.04
Town of Newington

LL#438
Pease Development Authority

Arboretum Dr

NHDOT LAROW

NS101 RASB4

NW100 PEM1E

NW43 PEM1E

F107-138

NS5 n/a

NW3 PEM1/SS1

F107-132

F107-133

F107-134

NW1 PEM1/SS1

F107-135

F107-136

F107-137

NW45 PEM1/SS1B

Parcel boundary and owner data were acquired from municipal databases as of May 2016.

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Date : 9/14/2017

Project No: 22860.003

Drawn By: dpelletier

- Town Boundary
- Approximate Parcel Boundary
- PSNH Fee Area
- Project Corridor
- Work Pad

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- Not Maintained
- Private
- State
- Railroad

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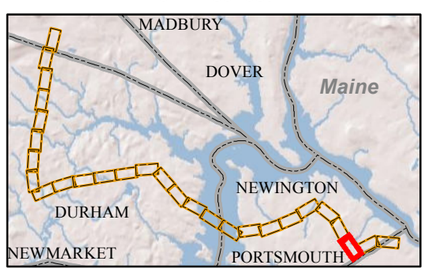
- Existing Str (Removed/Modified)
- Access Roads
- Underground Cable
- Silt Curtain
- Silt Fence, Hay Bale, Erosion Control Mix Berm
- Straw Wattle
- Wetland
- Prime Wetland
- Wetland Impact (PERM)
- Wetland Impact (TEMP)

- Stream Centerline
- Stream Top of Bank
- Temporary Culvert
- Stonewall alignment
- Temporary Mat Bridge
- NH DOT Right-of-way
- Historical Sites
- Designated River Buffer 250'
- Conservation Lands
- 100 Year Floodplain

Structures
- Direct Embed
- Drilled Pier
- Relocated Distribution
- Steep Slope BMPs
- Tree Clearing
- Stream Buffer
- 2ft Contour
- Tidal Buffer Zone
- Highest Observable Tide Line/Reference Line (4ft Contour)
- Mean Lower Low Water

0 75 150 300 Feet

1 inch = 150 feet



EVERSOURCE ENERGY

Seacoast Reliability Project

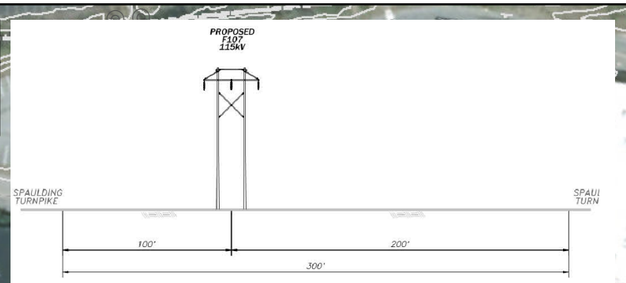
Revised Environmental Maps

NORMANDEAU ASSOCIATES
ENVIRONMENTAL CONSULTANTS

STATE OF NEW HAMPSHIRE
SARAH D. ALLEN
No. 083
CERTIFIED WETLAND SCIENTIST
9/1/2017

Path: J:\Projects\PSNH_F107\MXD\SRP_MapSet_AugSupplement.mxd

Wetland ID	Impact Type	Area (Sq. Ft.)
NW42 (PEM1/UB1E)	Temporary	765
NW43 (PEM1E)	Temporary	4101

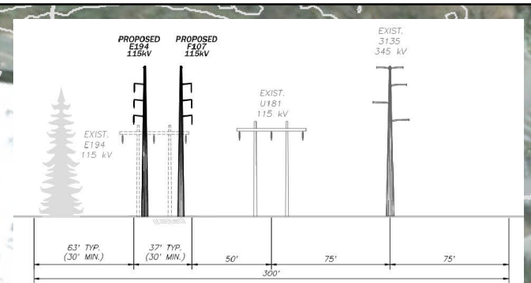


SECTION 30

PROPOSED F107 SINGLE CIRCUIT SPAULDING TURNPIKE CROSSING TO LINE E194 CROSSING

STR. 138 – STR. 140

(1500' ±)



SECTION 31

PROPOSED F107 SINGLE CIRCUIT E194 CROSSING TO 3135 CROSSING

STR. 141 – STR. 144

(2100' ±)

Parcel boundary and owner data were acquired from municipal databases as of May 2016.

Service Layer Credits: Copyright:© 2014 Esri, granit.edu aerial photos 2015.

Date : 9/14/2017

Project No: 22860.003

Drawn By: dpelletier

- Town Boundary
- Approximate Parcel Boundary
- PSNH Fee Area
- Project Corridor
- Work Pad

Roads
- Local
- Not Maintained
- Private
- State
- Railroad

- Existing Str (Remain)
- Existing Str (Removed/Modified)
- Access Roads
- Underground Cable
- Silt Curtain
- Silt Fence, Hay Bale, Erosion Control Mix Berm
- Straw Wattle
- Wetland
- Prime Wetland
- Wetland Impact (PERM)
- Wetland Impact (TEMP)

- Stream Centerline
- Stream Top of Bank
- Temporary Culvert
- Stonewall alignment
- Temporary Mat Bridge
- NH DOT Right-of-way
- Historical Sites
- Designated River Buffer 250'
- Conservation Lands
- 100 Year Floodplain

Structures
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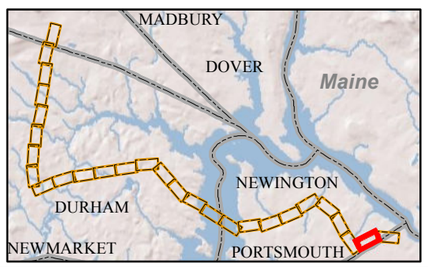
- Steep Slope BMPs
- Tree Clearing
- Stream Buffer
- 2ft Contour
- Tidal Buffer Zone
- Highest Observable Tide Line/Reference Line (4ft Contour)
- Mean Lower Low Water

0 75 150 300 Feet

1 inch = 150 feet



EVERSOURCE ENERGY

NORMANDEAU ASSOCIATES
ENVIRONMENTAL CONSULTANTS

Seacoast Reliability Project

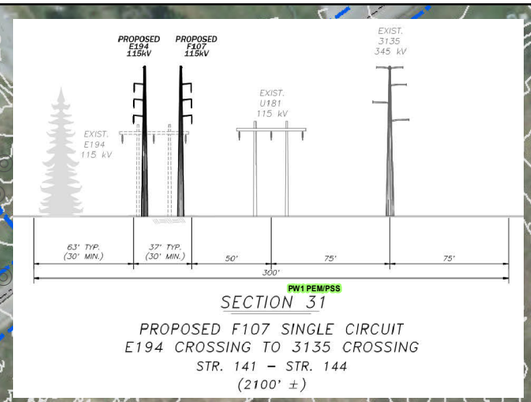
Revised Environmental Maps

STATE OF NEW HAMPSHIRE
SARAH D. ALLEN
No. 083
CERTIFIED WETLAND SCIENTIST

9/1/2017

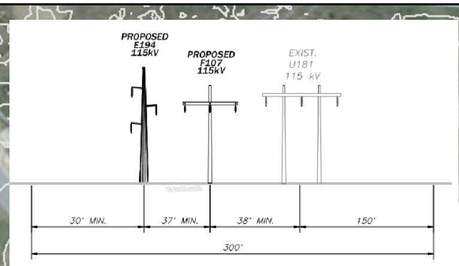
Path: J:\Projects\PSNH_F107\MXD\SRP_MapSet_AugSupplement.mxd

Wetland ID	Impact Type	Area (Sq. Ft.)
NS36 (n/a)	Temporary	45
NW35 (PEM1/SS1/FO1B)	Temporary	223
NW37 (PEM1/SS1E)	Temporary	544



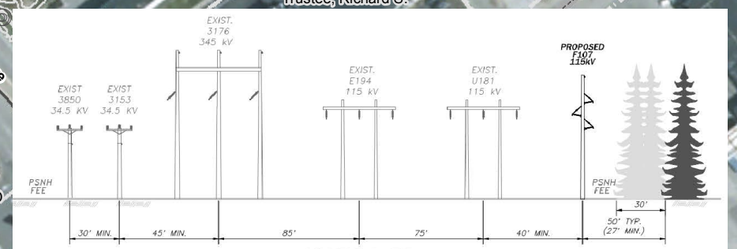
SECTION 31

PROPOSED F107 SINGLE CIRCUIT
E194 CROSSING TO 3135 CROSSING
STR. 141 – STR. 144
(2100' ±)



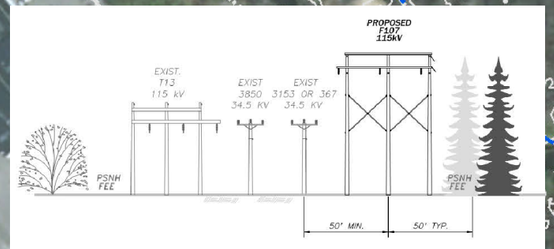
SECTION 32

PROPOSED F107 SINGLE CIRCUIT
3135 CROSSING TO U181 CROSSING
STR. 145 – STR. 146
(100' ±)



SECTION 33

PROPOSED F107 SINGLE CIRCUIT
NEWINGTON S/S TO SCHILLER S/S
STR. 147 – STR. 149
(900' ±)



SECTION 34

PROPOSED F107 SINGLE CIRCUIT
SCHILLER S/S TO PORTSMOUTH S/S
STR. 150 – STR. 151
(1200' ±)

Parcel boundary and owner data were acquired from municipal databases as of May 2016.

Service Layer Credits: Copyright:© 2014 Esri, granit.edu aerial photos 2015.

Date : 9/14/2017

Project No: 22860.003

Drawn By: dpelletier

Town Boundary
Approximate Parcel Boundary
PSNH Fee Area
Project Corridor
Work Pad

Roads
Local
Not Maintained
Private
State
Railroad

Existing Str (Remain)
Existing Str (Removed/Modified)
Access Roads
Underground Cable
Silt Curtain
Silt Fence, Hay Bale, Erosion Control Mix Berm
Straw Wattle
Wetland
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Temporary Culvert
Stonewall alignment
Temporary Mat Bridge
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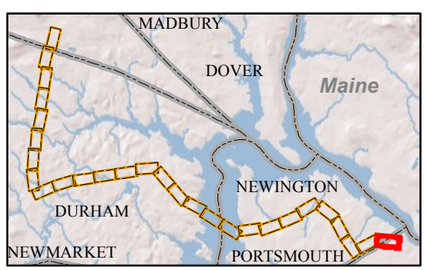

EVERSOURCE ENERGY

Seacoast Reliability Project

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Path: J:\Projects\PSNH_F107\MXD\SRP_MapSet_AugSupplement.mxd

NORMANDEAU ASSOCIATES
Environmental Consultants

Seacoast Reliability Project
Avoidance and Minimization

Best Management Practices and Construction Plan for Protected Wildlife and Plants

Prepared For:
Public Service Company of New Hampshire
d/b/a Eversource Energy
780 North Commercial Street
Manchester, NH 03101

Dated:
September 15, 2017

Prepared By:
Normandeau Associates, Inc.
25 Nashua Road
Bedford, NH 03110
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Table of Contents

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List of Tables

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1.0 Introduction

This document summarizes best management practices (BMPs) and time-of-year (TOY) considerations for construction of the Seacoast Reliability Project to avoid and minimize impacts to protected wildlife and plant resources. The resources described herein are those that must be considered to meet permitting requirements; they are based on the regulatory status of the resources and input from the resource agencies (US Fish and Wildlife Service (USFWS), National Marine Fisheries Service (NMFS), NH Fish and Game Department (NHFG), NH Natural Heritage Bureau (NHB), and NH Department of Environmental Services (DES). The TOY and BMPs incorporate standard practices for these agencies, and have been reviewed by NHFG and NHB. Because the permit application review process is ongoing and authorizations for construction have not been issued yet, the measures described herein may be subject to modification. Additional input from the agencies will be incorporated if presented, and further adjustments may also be required as part of the final permit conditions.

As set forth in the Site Evaluation Committee (SEC) Application and other permit applications, the Project has been designed to avoid and minimize impacts to protected plant and wildlife species to the extent practicable. This document describes the TOYs and (Best Management Practices) BMPs that apply to each species of concern. Once approved, the locations where the TOY restrictions and BMPs apply will be depicted on the construction plan set.

Due to the complexity of the construction sequence of work, the focus of this construction BMP/TOY plan will be to avoid and mitigate impacts. Attachment 1 has a simplified summary table of TOY Restrictions, restricted activity and avoidance & BMPs.

2.0 TOY Clearing, Construction Plan and BMPs

The following restrictions are organized by species or groups of species. The restricted activities have been broadly grouped into *Clearing*, *Site Preparation*, and *Construction*. *Clearing* includes cutting of trees 3 inches in diameter at breast height (dbh) or larger, mowing, and/or brush-cutting of vegetation less than 3 inches dbh. If only one type of clearing is restricted, this is noted. *Site Preparation* includes installation of access roads and crane pads; preliminary route clearing and preparation in Little Bay, installation of erosion and sediment controls, placement of timber mats, and installation of exclusion fencing if needed; and blasting, if needed. *Construction* includes excavation, transport of construction-related materials, and assembly and installation of structures and the submarine cable within the prepared access roads and construction envelopes, and site work to initiate restoration. Pedestrian access for inspection or hand work is not restricted unless specifically noted.

2.1 Wildlife Resources

General Wildlife Avoidance Measures

Restriction Dates: Follow these recommendations at all times
Restricted Activity: Clearing, Site Preparation, and Construction
Regulatory Basis: Permit Requirements

Description: General avoidance measures and best management practices apply throughout the Project to minimize impacts to wildlife resources in general. Minimizing impacts to all wildlife and wildlife habitat supports intact habitat systems which in turn support threatened and endangered species. These measures are also important to meeting the Project's wetland and stormwater permitting requirements. Construction Maps will include indicators of known and potential wildlife habitat and should be consulted in concert with the general BMPs and other protection measures.

General BMPs to Minimize Wildlife/Wildlife Habitat Impacts

- Limit removal of vegetation to that necessary for construction of the project; this will leave associated wildlife habitat as intact as possible
- Adhere to the General BMPs to Minimize Vegetation Impacts (Section 2.3, below)
- Adhere to General Vegetation Restoration BMPs (Section 2.3, below)
- Adhere to Erosion Prevention and Sediment Control Plans and BMPs to prevent the degredation of wildlife habitat in areas adjacent to and downstream of work areas
- Utilize wildlife friendly erosion control where possible to reduce the risk of entrapment
- Diligently sweep work areas for rare and other species prior to establishing work areas and utilize exclusion techniques to reduce re-entry by previously removed species

Active Bald Eagle Nests

Restriction Dates: March 1 - July 31
Restricted Activity: Clearing, Site Preparation, and Construction within Nest Buffer
Regulatory Basis: Federal Migratory Bird Treaty Act; State Endangered Species Act – Threatened species

Description: As of Spring 2017 there are no known active bald eagle nests within ¼ mile of the project area. Prior to initiating work during the nesting season, a survey will be conducted for active nests within or adjacent to the ROW. If there is a break in work during the early portion of the nesting season (March 1- April 15), a repeat survey may be required before initiating the next stage of work.

Per the USFWS National Bald Eagle Management Guidelines, no work shall be done within 1/4 mile of an active bald eagle nest from March 1st to July 31st. However, adjustments to this recommended buffer may be negotiated with regulating agencies, based on the conditions of the habitat surrounding the nest, level of disturbance to which nesting eagles may already be habituated, and the nature, timing, and duration of the activities that will disturb the nest. Note that blasting may require a larger buffer distance. Depending on when nesting is initiated, the restriction dates may also be adjusted. The fledglings of early nesters may be done using the nest before July 31. Disturbance considerations are not required for inactive nests; however, inactive nests may not be removed without agency approval.

Active Raptor Nests

Restriction Dates: Varies by Species, see Table 1
Restricted Activity: Clearing, Site Preparation, and Construction within Nest Buffer
Regulatory Basis: Federal Migratory Bird Treaty Act

Description: There are no known active raptor nests within the Right-of Way. Prior to initiating work during the nesting season, a survey will be conducted for active nests. If there is a break in work during the nesting season, a repeat survey may be required before initiating the next stage of work.

Nesting season dates for raptor species that nest in New Hampshire are given in Table 1. A suitable buffer distance to protect active nests from disturbance depends on the types of intervening features between the nest; the location, nature, timing, and duration of the disturbing activity; and the level of disturbance that the nest currently experiences to which the resident nesting birds may be habituated. Appropriate buffers distances for individual nests subject to disturbance from clearing, site preparation, or construction will be negotiated with the regulatory agencies. The nesting season dates are guidelines, and should be confirmed with site-specific observations as needed. Note that while disturbance considerations are not required for inactive nests, they may not be removed without agency approval.

Table 1. Raptor species nesting dates and nest buffer zones*

Species	Nesting Season Dates	Buffer Distance
Osprey	April 15 – August 15	0.25 miles
Sharp-shinned hawk	April 15 – July 25	0.25 miles
Cooper's hawk	April 1 – June 30	0.25 miles
Red-shouldered hawk	April 1 - June 25	0.25 miles
Broad-winged hawk	May 1 – July 30	0.25 miles
Red-tail hawk	March 15 – July 15	0.25 miles
American kestrel	April 1 – July 25	0.15 miles

*Based on literature reports

Northern Long-eared Bat

Restriction Dates: June 1 – July 31
Restricted Activity: Clearing (Cutting and felling of trees 3 inch dbh or larger)
Regulatory Basis: Federal Endangered Species Act – Threatened Species; State Endangered Species Act – Threatened Species

Description: The tree clearing standards put forth in the February 16, 2016 final 4(d) rule pertaining to the northern long-eared bat (NLEB) will be followed. To avoid take, based on this directive, no trees can be cleared within ¼ mile of known, occupied hibernacula at any time of the year, or within 150 feet of a known, occupied maternity roost during the June 1 – July 31

pup season. There are no known, occupied hibernacula or maternity roost trees within the applicable radii of the Project.

Based on U.S. Army Corps of Engineers (Corps) permit conditions associated with previous similar projects, Eversource is planning to proactively conduct acoustic monitoring during the 2017 NLEB survey window which runs from May 15 through August 15. The final 4(d) rule does not require a project proponent to identify either roost trees or hibernacula within the project area, only to adhere to the recommended cutting restrictions if those features are already known to be present, based on agency held records.

If NLEBs are identified during a survey, then TOY cutting restrictions may be required in locations where NLEB are detected.

Northern Black Racer

Restriction Dates: October 15 - April 30 (known hibernacula), April 15 through October 30 (general habitat)
Restricted Activity: Clearing, Site Preparation, and Construction
Regulatory Basis: State Endangered Species Act – Threatened Species
Description: Hibernacula - From October 15 through April 30 when racers may be entering, using, or exiting their hibernacula, no ground disturbing activities can take place in any location known by NHFG to host a hibernaculum. Surveys to date have not identified hibernacula in the Project area.

General Habitat - During the active season from April 15 through October 30, impacts to all species of snakes will be minimized by searching areas about to be impacted by clearing or site preparation for snakes, and removing them to a safe, suitable location close to their point of capture. Snake searches and removal will be conducted by the Environmental Monitor. Construction areas that are cleared of snakes must be fenced to prevent (re)entry by snakes or searched daily to find and remove snakes as needed during construction. The preferred approach will be determined by the Environmental Monitor, based on how long construction activities will last in a certain area. Silt fencing can be used to exclude snakes, but fencing products specifically designed to exclude reptiles from construction zones are also commercially available and are designed for ease of installation and reuse. If fencing is used, it will be removed as soon as construction is complete and snakes can safely enter the area.
For black racers, BMPs also include contractor training on recognizing this species and taking the appropriate actions to protect them. All personnel must understand and implement the appropriate protective actions and notifications.

Blanding's and Spotted Turtle

Restriction Dates: April 15 through October 15, action varies by resource
Restricted Activity: Clearing, Site Preparation, and Construction
Regulatory Basis: State Endangered Species Act – Endangered Species/Threatened Species

Description: Minimizing impacts to Blanding's and spotted turtles requires 1) minimizing the extent of in-water work during all seasons, 2) avoiding wetland impacts to the extent practicable in all seasons, 3) avoiding crushing turtles in wetlands and uplands during the April 15 – October 15 active season, and 4) avoiding impacts to nesting habitat from May 25 through October 15. Upland work conducted between October 15 and April 15 is unlikely to impact turtles as they are restricted to their wetland hibernacula during this part of the year. Blanding's turtles generally overwinter in large open water wetlands (marshes, ponds), while spotted turtles generally use wetlands with smaller deep water areas. Actions for each habitat type are described below.

Wetlands, including Ponds: Impacts to spotted and Blanding's turtles in wetlands will be minimized by avoiding and minimizing impacts to open water and mucky substrates in all seasons to the greatest extent practicable. During the active season for turtles, impacts will be minimized by searching woody and grassy wetland vegetation within the construction zone for turtles prior to clearing and site preparation, and removing them to a safe, suitable location close to their point of capture. Construction areas that are cleared of turtles must be fenced to prevent (re)entry by turtles or searched daily to find and remove turtles as needed during construction. The preferred approach may be based on how long construction activities will last in a certain area. If construction mats are used to cross an expanse of open water, the mats will be stacked in such a manner as to create underwater gaps that allow passage of aquatic animals, such as turtles. During the hibernation period, no turtle searches will be conducted as the likelihood of finding hibernating turtles is low, and there is no information about how to identify a suitable alternate location for hibernation.

Uplands: A search of upland vegetation in the proposed active construction area will be required in all ROW areas that are within 3,280 ft (0.6 miles) of a wetland suitable for spotted and Blanding's turtles as determined by the Environmental Monitor. Any turtle found will be moved to a safe, suitable location close to their point of capture prior to clearing or site preparation activity. Qualified, trained personnel (the Environmental Monitor) will search for, and move, turtles as needed. Construction areas that are cleared of turtles must be fenced to prevent (re)entry by turtles or searched daily to find and remove turtles as needed during construction. The preferred approach may be based on how long construction activities will last in a certain area.

Nesting Habitat: Habitat reviews to date have not identified likely turtle nesting areas within the ROW. If any are identified, symbolic fencing placed around the areas during the nesting season to keep all work activities from encroaching. Symbolic fencing will be designed to let turtles access these areas freely. If potential nesting habitat is part of an access road or construction pad, it will be searched for turtles prior to initiating construction activities then fenced to keep turtles out during construction. Fencing will be removed as soon as construction is complete and turtles can safely enter the area. Silt fencing can be used to exclude turtles, but fencing products specifically designed to exclude turtles from construction zones are also commercially available and are designed for ease of installation and reuse. If fencing is used, it will be removed as soon as active construction is complete and turtles can safely enter the area.

For spotted and Blanding's turtles, BMPs also include contractor training on recognizing these species and taking the appropriate actions to protect them. All personnel must understand and implement the appropriate protective actions and notifications.

New England Cottontail

Restriction Dates: March 31 through June 21
Restricted Activity: Clearing
Regulatory Basis: State Endangered Species Act – Endangered Species/Threatened Species

Description: New England cottontail (NEC) currently is not known to occur in the SRP area, but the NHFG is actively managing several sites within and near the ROW for this species. In locations identified as NEC habitat management areas, efforts will be made to minimize the amount of time that the ROW will be devoid of the brushy cover that NECs require. To the extent practicable, vegetation will be cleared between March 31 – June 21, or as otherwise directed by NHFG given the site specific considerations at these locations, by hand cutting or using a "brontosaurus" or similar equipment, and leave stumps and root systems in place. These practices will allow ample time during the growing season for woody species to re-sprout and provide necessary cover.

2.2 Fisheries

Little Bay
Restriction Dates: Proposed January 1 – August 31
Restricted Activity: Construction (submarine cable installation –preliminary site preparation will begin August 1)
Regulatory Basis: Federal Endangered Species Act; State Endangered Species Act

Description: The construction window for submarine cable installation is as follows: route clearing and preparation between August 1 and September 1; cable removal between September 1 and 15; installation of new cable via jet plow and handjetting between September 15 and December 31, which was identified as the best window to avoid or minimize impacts to many animals, eelgrass, and summer recreation. The DES prescribed dredge window is between November 15 and March 15, but this timeframe is not feasible for the SRP because the cable cannot be installed in freezing temperatures due to the difficulty in cable handling and warranty risks. Each of the three jet plow cable installations will occur within an estimated 7 to 13-hour period and result in a mobile, ephemeral plume of suspended sediments that is expected to dissipate approximately 2 hours after the jet plow pass is completed. There will be approximately a week between each cable installation. All practicable measures will be taken to minimize sediment disturbance and suspension in the water column. These will include: manipulating the jet plow speed and water pressure to maintain minimum sediment suspension in different substrate types within the proposed tidal constraints; maintaining silt curtains around the entire hand jetting area on the west shore, and as far seaward as effective on the east shore; where current prohibits silt curtains on the east shore, handjetting will be

limited to periods of low current during slack tides; maintaining erosion and scour protection in the salt marsh work areas during construction and after restoration; and maintaining on-shore erosion controls during construction to avoid sediment entering the bay.

Table 2. Seasons in which protected fish, diadromous fish, and Essential Fish Habitat species are likely to be found in Little Bay. Shading indicates species and seasons that will be affected by the SRP Fall and Winter work window in Little Bay.

Species	Designation*	Life Stage	Spring+	Summer+	Fall+	Winter+
Protected Species						
Shortnose Sturgeon	E,E - extirpated	Adults				
Atlantic Sturgeon	T	Adults & juveniles				
American Eel	SC-A1	Juveniles	X	X		
		Adults	X	X	X	X
Diadromous Fish						
Alewife (Little Bay)		Juveniles		X	X	
		Adults	X	X		
Blueback Herring (Oyster River)	SC-A1	Juveniles	X	X	X	
		Adults	X	X		
American Shad	SC-A1	Juveniles		X	X	
		Adults	X	X		

(continued)

*Protected species designations:

E,E – NH Endangered, Federally Endangered

T – NH Threatened

SC – NH Species of Special Concern – A1 indicates species is Near-Threatened and susceptible to further decline; B indicates a Responsibility Species, with most of the population existing in NH.

+Spring = Mar-May, Summer = Jun-Aug, Fall = Sep-Nov, Winter = Dec-Feb

Table 2. (cont).

Species	Designation*	Life Stage	Spring+	Summer+	Fall+	Winter+
Rainbow Smelt (Little Bay)	SC-A1	Juveniles	X	X	X	
		Adults	X			X
Sea Lamprey (Little Bay)		Juveniles	X			X
		Adults	X			
Essential Fish Habitat						
Atlantic Cod		Eggs	X		X	X
Atlantic Halibut		Eggs	X		X	X
		Spawning Adults	X		X	X
Bluefish		Juveniles		X	X	
		Adults			X	
Pollock		Larvae	X		X	X
White Hake		Eggs		X		
		Juveniles	X	X	X	

(continued)

*Protected species designations:

E,E – NH Endangered, Federally Endangered

T – NH Threatened

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+Spring = Mar-May, Summer = Jun-Aug, Fall = Sep-Nov, Winter = Dec-Feb

Table 2. (cont).

Species	Designation*	Life Stage	Spring+	Summer+	Fall+	Winter+
Windowpane Flounder		Eggs	X	X	X	X
		Larvae	X	X	X	X
		Spawning Adults	X	X	X	X
Winter Flounder		Eggs	X			X
		Larvae	X			
		Spawning Adults	X			X
Yellowtail Flounder		Larvae	X			

*Protected species designations:

E,E – NH Endangered, Federally Endangered

T – NH Threatened

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+ Spring = Mar-May, Summer = Jun-Aug, Fall = Sep-Nov, Winter = Dec-Feb

Fresh Water

Restriction Dates: None

Restricted Activity: Clearing

Regulatory Basis: State Endangered Species Act – Species of Special Concern

Description: Fish species in freshwater streams, such as the Oyster River and the perennial streams within the SRP corridor have the potential to be affected by habitat changes from clearing and site preparation. No direct impacts to the Oyster River or Longmarsh Brook are proposed, which are known to support the swamp darter and banded sunfish, respectively (both State Species of Special Concern), as well as diadromous fish (see Table 3). Clearing along the Oyster River and Longmarsh Brook will be minimized where practicable, and conducted by hand with climbing crews when unavoidable, with the purpose of minimizing disturbance to the stream banks and associated vegetation. American eel is also known to occur on LaRoche Brook, where temporary bridges are proposed to avoid stream impacts and allow unimpeded fish passage. The temporary bridge supports will be placed as far from the stream banks as possible to avoid bank disturbance. Shrubs and herbaceous vegetation plus root systems of cut trees will be left in place to further minimize stream bank disturbance along all streams where practicable.

Table 3. Seasons in which protected fish species and diadromous fish are likely to be found in freshwater habitats in the SRP area.

Species	Designation*	Life Stage	Spring+	Summer+	Fall+	Winter+
Protected Species						
Banded Sunfish	SC- A1B		X	X	X	X
Swamp Darter	SC-A1	Adults	X	X	X	X
Diadromous Fish						
Alewife (Oyster River)	SC-A1	Juveniles	X	X	X	
		Adults	X	X		
American Eel	SC-A1	Adults	X	X	X	X
Blueback Herring (Oyster River)	SC-A1	Juveniles	X	X	X	
		Adults	X	X		
American Shad	SC-A1	Adults	X	X		
Rainbow Smelt (Oyster River)	SC-A1	Adults	X			
Sea Lamprey (Oyster River)	SC-A1	Adults	X			

*Protected species designations:

E,E – NH Endangered, Federally Endangered

T – NH Threatened

SC – NH Species of Special Concern – A1 indicates species is Near-Threatened and susceptible to further decline; B indicates a Responsibility Species, with most of the population existing in NH.

+ Spring = Mar-May, Summer = Jun-Aug, Fall = Sep-Nov, Winter = Dec-Feb

2.3 Botanical Resources

General Avoidance Measures

Restriction Dates: Follow these recommendations at all times
Restricted Activity: Clearing, Site Preparation, and Construction
Regulatory Basis: Permit Requirements

Description: General avoidance measures and best management practices apply throughout the Project to minimize impacts to botanical resources in general. Minimizing impacts to all plants and plant communities provides intact habitat systems to support threatened and endangered plants. These measures are also central to meeting the Project's wetland and stormwater permitting requirements.

General BMPs to Minimize Vegetation Impacts

- Limit removal of vegetation to that necessary for construction of the project.
- Limit tree clearing to the minimum required width to meet safety clearances, leave root systems in place, except over underground installations or where other earthwork must be conducted. Leave herbaceous and shrub vegetation intact wherever practicable.
- Where practicable, fell trees within the ROW to minimize the potential for off-ROW vegetation damage.
- Maintain vegetation along stream banks and within wetlands to the extent practicable.
- Control the spread of invasive plants:
  - Environmental Monitor will identify existing invasive species in the work area.
  - Train construction contractors to identify common invasive plant species.
  - Perform regular inspection and cleaning of construction equipment and vehicles on the right-of-way as appropriate where invasive species are present.
  - If invasive species are cut due to construction activity, cut when dormant or prior to seed set, and dispose of in a manner and location that precludes spread.
  - Use soil from local sources. To the extent possible, match soil texture with soil texture found in impacted habitat. Any soil fill or topsoil used will be inspected at the source and be certified as weed free by the Environmental Monitor before being brought on site.
  - Use certified weed and invasive-free straw bales for erosion and sediment control.
  - Re-vegetate disturbed areas quickly using seed mixes that are devoid of invasive species.
- Follow erosion control BMPs during construction. Sediment and erosion control plans will be developed that specify the types of BMPs necessary. Depending on the site, BMPs may include installation of silt fence, straw wattles, mulch/stump grinding berms, straw bales, or check dams, and covering bare soils with mulch, blown straw, bonded fiber matrix or fiber rolls to protect drainage ways and streams from sediment runoff.
- Use BMPs for minimizing soil rutting and compaction.

General Vegetation Restoration BMPs

- Revegetate disturbed areas in a timely manner once construction is complete in specific areas.
- When restoring impact areas without rare, threatened, or endangered (RTE) plant species, use NHB-approved native seed mixes . Seed mix should be selected based on site conditions (e.g., upland vs wetland) and should contain common native species associated with the impacted habitat.
- Perform post-construction inspection or monitoring in restored habitats for a period of two years following completion of construction activities in that location.

Eelgrass (*Zostera marina*)

- Conduct a field survey for eelgrass the summer before construction in a band approximately 500 feet to either side of the cable route.
- Review eelgrass mapping efforts since 2015 to evaluate changes in distribution in the vicinity of the project.
- Conduct cable installation to minimize suspended sediments (See Section 2.2 Fisheries, Little Bay section)

Endangered Plants and Exemplary Communities

Restriction Dates: Clear/construct in winter, over snow and frozen ground to extent practicable
Restricted Activity: Clearing, Site Preparation, and Construction
Regulatory Basis: State Endangered Species Act – Endangered Species /Exemplary Communities

Description: In addition to the general avoidance measures listed above, the following practices will be instituted to avoid impacts to rare species and communities wherever practicable.

General avoidance measures

- A contractor training program will be developed prior to construction activities to familiarize the crews with the locations, species and habitats that will require special consideration. This will be the responsibility of the Environmental Monitor or a qualified botanist.
- The Environmental Monitor will discuss threatened and endangered plant issues at the morning tailboard meetings with Contractors for work taking place in sensitive areas.
- Clear and construct in sensitive plant locations when the ground is frozen and snow cover is present, to the extent practicable.
- If clearing under frozen conditions is not practicable, no equipment or matting will be allowed within areas supporting the rare species.

- If construction takes place when the ground is not frozen, use elevated matting to cross any area of perennial RTE plants to minimize impacts.

Crested Sedge *(Carex cristatella)*

- Prior to construction, locations of known crested sedge will be resurveyed and flagged with coded flagging by a qualified botanist. Any newly discovered populations will be flagged for avoidance and reported to NHNHB. If avoidance of any populations is not possible, consult with NHNHB for recommendations.
- Fence any known sensitive areas adjacent to impact areas as needed to prevent impacts beyond the work zone, and install generic caution signs along construction access roads to mark areas of resource sensitivity.
- If project constraints require construction to be performed during the growing season, perform work after the species has set seed, to the extent practicable.
- Approximately 60 square feet are currently anticipated to be temporarily impacted with an access road. Place access road on raised timber mats to minimize ground compaction.
- At the conclusion of construction, restore the native topsoil that was present prior to construction.
- Allow crested sedge location to reseed naturally without seed mix, unless directed by NHNHB to collect seed from adjacent (non-impacted plants) for use during restoration.
- Implement long-term population monitoring according to a monitoring plan approved by NHNHB.

Salt Marsh

- All work in salt marshes, including impacts and restoration, will be conducted according to the approved Salt Marsh Restoration Plan and overseen by an Environmental Monitor
- Prior to construction, salt marsh limits and location of permitted work areas will be flagged with coded flagging by a qualified botanist.
- Fence any known sensitive areas adjacent to permitted work areas as needed to prevent impacts beyond the work zone, and install generic caution signs along construction access roads to mark areas of resource sensitivity.
- Implement long-term monitoring according to the Salt Marsh Monitoring Plan.

Attachment 1

Table A.1. Summary Table by Species

Species	Known Presence in Project Area?	TOY Restrictions	Restricted Activity	Avoidance & BMPs
Wildlife Species				
Bald Eagles	No known nests in or within ¼ mile of project	March 1 – July 31	Clearing, Site Prep., Construction	Survey for active nests prior to Project initiation (clearing, site prep, construction); restrict project activities near nests as applicable
Other Raptors	No known nests in or within ¼ mile of project	Generally April – July; May and August depending on species	Clearing, Site Prep., Construction	Survey for active nests prior to Project initiation (clearing, site prep, construction); restrict project activities near nests as applicable
Northern Long-eared Bat (NLEB)	No known, occupied hibernacula or maternity roost trees	June 1 – July 31	Clearing	Acoustic surveys planning summer 2017; tree clearing timing where detected; clearing planned for fall/winter
Northern Black Racer	No known hibernacula; likely present	Hibernacula: Oct 15 – Apr 30 General: April 15 – Oct 30	Clearing, Site Prep., Construction	Site searches prior to active construction and site prep activity; site searches and removal as needed during construction
Blanding's & Spotted Turtles	Known in proximity to project; habitat present	April 15 – October 15	Clearing, Site Prep., Construction	Minimizing in-wetland work; avoiding/minimizing wetland impacts; active construction site searches near habitat; site review for nesting areas and avoidance

(continued)

Table A.1. (cont).

Species	Known Presence in Project Area?	TOY Restrictions	Restricted Activity	Avoidance & BMPs
New England Cottontail (NEC)	No known populations but habitat being managed for NEC	March 31 – June 21	Clearing	Minimize removal of brushy growth; hand cut or "mow" with "brontosaurus"-type equipment; leave stumps and roots for regrowth
Fisheries				
Little Bay Species	Confirmed or assumed listed and EFH species	Jan 1 – Jul 31	Underwater cable construction; cable removal	Timed construction window Sept 1 – Dec 31 to minimize impacts ; method allows for rapid installation; jetplow will occur over 3 days, each separated by a week; the associated sediment plume will be ephemeral and will affect only a percentage of the crossing at any given time; handjetting will be contained within silt curtains on tidal flats; where current prohibits silt curtains on the east shore, handjetting will be limited to periods of low current during slack tides.
Freshwater Fish/Species	Assumed in Oyster River and Longmarsh and LaRoche Brooks	None	Clearing	Minimize clearing impacts near subject waters; direct impacts to/over Oyster River and Longmarsh Brook avoided; temporary bridges proposed for 2 crossings over LaRoche Brook.

(continued)

Table A.1. (cont).

Species	Known Presence in Project Area?	TOY Restrictions	Restricted Activity	Avoidance & BMPs
Botanical Resources				
Crested sedge (*Carex cristatella*)	Yes in specific patches in Durham ROW area	Growing Season	Clearing, Site Prep., Construction	Resurvey populations/patches; identify with fencing; avoid and use winter construction/clearing where possible; timber mats where unavoidable for access roads; natural reseeding and monitoring
Salt Marsh	Small patches near Durham/ Newington shores of Little Bay	Restoration complete by Nov. 1	Underground/underwater cable construction	Adhere to approved Salt Marsh Restoration Plan

NORMANDEAU ASSOCIATES
Environmental Consultants

Seacoast Reliability Project

Revised Little Bay Impact Assessment Report

Prepared For:
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d/b/a Eversource Energy
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September 15, 2017

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1.0 Introduction

This document describes revisions to the submarine transmission cable design for Little Bay and its immediate onshore burial prior to returning aboveground. The revisions that affect the environmental assessment are based on reducing the cable burial depth in the channel of Little Bay from 8 feet to 5 feet, and additional information on nearshore burial depths. The following report sections describe the relevant design changes, design alternatives that were considered and rejected, environmental impacts from the revisions, and changes to application fees and mitigation costs as a result of the revised design.

2.0 Design

The revised design is an advancement and modification of the design submitted in the March 29, 2017 amendment.

Tidal Datum

For regulatory and design purposes, Eversource needed to establish the various tide levels expected at the site. A site-specific tidal datum was derived from tide gages deployed by the Project in combination with site observations and calculations using National Oceanic and Atmospheric Administration's Vdatum model. Most important for this project are the Highest Observable Tide Line (HOTL) and Mean Lower Low Water (MLLW). See Appendix A for the derivation of the site-specific datum.

Channel Burial Depth

The revised design includes a reduction in the burial depth in the deeper sections of Little Bay ("the channel") from 8 feet to 5 feet of cover. The remainder of the submarine cable will be buried with 3.5 feet (42 inches) of cover as originally proposed. A burial depth of 42 inches is the minimum required to meet the National Electric Safety Code for this cable without supplemental protection. The proposed deeper burial depth in the channel is to provide further protection for the cable against boating activities (anchors and dragging) and the risk of scour as a result of currents in the channel. The 8-foot depth originally proposed is common in active shipping and navigational channels, which are typically maintained by the US Army Corps of Engineers. In upper Little Bay, the boat traffic is predominantly smaller working and recreational vessels which will carry lighter anchors, and, as it is not a federally maintained channel, dredging does not occur. Review of historic navigation charts indicates that the channel is relatively stable, with no detectable changes in contours. This is also supported by the degree of substrate compaction observed in the channel during sediment vibratory coring, again indicating minimal changes in channel morphology in this area. After evaluation of these conditions, the Project determined that the 5-foot burial depth was adequate protection, and had the advantage of disturbing less sediment during installation.

Nearshore Cable Protection

The revised design also reflects new information collected by the marine contractor, Kokosing Industrial, Durocher Marine Services (Durocher). Durocher conducted site specific probes every 10 feet in the nearshore areas of the cable route that were outside of the 2013 sub-surface profiling conducted by Ocean Surveys Inc. (OSI) for the Project. The 2013 OSI survey indicated no bedrock or large buried objects within the cable route but was unable to survey within approximately 250 feet of shore given the shallow nearshore conditions. In June 2017, Durocher used probes to measure the surface sediments and the depth to refusal from the shore to 40 feet seaward beyond the depth where adequate soft sediments were identified by the probes. Adequate depth was defined as 48 inches, to allow burial of the 5-inch diameter cable and 42 inches of sediment over the cable.

The results of the nearshore survey are provided in Appendix A, and show that a 48-inch burial depth becomes available approximately 140 feet from the HOTL on the west shore and 290 feet from HOTL on the east shore. In the areas where bedrock is too shallow to allow a 42-inch burial, several treatments are proposed. Close to shore, trenches will be cut into the bedrock as necessary to bury the cable with adequate protection. This will include the area under salt marsh and approximately 10 feet beyond. The trenching will be conducted with a hoe ram or a rotary cutter, depending on the integrity of the rock. The trenching will be conducted in the dry, during low tide periods to minimize noise impacts to aquatic organisms. No blasting will occur.

Below the trenching zone, the cables will be covered with concrete mattresses to protect them from human activities (boating, fishing, vandalism) and natural events, primarily damage from ice. The concrete mattresses are built of concrete blocks interlinked to form a mat approximately 8 feet wide and 20 feet long. Each can vary in thickness from 4.5 inches to 9 inches. The Project is evaluating the feasibility of using thinner mattresses, but for this design, is proposing to use the thickest mattress, 9 inches, to assess a "worst-case" condition. The design specifies 36 inches of "overhang" of concrete mattress beyond the cable to adequately protect it. On the west shore, the cable spacing is positioned so that a single mattress covers each cable to minimize the risk of inadequate coverage of each cable since the level of horizontal precision for installation of heavy, unwieldy cable at the starting end is on the order of a foot, not inches. Therefore, where they are closest to the shore on the west side, the mattresses will affect an area 24 feet wide and the cables will be 8 feet apart. On the east shore, the installers can be a little more precise, so the design uses a minimum cable spacing of 6 feet in the intertidal zone.

The concrete mattresses are currently proposed to be 9 inches thick and will weigh approximately 8,000 pounds. In the locations where the sediments are deeper, the weight and honey-comb configuration of the mattresses are expected to result in the mattresses sinking into the sediments. Higher in the intertidal zone, the substrates are firmer and have less depth to bedrock, therefore the mattresses are not expected to settle as much. In these areas, they are expected to function as hard substrate and become colonized with macroalgae and associated oysters, mussels, crabs and snails typical of rocks and ledge found in the intertidal zone of Little Bay. Infaunal organisms are expected to colonize the soft substrate exposed in spaces between the individual blocks.

3.0 Alternatives Analysis

Discussions of alternatives for crossing Little Bay are included in the original SEC application (see Section 301.03, Section (h)(2), and the Pre-Filed Testimony of Mr. James Jiottis, beginning on page 4). This current document addresses additional components of the revised design, primarily the concrete mattresses. Alternatives evaluated and rejected as a substitute for concrete mattresses include:

- Trenching further into the tidal flats was considered. This concept includes trenching a channel into the rock for each cable as deep as is needed to achieve the 42-inch burial depth. This concept was rejected for the challenges resulting from working in the lower intertidal zone. If conducted only in the dry, the project would have limited work windows for installation, mostly a few hours most days. Trenching in rock will be noisy, and work at night is not proposed to minimize neighborhood disturbance. If conducted from a barge, the project will have unnecessary sediment disturbance and potentially dangerous sound levels due to the percussive nature of hoe ramming and rock trenching.
- Blasting was briefly evaluated as a method of trenching that could be accomplished more quickly and efficiently. It was rejected because a blasting expert to Eversource advised that the minimum trench depth that could be reliably blasted was approximately 6 feet in order to imbed sufficient blasting compound to be effective and not blow out the top of the hole. This would create excess debris to be removed. Blasting in the dry would be a considerable disturbance to neighbors. Blasting underwater would create lethal conditions for fish with swim bladders and other aquatic organisms.
- Split pipes were also evaluated as a substitute for concrete mattresses. Split pipes are sections of half-pipes laid under the cable and bolted to half-pipes on top of the cable to provide additional protection. While needing less burial depth (a minimum of 1 foot of sediment over the top of the pipes), they would require trenching an additional 30 linear feet of the ledge in the intertidal zone, which becomes challenging and slower due to tides. They also take longer to install and are considerably more expensive than concrete mattresses.

4.0 Avoidance and Minimization

Avoidance measures to reduce impacts in the marine environment were addressed at the initial Project evaluation stage and are described in the original SEC application (see Section 301.03, Section (h)(2); the Pre-Filed Testimony of Mr. James Jiottis, page 20; and Appendix 34, the Natural Resource Impact Assessment). Because no further impacts to Little Bay occur under the revised design, this report does not address avoidance.

Several minimization measures are evident in the revised Project design, including a shallower burial depth in the channel; trenching to retain habitat for salt marsh; construction methods that reduce the duration and magnitude of underwater noise; and partial burial of the concrete mattresses to minimize their environmental effect.

Shallower Burial Depth in Channel

The primary environmental benefit of reducing the depth of burial in the channel from 8 feet to 5 feet is that less sediment will be suspended during the jet plowing process. The jet plow uses water jets on the leading edge of the plow blade to fluidize sediments while simultaneously laying the cable. The sediment dispersion model estimated that between 10 and 35% of the fluidized sediments go up into suspension during installation. Using the 25% assumed by the model, reducing the cable trench from 8 feet to 5 feet reduces the volume of material going into suspension by 38%.

Minimization of Salt Marsh Impacts

The concrete mattresses will be laid to avoid any permanent impacts to salt marshes. As currently designed, the mattresses will begin approximately 10 feet seaward of the toe of salt marsh habitat on both shores of Little Bay. The salt marshes will be temporarily impacted as the cables are buried beneath them during the installation process (see Salt Marsh Protection and Restoration Plan, Document 5 in the June 30, 2017 Supplement).

Minimization of Underwater Noise

The trenching work as proposed is a balance between reasonable working periods in the dry, and avoiding working in the water. Noise travels further in water and loud percussive noise can have adverse effects on aquatic organisms. The current design avoids those effects by trenching in the ledge in the "dry" when the tide is out, and using concrete mattresses to minimize need for trenching in the entire area where shallow ledge prohibits full burial depth. Blasting was also reviewed and rejected in part due to its risk of injury to aquatic organisms.

Partial Burial of the Concrete Mattresses

The adverse impacts of the mattresses lower in the intertidal zone where sediments are deeper but not enough to provide 42 inches of cover, are reduced because those mattresses are expected to become partially or fully embedded into the surrounding soft sediments. This is expected to correspond approximately with the mean lower low water (MLLW) line as shown on the Environmental Maps. Based on that line, an estimated 5 of 100 linear feet (95%) of concrete mattresses are expected to be flush or partially embedded on the west shore, and similarly 75 of 255 linear feet of mattresses (30%) of those on the east shore. Installing the concrete mattresses before the sediments become fully reconsolidated after the cable laying will also promote embeddedness.

5.0 Impacts to Little Bay Resources

Unavoidable impacts to marine and estuarine resources in Little Bay are presented as part of the full project impacts (Table 1) and specific to the estuary (Table 2). The extent of total impacts does not increase but permanent impacts increase from 5,336 square feet (sf) to 8,681 sf as a result of an increase in the number of concrete mattresses. Because the concrete mattresses are proposed within areas already proposed for temporary disturbance, the extent of temporary impacts decreases from 273,206 sf to 269,987 sf. See also the revised Wetland Permit Application in Document 8 in this current Project Supplement.

Table 1. Proposed wetland impacts by cover class and town. The highlighted cells indicate changes from previously reported impacts

	# Wetlands	Permanent Impact (SF)	Temporary Impact (SF)	Total (SF)
Madbury				
PEM/PSS	1	199	28,940	29,139
PSS	1	0	321	321
Sub-Total:	***2***	***199***	***29,261***	***29,460***
Durham				
E1UB (Subtidal)	1	0	49,832	49,832
E2US (Mud Flat)	1	2,380	115,292	117,672
E2EM (Salt Marsh)	1	0	943	943
E2RS (Rocky Shore)	1	1	67	68
PEM (Emergent/Marsh)	5	71	25,632	25,703
PEM/PSS	23	49	71,739	71,788
PEM/PSS/PFO	1	0	807	807
PEM/PSS/PUB	1	20	18,175	18,195
PEM (Wet Meadow)	8	17	7,502	7,519
PFO	3	26	4,514	4,540
PSS	11	20	16,366	16,386
PSS/PFO	4	0	9,488	9,488
Sub-Total:	***60***	***2,584***	***320,357***	***322,941***
Newington				
E1UB (Subtidal)	1	640	76,926	77,566
E2US (Mud Flat)	1	5,389	26,166	31,555
E2EM (Salt Marsh)	1	0	513	513
E2RS (Rocky Shore)	1	271	248	519
PEM (Emergent/Marsh)	2	133	16,500	16,633
PEM/PSS	8	192	62,614	62,806
PEM/PSS/PFO	3	0	9,718	9,718
PEM/PUB	2	0	976	976

(continued)

Table 1.(cont).

	# Wetlands	Permanent Impact (SF)	Temporary Impact (SF)	Total (SF)
PEM (Wet Meadow)	6	20	13,064	13,084
PSS	3	20	8,854	8,874
PSS/PFO	2	0	4,957	4,957
PSS/PUB	1	11	6,464	6,475
Sub-Total:	***31***	***6,676***	***227,000***	***233,676***
Portsmouth				
	0	*No Impacts*		
Sub-Total:	***0***	***0***	***0***	***0***
Total:	**SF**	**9,459**	**576,618**	**586,077**
	Acres	**0.22**	**13.24**	**13.45**

Table 2. Estuarine Impacts by wetland type and town

	Permanent Impact (SF)	Temporary Impact (SF)	Total Impact (SF)
Durham			
E1UB (Subtidal)	0	49,832	49,832
E2US (Mud Flat)	2,380	115,292	117,672
E2EM (Salt Marsh)	0	943	943
E2RS (Rocky Shore)	1	67	68
Sub-Total:	***2,381***	***166,134***	***168,515***
Newington			
E1UB (Subtidal)	640	76,926	77,566
E2US (Mud Flat)	5,389	26,166	31,555
E2EM (Salt Marsh)	0	513	513
E2RS (Rocky Shore)	271	248	519
Sub-Total:	***6,300***	***103,853***	***110,153***
TOTAL:	**8,681**	**269,987**	**278,668**

Bathymetry

It is expected that most concrete mattresses will become at least partially embedded in the bay bottom because the installation method will create at least a partial trench. Above MLLW, the concrete mattresses will likely rest on hard substrate and could protrude the full 9-inch thickness of the mattress. On the west shore this area is within an existing cut in a rocky shore, and will as a consequence appear similar in character to the surrounding shoreline. On the east shore, the substrates are predominantly shallow soft sediments, and while the protrusion will

likely be less, approximately 30% of the mattresses (those above MLLW) are likely to protrude above the natural sediments.

Below the MLLW line, the mattresses are expected to settle into the soft substrates and become largely embedded. No bathymetric change is expected in these locations.

Shoreline Stability

The concrete mattresses are proposed in the nearshore areas where some rocks already occur naturally, and where currents are relatively low. The mattresses are expected to be embedded in the area below MLLW where the deeper soft sediments occur, and mattresses placed above MLLW are expected to be elevated no more than 9 inches above the substrate. Normandeau visited both shores of the project area to look for any evidence of effects from long-shore waves or currents. The existing rocks in the intertidal zone show almost no sign of scour or erosion (Figures 1 and 2) which suggests the concrete mattresses will also not be subject to deposition or accretion. The other concern is potential effects from ice either lifting or cracking the mattresses during severe cold in winter. The concrete mattress manufacturers have indicated that the type of concrete mattresses proposed for this project are unlikely to be vulnerable to ice damage.

Figure 1.Lower intertidal zone on east shore.

Figure 2.Rocks in soft sediment on east shore

Eelgrass

No effects to eelgrass are anticipated because no eelgrass occurs in the immediate vicinity of the cable route and the proposed concrete mattresses. Although eelgrass was present along the western side of upper Little Bay in 1981, it has not been observed there since annual mapping began in 2002. It was mapped periodically within the cable route on the eastern shore, but has not been observed there since 2012. The Project will re-survey for eelgrass immediately prior to the cable installation in August 2018.

Should eelgrass recolonize Little Bay in the future, areas where concrete mattresses remain exposed would not support this species except in the areas between the individual blocks. Where mattresses become fully embedded by even a few inches of sediment, eelgrass could colonize the substrate directly above the individual blocks although the plants may be more subject to dislodgement by epibenthic organisms (e.g., horseshoe crabs, crabs, and lobsters) than plants growing in thicker sediments.

Macroalgae

Exposed concrete mattresses will provide suitable substrate for many species of attached macroalgae. In the intertidal zone, the mattresses will likely be colonized by fucoid algae, most likely species such as *Ascophyllum nodosum*, similar to the coverage observed on boulders and exposed bedrock in this area.

Salt Marsh

No changes to salt marsh impacts will occur as a result of the revised design.

Shellfish

Habitat for infaunal shellfish such as softshell clams and razor clams will be reduced by the footprint of the concrete mattresses. Both of these species burrow into the sediment to increasing depths with age (size) so although juveniles may settle on slightly embedded mattresses, they may not survive because of the inability to burrow to typical depths. Either species could successfully inhabit the exposed sediment between the concrete blocks.

Where concrete mattresses are exposed, surface-dwelling shellfish such as blue mussels ribbed mussels, and oysters, as well as barnacles could settle on the blocks. Juvenile oysters and blue mussels tend to settle on, and adjacent to, cohorts; therefore, if settled juveniles survive, they can become habitat for additional individuals even if sedimentation occurs after initial settlement. As mussels and oysters are known to occur intertidally in Little Bay, it is likely that colonization will occur.

Benthic Infauna

Where the concrete mattresses remain exposed (generally above MLLW), their use will result in a conversion of soft substrate habitat to hard substrate. Where the mattresses progressively become embedded, the conversion will be temporary, although the soft substrate above the mattresses will be a relatively thin layer such that the infaunal community may not support deep burrowers such as maldanid polychaetes (i.e., "equilibrium" stage communities); however, the infauna observed during the 2014 survey along the route included few deep burrowers so this habitat loss is expected to be minimal.

Epibenthos

Burrowing by horseshoe crabs, lobsters and other large crustaceans will be restricted directly over the mattresses but these species may make burrows along the edges of the mattresses so that the concrete blocks provide some shelter. This would occur primarily below MLLW.

Fish

Exposed concrete mattresses will reduce the preferred habitat for most demersal species expected to occur in the project area. As this area is very small relative to the available habitat and is primarily limited to the area above MLLW, this loss is unlikely to affect the ability of any fish species to use the bay for any purpose, including feeding, reproduction, and refuge. Where concrete mattresses are colonized with macroalgae, availability of refuge will be increased and this may slightly enhance survivorship for some juveniles of certain species (e.g., winter

flounder). Where concrete mattresses are embedded, fishes that feed on benthic infauna will continue to be able to feed once infaunal colonization has occurred.

6.0 Mitigation

The additional impacts resulting from the revised design are shown in Table 3. The In Lieu Fee proposed for the SRP is higher as a result of the increase in 3,345 sf of permanent impact from the concrete mattresses in tidal wetlands. The dollar value is estimated as $62,599.05 and $58,391.18 for tidal impacts in the towns of Durham and Newington, respectively, a collective increase of $31,383.88. The remainder of the mitigation values are unchanged. The revised total for the entire project is $349,834.26.

Table 3. New Hampshire Aquatic Resource Mitigation (ARM) fund payment calculations for permanent and secondary wetland impacts. The highlighted cells indicate changes from previously reported impacts.

Town	A: Secondary Impact: Forested Wetland Conversion (SF)	A1: Conversion Mitigation Area (15% of total area A)(SF)	B: Secondary Impact: Stream Buffer Clearing (SF)	B1: Conversion Mitigation Area (15% of total area B)(SF)	C: Permanent Impacts (SF)	Total Impacts for Mitigation by Town (SF) (Sum A1+B1+C)	ARM Payment (from NH DES ARM Fund Calculator by Town)[1] (USD)
Madbury	2,072	311	7,383	1,107	199	1,617	$6,501.15
Durham (Freshwater)	216,621	32,493	68,997	10,350	203	43,046	$192,471.01
Durham (Tidal)	-	-	-	-	2,381	2,381	$21,292.27
Newington (Freshwater)	76,726	11,509	10,820	1,623	376	13,508	$62,599.05
Newington (Tidal)	-	-	-	-	6,300	6,300	$58,391.18
Portsmouth	11,305	1,696	0	0	0	1,696	$8,579.60
Total:	306,724	46,009	87,200	13,080	9,459	68,548	$349,834.26

[1] http://des.nh.gov/organization/divisions/water/wetlands/wmp/; *ARM Fund Calculator Downloaded 8-31-16*

Appendix A – Durocher Marine Survey Report

Document type: **Reporting**		
Project: **Eversource Energy – 115kV Seacoast Reliability Project F107 Cable Project Madbury Substation to Portsmouth Substation, Little Bay, Portsmouth, NH**	Contractor's Document Number: **LSCA-EE-KIDMD013**	Issue: **DM 003**
Document title: **Marine Route Survey, Revision 2.1**	Page: **1 of 22**	Category: **INTERNAL**

Survey Overview

The purpose of the survey was to record the most recent bottom conditions of the proposed route alignments provided by Eversource Energy drawings F10743003. The final length of cable required for the designed alignments was also confirmed during the site investigation. Any Eversource Energy drawing revisions or route changes after March 24, 2017 could change the length of cable needed.

The survey investigated potentially challenging installation areas using a steel rod and/or water jet probe by bottom proofing, verifying water depths, investigating landing sites, identification of hard areas, and confirming some of the locations of existing cables within the cable alignments. The cable route designed by Eversource Energy will be impacted by existing cables that will require removal.

Issue:	Date:	Document Status:	Prepared:	Checked:	Approved:	Released:
003	06/27/17	DRAFT Revision 2	TJO	AH/BW	06/29/17	06/29/17
002	04/05/17	DRAFT Revision 1	TJP	BW/AH	04/05/17	04/05/17
001	04/04/17	DRAFT	TJP	BW/AH		

Prime Contractor:

LS Cable & System

Cable Installation Contractor:

kokosing INDUSTRIAL

DUROCHER MARINE DIVISION

Owner:

EVERSOURCE

Kokosing Industrial
Durocher Marine Division
958 N. Huron Street
Cheboygan, MI 49721

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Introduction

Kokosing Industrial Durocher Marine Division performed a marine route survey between 03/21/17 and 03/24/17 for the Eversource Energy 115kV Seacoast Reliability Project F107 - 115kV submarine cable from Madbury Substation to Portsmouth Substation in Little Bay located in Portsmouth, NH. The attached google earth images provide a birds-eye view of the cable route alignments and marine route survey targets. A second survey was performed in June 2017 to collect additional data in the upper inter-tidal zones.

Figure 1: Aerial view of Eversource Energy proposed cable alignments/existing cables/oyster farm.

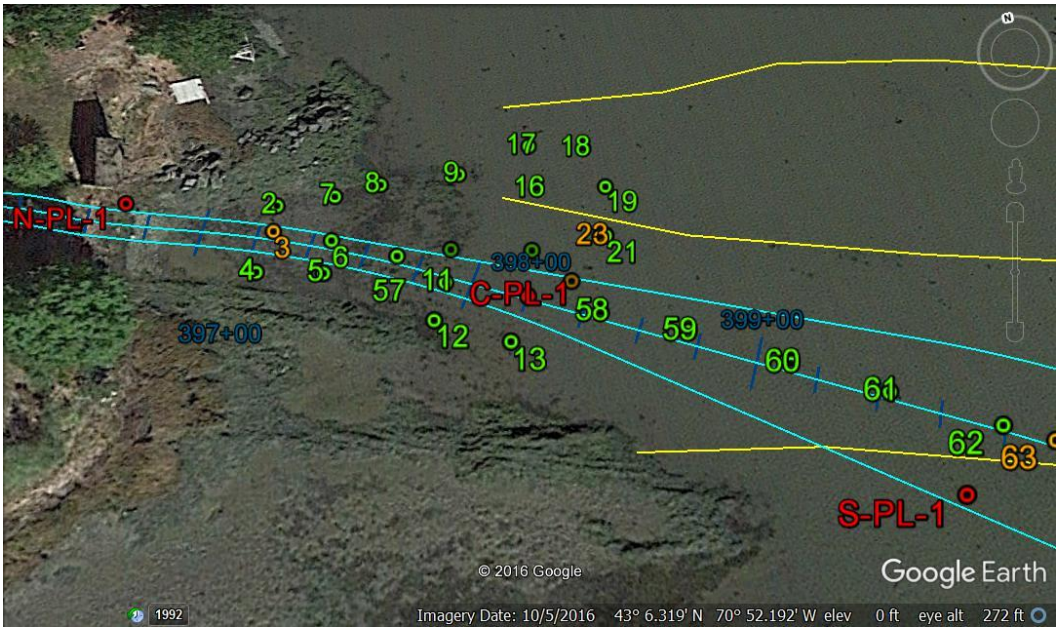

Figure 2: West shoreline station 396+60 east to station 400+00 showing target locations.

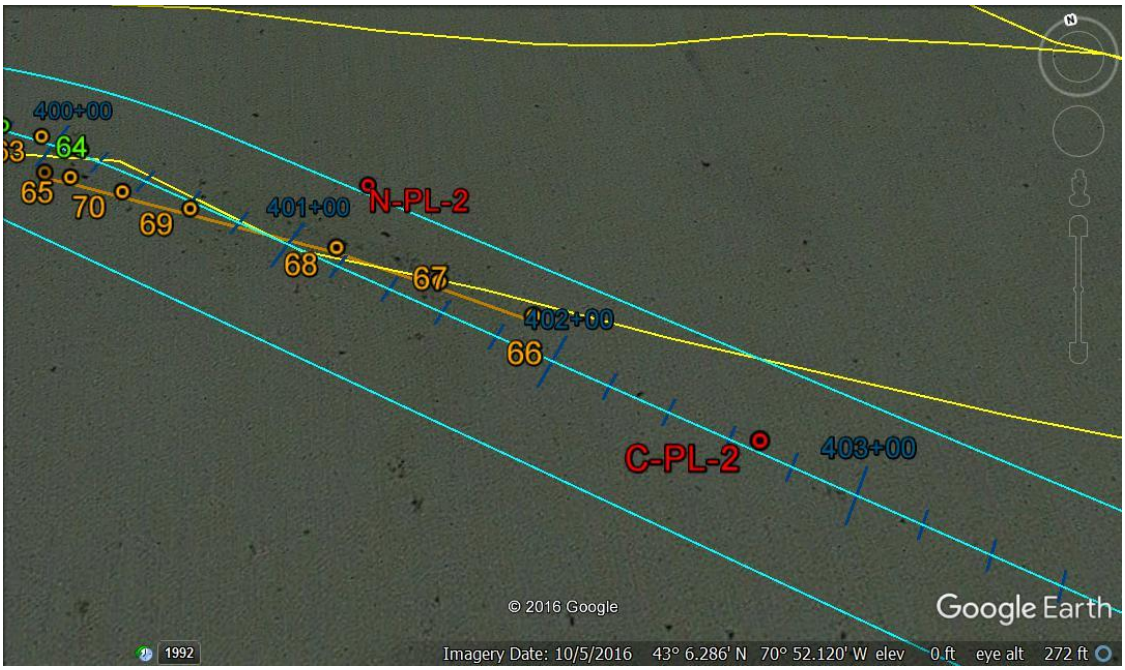

Figure 3: Station 400+00 to station 404+00 showing target locations.

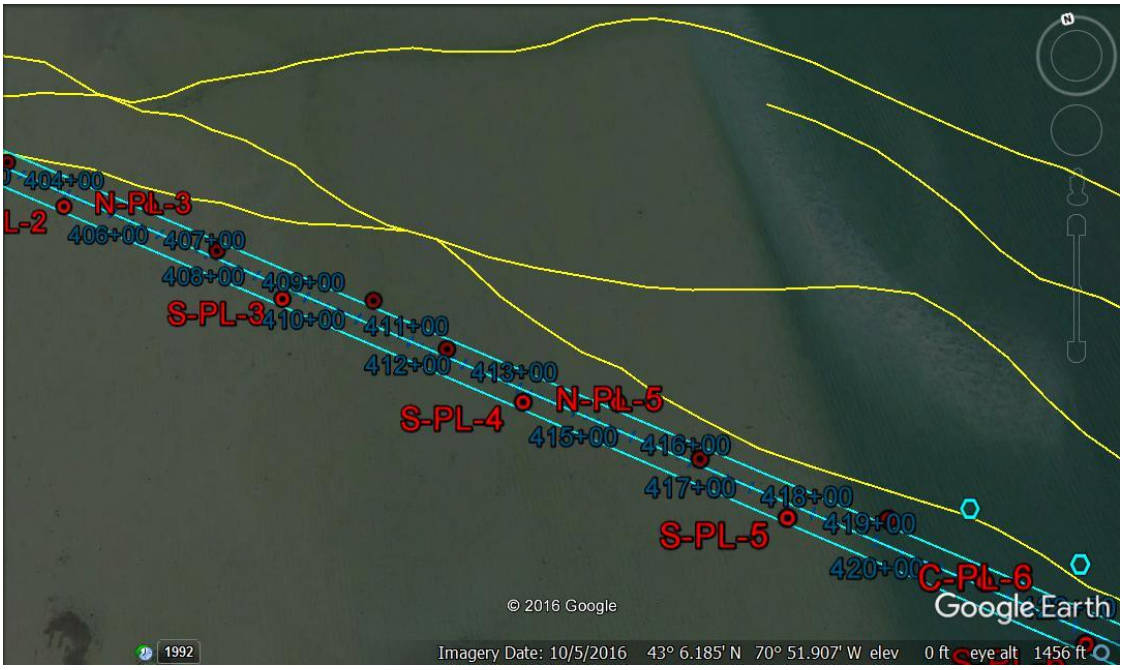

Figure 4: Station 404+00 to station 422+00 showing target locations.

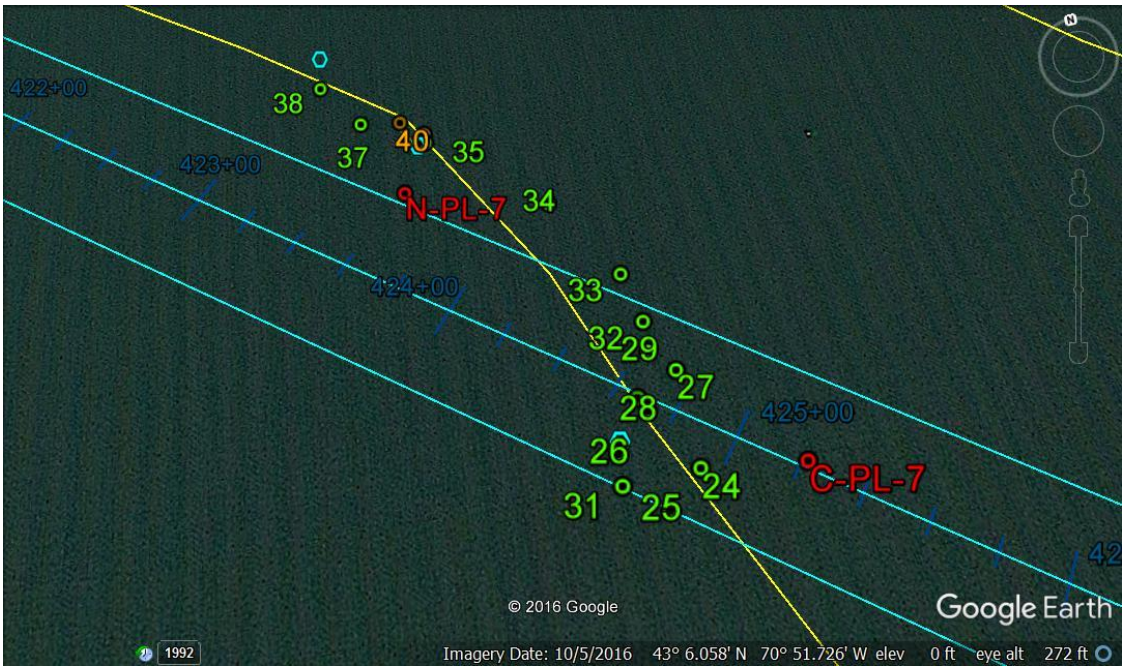

Figure 5: Station 422+00 to station 426+00 showing target locations.

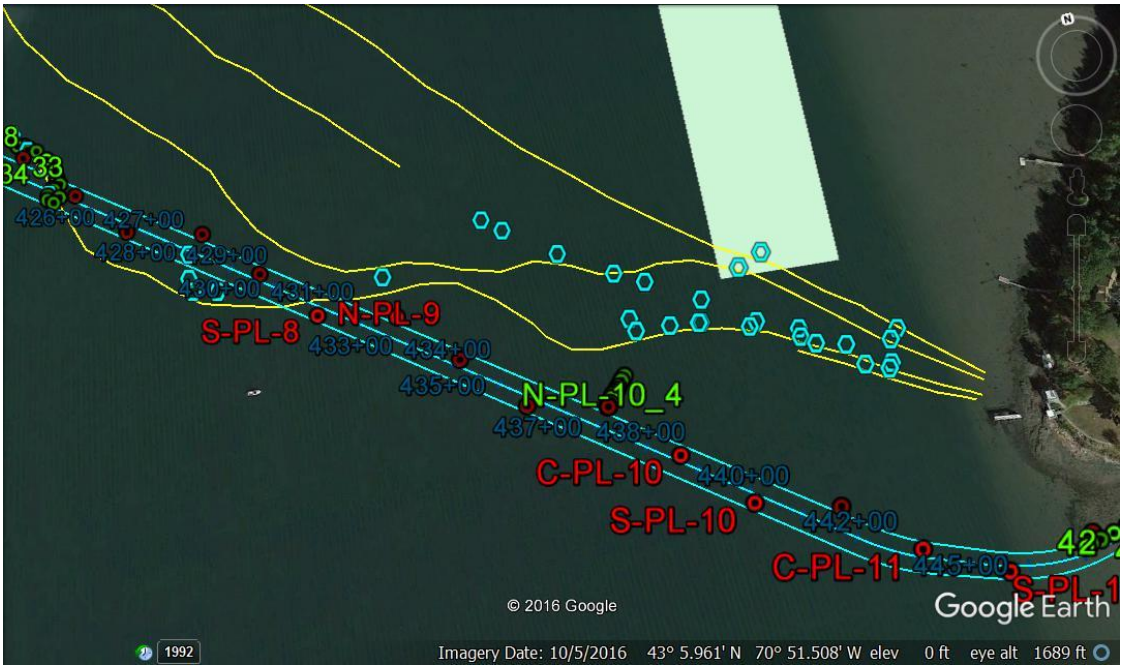

Figure 6: Station 426+00 to station 446+00 showing target locations.

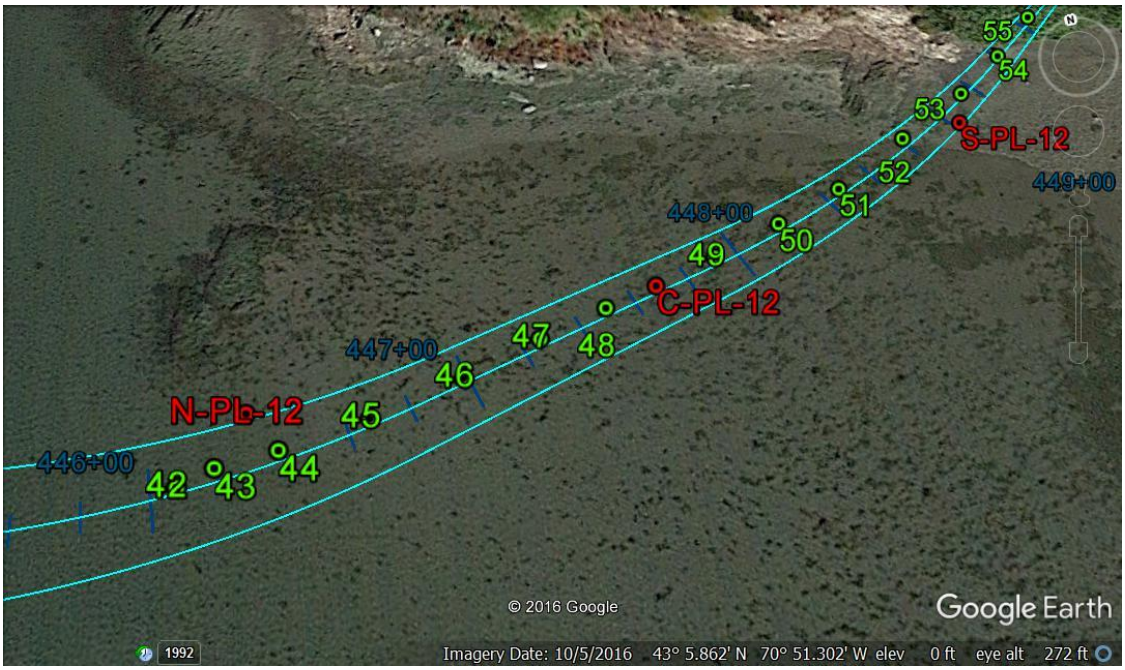

Figure 7: Station 446+00 to station 448+00 showing target locations.

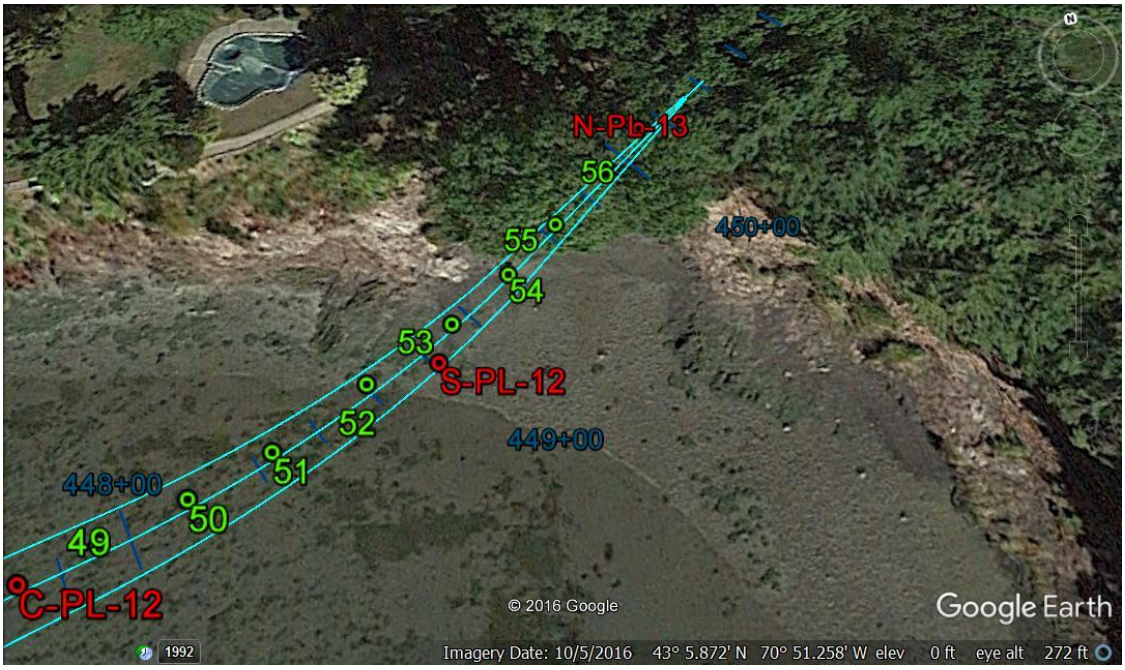

Figure 8: Station 448+00 to east shoreline at station 449+40 showing target locations.

In an effort to verify if 42 inch and 5 feet burial depths could be achieved along the cable alignments, the following data is provided.

Attachment #1

Copy of Probe Logs from March 2017 Survey……. 4 pages

KOKOSING INDUSTRIAL DUROCHER MARINE DIVISION

EVERSOURCE ENERGY 115KV SEACOAST RELIABILITY PROJECT - DIVER PROBE SURVEY - KIDMD JOB # 25090

INFORMATION CONTAINED IN THIS REPORT MUST NOT BE INTERPRETED AS BURIAL DEPTH. BURIAL DEPTHS ARE PROVIDED FROM PLOW TELEMETRY DATA DURING BURIAL OPERATIONS AND SPOT CHECKED REAL TIME USING DIVERS.

KEY	
Full Penetration (8 feet)	
Partial Penetration (4.0 feet or less)	
No or Little Penetration	
Unknown / Interpolated Similar	

KEY	
Full Penetration (8 feet)	
Partial Penetration (4.0 feet or less)	
No or Little Penetration	
Unknown / Interpolated Similar	

KEY	
Full Penetration (8 feet)	
Partial Penetration (4.0 feet or less)	
No or Little Penetration	
Unknown / Interpolated Similar	

TARGET ID #	STATION	NORTH PROBE NOTES	MATS
396+60 +/-		West Shoreline	
N-PL-1	396+70	1/2" probe, no penetration, area exposed.	
	398+20	Unknown / Interpolated Similar	
	399+70	Unknown / Interpolated Similar	
N-PL-2	401+12	1/2" rebar, 10' penetration.	
	402+70	Unknown / Interpolated Similar	
	404+20	Unknown / Interpolated Similar	
N-PL-3	405+62	1/2" rebar, 10' penetration.	
	407+20	Unknown / Interpolated Similar	
	408+70	Unknown / Interpolated Similar	
N-PL-4	410+15	1/2" rebar, 10' penetration.	
	411+70	Unknown / Interpolated Similar	
	413+20	Unknown / Interpolated Similar	
N-PL-5	414+64	1/2" rebar, 10' penetration.	
	416+20	Unknown / Interpolated Similar	
	417+70	Unknown / Interpolated Similar	
418+50		42 Inch to 8 Feet Burial Transition	
419+00 +/-		West Tidal Flats Boundary +/-	
N-PL-6	419+14	Jet-Probe @ 50 psi. 10' penetration.	
	420+70	Unknown / Interpolated Similar	
	422+20	Unknown / Interpolated Similar	
N-PL-7	423+66	Jet-Probe @ 50 psi. 10' penetration.	
	425+20	Unknown / Interpolated Similar	

TARGET ID #	STATION	CENTER PROBE NOTES	MATS
396+60 +/-		West Shoreline	
	396+70	Unknown / Interpolated Similar	
C-PL-1	398+20	1/2" rebar, 48" penetration.	
	399+70	Unknown / Interpolated Similar	
	401+20	Unknown / Interpolated Similar	
C-PL-2	402+70	1/2" rebar, 10' penetration.	
	404+20	Unknown / Interpolated Similar	
	405+70	Unknown / Interpolated Similar	
C-PL-3	407+20	1/2" rebar, 10' penetration.	
	408+70	Unknown / Interpolated Similar	
	410+20	Unknown / Interpolated Similar	
C-PL-4	411+71	1/2" rebar, 10' penetration.	
	413+20	Unknown / Interpolated Similar	
	414+70	Unknown / Interpolated Similar	
C-PL-5	416+18	1/2" rebar, 10' penetration.	
	417+70	Unknown / Interpolated Similar	
418+50		42 Inch to 8 Feet Burial Transition	
419+00 +/-		West Tidal Flats Boundary +/-	
	419+20	Unknown / Interpolated Similar	
C-PL-6	420+69	Jet probe @50 psi. 10' penetration.	
	422+20	Unknown / Interpolated Similar	
	423+70	Unknown / Interpolated Similar	
C-PL-7	425+23	Jet probe @50 psi. 10' penetration.	

TARGET ID #	STATION	SOUTH PROBE NOTES	MATS
396+60 +/-		West Shoreline	
	396+70	Unknown / Interpolated Similar	
	398+20	Unknown / Interpolated Similar	
S-PL-1	399+11	1/2" rebar, 8' penetration then rock.	
	401+20	Unknown / Interpolated Similar	
	402+70	Unknown / Interpolated Similar	
S-PL-2	404+20	1/2" rebar, 10' penetration.	
	405+70	Unknown / Interpolated Similar	
	407+20	Unknown / Interpolated Similar	
S-PL-3	408+73	1/2" rebar, 10' penetration.	
	410+20	Unknown / Interpolated Similar	
	411+70	Unknown / Interpolated Similar	
S-PL-4	413+25	1/2" rebar, 10' penetration.	
	414+70	Unknown / Interpolated Similar	
	416+20	Unknown / Interpolated Similar	
S-PL-5	417+72	1/2" rebar, 10' penetration.	
418+50		42 Inch to 8 Feet Burial Transition	
419+00 +/-		West Tidal Flats Boundary +/-	
	419+20	Unknown / Interpolated Similar	
	420+70	Unknown / Interpolated Similar	
S-PL-6	422+20	Jet-Probe @ 50 psi. 10' penetration.	
	423+70	Unknown / Interpolated Similar	
	425+20	Unknown / Interpolated Similar	

KOKOSING INDUSTRIAL DUROCHER MARINE DIVISION

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Full Penetration (8 feet)	
Partial Penetration (4.0 feet or less)	
No or Little Penetration	
Unknown / Interpolated Similar	

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No or Little Penetration	
Unknown / Interpolated Similar	

TARGET ID #	STATION	NORTH PROBE NOTES	MATS
	426+70	Unknown / Interpolated Similar	
N-PL-8	428+14	Jet-Probe @ 50 psi. No 'crust' layer. 10' penetration.	
	429+70	Unknown / Interpolated Similar	
	431+20	Unknown / Interpolated Similar	
N-PL-9	432+66	Jet-Probe @ 50 psi. Crust ~2' below bottom then smooth penetration to 10'. Diver brought up some fine silty clay residual.	
	434+20	Unknown / Interpolated Similar	
	435+70	Unknown / Interpolated Similar	

TARGET ID #	STATION	CENTER PROBE NOTES	MATS
	426+70	Unknown / Interpolated Similar	
	428+20	Unknown / Interpolated Similar	
C-PL-8	429+71	Jet-Probe @ 50 psi. ~1.5' below surface there is a firm layer, difficult to probe through. Probe became stuck at ~3', 1st attempt on top of sand wave, possible clay layer at refusal. 2nd attempt nearby refusal at ~3.5'. No clay residual on probe when removed.	
	431+20	Unknown / Interpolated Similar	
	432+70	Unknown / Interpolated Similar	
C-PL-9	434+18	Jet-Probe @ 50 psi. Slow penetration after first 2' through hard packed sand. 10' penetration total.	
	435+70	Unknown / Interpolated Similar	

TARGET ID #	STATION	SOUTH PROBE NOTES	MATS
S-PL-7	426+73	Jet-Probe @ 50 psi. 10' penetration.	
	428+20	Unknown / Interpolated Similar	
	429+70	Unknown / Interpolated Similar	
S-PL-8	431+21	1st Attempt: 1/2" rebar, ~4' penetration. 2nd Attempt: Jet-Probe @ 50 psi: 10' penetration.	
	432+70	Unknown / Interpolated Similar	
	434+20	Unknown / Interpolated Similar	
S-PL-9	435+75	Jet-Probe @ 50 psi. First 2' loose, then hard layer, then relatively smooth 10' penetration.	

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No or Little Penetration	
Unknown / Interpolated Similar	

TARGET ID #	STATION	NORTH PROBE NOTES	MATS
N-PL-10 (North Offsets)	437+13	Jet-Probe @ 50 psi. Start online and move to the north approximately every 5 to 10 ft. 10th probe is ~70' offline. 1st: shale rock @ 2" 2nd: shale rock @ 2" 3rd: 1.5' then cobble 4th: 1.5' hard clay rock at 2' 5th: 2' hard clay then rock 6th: 1' large rock 7th: 3' large rock 8th: 3' large rock 9th: 3.5' something hard, rock or possible log 10th: 3' something hard, clay or rock	
	438+70	Unknown / Interpolated Similar	
	440+20	Unknown / Interpolated Similar	
N-PL-11	441+66	Jet-Probe @ 50 psi. 10' penetration.	
442+70 +/-		8 Feet to 42 Inch Burial Transition	
	443+20	Unknown / Interpolated Similar	
	444+70	Unknown / Interpolated Similar	

TARGET ID #	STATION	CENTER PROBE NOTES	MATS
	437+20	Unknown / Interpolated Similar	
C-PL-10	438+70	Jet-Probe @ 50 psi. Easy penetration to 10'.	
	440+20	Unknown / Interpolated Similar	
	441+70	Unknown / Interpolated Similar	
442+70 +/-		8 Feet to 42 Inch Burial Transition	
C-PL-11	443+19	Jet-Probe @ 50 psi. 10' penetration.	
	444+70	Unknown / Interpolated Similar	

TARGET ID #	STATION	SOUTH PROBE NOTES	MATS
	437+20	Unknown / Interpolated Similar	
	438+70	Unknown / Interpolated Similar	
S-PL-10	440+22	Jet-Probe @ 50 psi. smooth 10' penetration.	
	441+70	Unknown / Interpolated Similar	
442+70 +/-		8 Feet to 42 Inch Burial Transition	
	443+20	Unknown / Interpolated Similar	
S-PL-11	444+66	Jet-Probe @ 50 psi. Smooth penetration to 8.5' feet then rock refusal.	

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No or Little Penetration	
Unknown / Interpolated Similar	

TARGET ID #	STATION	NORTH PROBE NOTES	MATS
445+00 +/-		East Tidal Flats Boundary	
N-PL-12	446+30	1/2" rebar 6' penetration, @24" more sandy than mud	
	447+70	Unknown / Interpolated Similar	
	449+20	Unknown / Interpolated Similar	
449+40 +/-		East Shoreline	

TARGET ID #	STATION	CENTER PROBE NOTES	MATS
445+00 +/-		East Tidal Flats Boundary	
	446+20	Unknown / Interpolated Similar	
C-PL-12	447+68	1/2" probe, 5' penetration.	
	449+20	Unknown / Interpolated Similar	
449+40 +/-		East Shoreline	

TARGET ID #	STATION	SOUTH PROBE NOTES	MATS
445+00 +/-		East Tidal Flats Boundary	
	446+20	Unknown / Interpolated Similar	
	447+70	Unknown / Interpolated Similar	
S-PL-12	449+00	1/2" rebar, 6" penetration rock or shale refusal.	
449+40 +/-		East Shoreline	

Attachment #2

Copy of Probe Logs- West Bank 06/15/17 & 06/17/17
Data for North Alignment……. 1 page

Copy of Probe Logs- West Bank 06/15/17 & 06/17/17
Data for Center Alignment…… 1 page

Copy of Probe Logs- West Bank 06/15/17 & 06/17/17
Data for South Alignment……. 1 page

KOKOSING INDUSTRIAL DUROCHER MARINE DIVISION

EVERSOURCE ENERGY 115KV SEACOAST RELIABILITY PROJECT - SHORELINE PROBE SURVEY - KIDMD JOB # 25090

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TARGET ID	APPROX. STATION	DATE	EASTING (X)	NORTHING (Y)	SEAFLOOR ELEVATION (MLLW - FT)	SEAFLOOR ELEVATION (NAVD88 - FT)	SEAFLOOR ELEVATION (MHW - FT)	PENETRATION (INCHES)	SEA BED TYPE	PROBE RESISTANCE	WATER DEPTH (INCHES)
West Bank - North Alignment											
NW Tide Line	396+80	06/15/17	1196912.4	221685.8	3.0	0.7	-1.4	exposed rock	shoreline/rock	rock	dry
NW - 1	396+85	06/15/17	1196917.4	221684.3	2.2	-0.1	-2.2	6"	mud	rock	dry
NW - 2	396+94	06/15/17	1196926.1	221681.9	1.3	-1.0	-3.1	7"	mud	rock	dry
NW - 3	397+03	06/15/17	1196935.4	221678.9	0.5	-1.8	-3.9	10"	mud	rock	dry
NW - 4	397+15	06/15/17	1196946.7	221675.4	0.0	-2.3	-4.4	14"	mud	rock	dry
NW - 5	397+24	06/15/17	1196955.7	221671.7	-0.3	-2.6	-4.7	17"	mud	rock	dry
NW - 6	397+34	06/15/17	1196965.4	221669.5	-0.5	-2.8	-4.8	15"	mud	rock	dry
NW - 7	397+43	06/15/17	1196973.6	221665.1	-0.6	-2.9	-5.0	19"	mud	rock	dry
NW - 8	397+54	06/15/17	1196983.8	221660.7	-0.8	-3.1	-5.1	25"	mud	rock	dry
NW - 9	397+63	06/15/17	1196992.2	221657.7	-0.8	-3.1	-5.2	30"	mud	rock	dry
NW - 10	397+74	06/17/17	1197002.5	221652.9	-0.9	-3.2	-5.2	29"	mud	rock	77"
NW - 11	397+81	06/17/17	1197009.0	221649.3	-1.1	-3.4	-5.5	49"	mud	compact sand	79"
NW - 12	397+93	06/17/17	1197020.6	221646.1	-1.0	-3.3	-5.4	50"	mud	compact sand	78"
NW - 13	398+04	06/17/17	1197029.8	221639.3	-1.2	-3.5	-5.6	55"	mud	compact sand	77"
NW - 14	398+15	06/17/17	1197040.6	221636.6	-1.1	-3.4	-5.5	60"	mud	compact sand	74"
NW - 15	398+24	06/17/17	1197048.4	221633.2	-1.3	-3.6	-5.7	52"	mud	compact sand	73"
NW - 16	398+35	06/17/17	1197059.2	221629.2	-1.4	-3.7	-5.8	65"	mud	compact sand	70"

KOKOSING INDUSTRIAL DUROCHER MARINE DIVISION

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TARGET ID	APPROX. STATION	DATE	EASTING (X)	NORTHING (Y)	SEAFLOOR ELEVATION (MLLW - FT)	SEAFLOOR ELEVATION (NAVD88 - FT)	SEAFLOOR ELEVATION (MHW - FT)	PENETRATION (INCHES)	SEA BED TYPE	PROBE RESISTANCE	WATER DEPTH (INCHES)
West Bank - Center Alignment											
CW Tide Line	396+76	06/15/17	1196907.2	221680.6	3.2	1.0	-1.1	exposed rock	shoreline/rock	rock	dry
CW - 1	396+85	06/15/17	1196916.6	221678.6	1.9	-0.4	-2.5	7"	mud	rock	dry
CW - 2	396+95	06/15/17	1196926.1	221676.2	1.0	-1.3	-3.4	6"	mud	rock	dry
CW - 3	397+05	06/15/17	1196936.4	221672.0	0.3	-2.0	-4.1	15"	mud	rock	dry
CW - 4	397+15	06/15/17	1196946.7	221669.0	0.1	-2.2	-4.3	15"	mud	rock	dry
CW - 5	397+25	06/15/17	1196955.0	221665.7	-0.1	-2.4	-4.5	16"	mud	rock	dry
CW - 6	397+35	06/15/17	1196964.2	221661.8	-0.3	-2.6	-4.7	16"	mud	rock	dry
CW - 7	397+45	06/15/17	1196973.2	221658.2	-0.5	-2.8	-4.9	20"	mud	rock	dry
CW - 8	397+55	06/15/17	1196982.4	221654.8	-0.6	-2.9	-5.0	21"	mud	rock	dry
CW - 9	397+65	06/17/17	1196990.7	221652.1	-0.6	-2.9	-5.0	24"	mud	rock	74"
CW - 10	397+75	06/17/17	1197000.2	221645.6	-0.8	-3.1	-5.2	29"	mud	rock	77"
CW - 11	397+85	06/17/17	1197010.9	221641.3	-1.1	-3.4	-5.5	49"	mud	compact sand	79"
CW - 12	397+95	06/17/17	1197018.2	221638.1	-1.3	-3.6	-5.7	54"	mud	compact sand	78"
CW - 13	398+05	06/17/17	1197028.8	221629.9	-1.1	-3.4	-5.5	58"	mud	compact sand	76"
CW - 14	398+15	06/17/17	1197039.8	221626.2	-1.2	-3.5	-5.6	55"	mud	compact sand	74"
CW - 15	398+25	06/17/17	1197044.0	221621.9	-1.4	-3.7	-5.8	55"	mud	compact sand	73"
CW - 16	398+35	06/17/17	1197053.2	221617.0	-1.3	-3.6	-5.7	61"	mud	compact sand	71"

KOKOSING INDUSTRIAL DUROCHER MARINE DIVISION

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TARGET ID	APPROX. STATION	DATE	EASTING (X)	NORTHING (Y)	SEAFLOOR ELEVATION (MLLW - FT)	SEAFLOOR ELEVATION (NAVD88 - FT)	SEAFLOOR ELEVATION (MHW - FT)	PENETRATION (INCHES)	SEA BED TYPE	PROBE RESISTANCE	WATER DEPTH (INCHES)
West Bank - South Alignment											
SW Tide Line	396+72	06/15/17	1196902.6	221675.3	4.1	1.8	-0.3	exposed rock	shoreline/rock	rock	dry
SW - 1	396+77	06/15/17	1196907.4	221674.4	2.9	0.6	-1.5	exposed rock	rock	rock	dry
SW - 2	396+87	06/15/17	1196917.2	221671.6	1.6	-0.7	-2.8	4"	mud	rock	dry
SW - 3	396+97	06/15/17	1196926.9	221669.2	0.5	-1.8	-3.8	12"	mud	rock	dry
SW - 4	397+07	06/15/17	1196935.7	221666.2	0.4	-1.9	-4.0	14"	mud	rock	dry
SW - 5	397+17	06/15/17	1196946.1	221663.3	0.1	-2.2	-4.3	15"	mud	rock	dry
SW - 6	397+27	06/15/17	1196954.9	221660.2	-0.1	-2.4	-4.5	17"	mud	rock	dry
SW - 7	397+37	06/15/17	1196964.1	221655.5	-0.3	-2.6	-4.7	18"	mud	rock	dry
SW - 8	397+47	06/15/17	1196973.3	221652.2	-0.5	-2.8	-4.9	18"	mud	rock	dry
SW - 9	397+57	06/15/17	1196981.8	221647.8	-0.6	-2.9	-5.0	23"	mud	rock	dry
SW - 10	397+68	06/17/17	1196988.5	221644.2	-0.8	-3.1	-5.2	16"	mud	rock	76"
SW - 11	397+78	06/17/17	1196998.2	221638.4	-1.3	-3.6	-5.7	29"	mud	rock	77"
SW - 12	397+88	06/17/17	1197006.1	221634.6	-1.1	-3.4	-5.5	49"	mud	compact sand	79"
SW - 13	397+98	06/17/17	1197016.8	221627.3	-1.2	-3.5	-5.6	42"	mud	rock	78"
SW - 14	398+08	06/17/17	1197027.2	221622.0	-1.0	-3.3	-5.4	49"	mud	compact sand	76"
SW - 15	398+18	06/17/17	1197037.8	221616.0	-1.1	-3.4	-5.5	56"	mud	compact sand	74"
SW - 16	398+28	06/17/17	1197041.5	221613.5	-1.1	-3.4	-5.5	58"	mud	compact sand	70"
SW - 17	398+38	06/17/17	1197050.1	221607.1	-1.3	-3.6	-5.7	55"	mud	compact sand	71"

Attachment #3

Copy of Probe Logs- East Bank 06/16/17
Data for North Alignment……. 2 pages

Copy of Probe Logs- East Bank 06/16/17
Data for Center Alignment…… 2 pages

Copy of Probe Logs- East Bank 06/16/17
Data for South Alignment……. 2 pages

KOKOSING INDUSTRIAL DUROCHER MARINE DIVISION

EVERSOURCE ENERGY 115KV SEACOAST RELIABILITY PROJECT - SHORELINE PROBE SURVEY - KIDMD JOB # 25090

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East Bank - North Alignment											
NE - 1	449+70	06/16/17	1201235.8	218991.6	4.6	2.3	0.2	15"	shale/sand	compact shale/rock	dry
NE - 2	449+60	06/16/17	1201227.0	218985.7	3.6	1.3	-0.9	23"	shale/sand	compact shale/rock	dry
NE - 3	449+50	06/16/17	1201219.4	218979.7	2.9	0.6	-1.5	15"	shale/sand	compact shale/rock	dry
NE - 4	449+40	06/16/17	1201211.2	218974.4	3.0	0.7	-1.4	19"	shale/mud	compact shale/rock	dry
NE - 5	449+30	06/16/17	1201202.7	218969.0	2.4	0.1	-2.0	23"	shale/mud	compact shale/rock	dry
NE - 6	449+20	06/16/17	1201194.1	218963.9	2.4	0.1	-2.1	12"	shale/mud	compact shale/rock	dry
NE - 7	449+10	06/16/17	1201185.5	218957.2	2.0	-0.3	-2.4	exposed rock	rock	rock	dry
NE - 8	449+00	06/16/17	1201176.8	218953.1	2.1	-0.2	-2.3	exposed rock	rock	rock	dry
NE - 9	448+90	06/16/17	1201168.2	218947.7	0.9	-1.4	-3.5	2"	mud	rock	dry
NE - 10	448+80	06/16/17	1201159.6	218943.1	0.1	-2.2	-4.3	12"	mud	compact sand	dry
NE - 11	448+70	06/16/17	1201150.5	218937.8	-0.4	-2.7	-4.8	18"	mud	compact sand	5"
NE - 12	448+60	06/16/17	1201142.1	218933.7	-0.6	-2.9	-5.0	10"	mud	compact sand	2"
NE - 13	448+50	06/16/17	1201132.5	218929.8	-1.1	-3.4	-5.5	8"	mud	compact sand	2"
NE - 14	448+40	06/16/17	1201124.1	218926.0	-1.0	-3.3	-5.4	13"	mud	compact sand	3"
NE - 15	448+30	06/16/17	1201114.3	218922.7	-1.1	-3.5	-5.6	11"	mud	compact sand	4"
NE - 16	448+20	06/16/17	1201104.8	218919.5	-1.2	-3.5	-5.6	14"	mud	compact sand	4"
NE - 17	448+10	06/16/17	1201096.0	218916.8	-0.4	-2.8	-4.9	exposed rock	rock	rock	3"
NE - 18	448+00	06/16/17	1201085.9	218912.4	-1.4	-3.7	-5.8	14"	mud	compact sand	5"
NE - 19	447+90	06/16/17	1201076.5	218910.4	-1.5	-3.8	-5.9	13"	mud	compact sand	5"
NE - 20	447+80	06/16/17	1201067.2	218907.8	-1.4	-3.7	-5.8	16"	mud	compact sand	4"
NE - 21	447+70	06/16/17	1201057.4	218905.1	-1.2	-3.5	-5.6	21"	mud	compact sand	4"
NE - 22	447+60	06/16/17	1201047.1	218902.2	-1.5	-3.8	-5.9	16"	mud	compact sand	6"
NE - 23	447+50	06/16/17	1201038.1	218899.6	-1.5	-3.8	-5.9	20"	mud	compact sand	5"

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NE - 24	447+40	06/16/17	1201028.0	218896.8	-1.1	-3.4	-5.5	15"	mud	compact sand	4"
NE - 25	447+30	06/16/17	1201018.2	218894.1	-1.5	-3.8	-6.0	11"	mud	compact sand	6"
NE - 26	447+20	06/16/17	1201009.1	218891.3	-1.5	-3.8	-5.9	50"	mud	compact sand	5"
NE - 27	447+10	06/16/17	1200998.4	218889.4	-1.9	-4.2	-6.3	16"	mud	compact sand	5"
NE - 28	447+00	06/16/17	1200989.5	218886.1	-1.7	-4.0	-6.2	12"	mud	compact sand	5"
NE - 29	446+90	06/16/17	1200979.9	218883.4	-1.8	-4.2	-6.3	23"	mud	compact sand	4"
NE - 30	446+80	06/16/17	1200970.0	218880.6	-1.7	-4.0	-6.1	22"	mud	compact sand	5"
NE - 31	446+70	06/16/17	1200960.2	218879.4	-1.7	-4.0	-6.1	20"	mud	compact sand	6"
NE - 32	446+60	06/16/17	1200950.9	218877.5	-1.8	-4.1	-6.2	19"	mud	compact sand	7"
NE - 33	446+50	06/16/17	1200941.0	218875.8	-2.1	-4.4	-6.6	21"	mud	compact sand	8"
NE - 34	446+40	06/16/17	1200931.0	218874.6	-2.2	-4.6	-6.7	50"	mud	compact sand	11"
NE - 35	446+30	06/16/17	1200920.7	218872.5	-2.4	-4.7	-6.8	49"	mud	compact sand	14"
NE - 36	446+20	06/16/17	1200910.6	218871.8	-2.7	-5.0	-7.1	50"	mud	compact sand	14"
NE - 37	446+10	06/16/17	1200902.5	218871.4	-2.9	-5.2	-7.4	49"	mud	compact sand	18"

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East Bank - Center Alignment											
CE - 1	449+75	06/16/17	1201240.8	218990.7	5.0	2.7	0.6	16"	shale/sand	compact shale/rock	dry
CE - 2	449+65	06/16/17	1201233.1	218985.3	3.0	0.7	-1.4	18"	shale/sand	compact shale/rock	dry
CE - 3	449+55	06/16/17	1201225.4	218978.7	2.9	0.6	-1.5	16"	shale/sand	compact shale/rock	dry
CE - 4	449+45	06/16/17	1201217.2	218972.7	2.4	0.1	-2.0	20"	shale/mud	compact shale/rock	dry
CE - 5	449+35	06/16/17	1201209.9	218966.5	2.1	-0.2	-2.3	15"	shale/mud	compact shale/rock	dry
CE - 6	449+25	06/16/17	1201201.8	218960.2	1.7	-0.6	-2.7	17"	shale/mud	compact shale/rock	dry
CE - 7	449+15	06/16/17	1201193.2	218954.4	1.5	-0.8	-2.9	12"	shale/mud	compact shale/rock	dry
CE - 8	449+05	06/16/17	1201185.2	218949.3	1.1	-1.3	-3.4	2"	shale/mud	rock	dry
CE - 9	448+95	06/16/17	1201176.4	218943.4	1.2	-1.1	-3.2	exposed rock	rock	rock	dry
CE - 10	448+85	06/16/17	1201168.7	218938.7	0.0	-2.3	-4.4	3"	mud	rock	dry
CE - 11	448+75	06/16/17	1201159.2	218933.3	-0.9	-3.2	-5.3	9"	mud	compact sand	7"
CE - 12	448+65	06/16/17	1201151.1	218928.6	-0.9	-3.2	-5.3	10"	mud	compact sand	3"
CE - 13	448+55	06/16/17	1201141.5	218923.3	-1.1	-3.4	-5.5	12"	mud	compact sand	4"
CE - 14	448+45	06/16/17	1201132.7	218920.2	-1.2	-3.5	-5.6	24"	mud	compact sand	31"
CE - 15	448+35	06/16/17	1201124.0	218914.7	-1.0	-3.3	-5.5	48"	mud	compact sand	32"
CE - 16	448+25	06/16/17	1201114.5	218911.9	-1.3	-3.6	-5.7	10"	mud	compact sand	31"
CE - 17	448+15	06/16/17	1201104.9	218906.2	-1.8	-4.1	-6.2	17"	mud	compact sand	31"
CE - 18a	448+05	06/16/17	1201096.4	218904.7	-1.3	-3.6	-5.7	21"	mud	compact sand	30"
CE - 18b	448+05	06/16/17	1201096.4	218903.5	-1.1	-3.4	-5.5	exposed rock	rock	rock	30"
CE - 19	447+95	06/16/17	1201086.5	218901.1	-1.3	-3.6	-5.7	48"	mud	compact sand	30"
CE - 20	447+85	06/16/17	1201076.8	218899.3	-1.4	-3.7	-5.9	48"	mud	compact sand	29"
CE - 21	447+75	06/16/17	1201067.2	218895.6	-1.5	-3.8	-5.9	39"	mud	compact sand	29"
CE - 22	447+65	06/16/17	1201058.6	218892.8	-1.6	-3.9	-6.0	30"	mud	compact sand	28"

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CE - 23	447+55	06/16/17	1201047.7	218889.4	-1.7	-4.0	-6.1	39"	mud	compact sand	27"
CE - 24	447+45	06/16/17	1201039.5	218887.4	-1.5	-3.8	-5.9	39"	mud	compact sand	27"
CE - 25	447+35	06/16/17	1201028.8	218883.4	-1.3	-3.6	-5.7	39"	mud	compact sand	27"
CE - 26	447+25	06/16/17	1201020.0	218881.9	-1.4	-3.8	-5.9	40"	mud	compact sand	24"
CE - 27	447+15	06/16/17	1201010.7	218878.3	-1.6	-3.9	-6.0	48"	mud	compact sand	24"
CE - 28	447+05	06/16/17	1200999.9	218874.9	-1.7	-4.0	-6.1	30"	mud	compact sand	24"
CE - 29	446+95	06/16/17	1200990.8	218872.4	-1.6	-3.9	-6.0	48"	mud	compact sand	17"
CE - 30	446+85	06/16/17	1200981.1	218870.4	-1.7	-4.1	-6.2	48"	mud	compact sand	15"
CE - 31	446+75	06/16/17	1200971.5	218866.7	-1.8	-4.1	-6.2	13"	mud	compact sand	15"
CE - 32	446+65	06/16/17	1200961.4	218863.7	-1.9	-4.2	-6.3	48"	mud	compact sand	15"
CE - 33	446+55	06/16/17	1200951.7	218862.3	-1.9	-4.2	-6.3	48"	mud	compact sand	15"
CE - 34	446+45	06/16/17	1200941.1	218860.0	-1.9	-4.2	-6.3	48"	mud	compact sand	16"
CE - 35	446+35	06/16/17	1200934.7	218857.7	-2.4	-4.7	-6.9	48"	mud	compact sand	14"
CE - 36	446+25	06/16/17	1200923.0	218856.8	-2.4	-4.7	-6.8	49"	mud	compact sand	13"
CE - 37	446+15	06/16/17	1200913.2	218854.8	-2.5	-4.8	-6.9	48"	mud	compact sand	16"
CE - 38	446+05	06/16/17	1200903.6	218853.1	-2.8	-5.1	-7.2	48"	mud	compact sand	18"

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East Bank - South Alignment											
SE - 1	449+86	06/16/17	1201251.0	218994.9	4.9	2.6	0.5	13"	shale/sand	compact shale/rock	dry
SE - 2	449+76	06/16/17	1201243.8	218988.1	4.5	2.2	0.1	16"	shale/sand	compact shale/rock	dry
SE - 3	449+66	06/16/17	1201236.4	218982.6	3.3	1.0	-1.1	17"	shale/sand	compact shale/rock	dry
SE - 4	449+56	06/16/17	1201228.8	218975.4	1.3	-1.0	-3.2	31"	shale/mud	compact shale/rock	dry
SE - 5	449+46	06/16/17	1201220.6	218968.9	2.2	-0.1	-2.2	21"	shale/mud	compact shale/rock	dry
SE - 6	449+36	06/16/17	1201213.8	218962.9	1.6	-0.7	-2.9	15"	shale/mud	compact shale/rock	dry
SE - 7	449+26	06/16/17	1201205.2	218956.0	1.3	-1.0	-3.1	15"	shale/mud	compact shale/rock	dry
SE - 8	449+16	06/16/17	1201198.0	218949.9	1.2	-1.1	-3.2	16"	shale/mud	compact shale/rock	dry
SE - 9	449+07	06/16/17	1201189.7	218943.1	0.8	-1.6	-3.7	12"	shale/mud	compact shale/rock	dry
SE - 10	448+97	06/16/17	1201181.0	218938.0	0.0	-2.4	-4.5	6"	rock	rock	dry
SE - 11	448+88	06/16/17	1201173.2	218933.0	-0.7	-3.0	-5.1	2"	rock	rock	dry
SE - 12	448+78	06/16/17	1201164.6	218926.8	-0.8	-3.1	-5.2	9"	mud	compact sand	8"
SE - 13	448+68	06/16/17	1201156.3	218921.8	-1.0	-3.3	-5.4	10"	compact sand	compact sand	4"
SE - 14	448+58	06/16/17	1201147.5	218916.4	-1.0	-3.3	-5.4	11"	mud	compact sand	5"
SE - 15	448+50	06/16/17	1201140.4	218911.4	-1.2	-3.5	-5.6	48"	mud	compact sand	32"
SE - 16	448+30	06/16/17	1201121.9	218903.6	-1.4	-3.7	-5.8	48"	mud	compact sand	32"
SE - 17	448+10	06/16/17	1201102.8	218895.6	-1.3	-3.6	-5.7	21"	mud	compact sand	31"
SE - 18	447+90	06/16/17	1201083.5	218887.8	-1.5	-3.8	-5.9	48"	mud	compact sand	31"
SE - 19	447+70	06/16/17	1201064.6	218882.4	-1.5	-3.8	-5.9	39"	mud	compact sand	29"
SE - 20	447+50	06/16/17	1201046.2	218876.3	-1.5	-3.9	-6.0	48"	mud	compact sand	27"
SE - 21	447+30	06/16/17	1201027.3	218870.0	-1.6	-3.9	-6.0	43"	mud	compact sand	27"
SE - 22	447+10	06/16/17	1201008.7	218862.4	-1.6	-3.9	-6.1	48"	mud	compact sand	24"
SE - 23	446+90	06/16/17	1200988.9	218856.6	-1.8	-4.1	-6.2	48"	mud	compact sand	16"

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SE - 24	446+80	06/16/17	1200979.8	218853.6	-1.8	-4.1	-6.2	48"	mud	compact sand	16"
SE - 25	446+70	06/16/17	1200970.1	218850.4	-1.8	-4.1	-6.2	49"	mud	compact sand	16"
SE - 26	446+60	06/16/17	1200960.1	218847.2	-2.0	-4.3	-6.5	27"	mud	compact sand	16"
SE - 27	446+50	06/16/17	1200950.9	218845.2	-2.2	-4.5	-6.6	48"	mud	compact sand	16"
SE - 28	446+40	06/16/17	1200941.6	218842.5	-2.5	-4.8	-6.9	48"	mud	compact sand	18"
SE - 29	446+30	06/16/17	1200931.4	218840.5	-2.5	-4.8	-6.9	48"	mud	compact sand	19"
SE - 30	446+20	06/16/17	1200922.0	218838.9	-2.5	-4.8	-6.9	48"	mud	compact sand	19"
SE - 31	446+10	06/16/17	1200912.2	218837.1	-2.6	-4.9	-7.0	48"	mud	compact sand	19"
SE - 32	446+00	06/16/17	1200902.1	218835.6	-3.2	-5.5	-7.6	52"	mud	compact sand	18"

Appendix B – Derivation of Site Specific Tidal Datum

Appendix B – Derivation of Site Specific Tidal Datum

Eversource Energy
Seacoast Reliability Project
Local Tidal Datum for Little Bay

Eversource Energy requested that Normandeau Associates (Normandeau) examine the local tidal conditions in the vicinity of the proposed Seacoast Reliability Project (SRP). The purpose of the study was to determine the water depths at a range of low tides for construction purposes. This work relied on information from Durocher Marine Inc and Ocean Survey Inc, (OSI) who surveyed substrate elevations along the proposed cable route near the shoreline.

Methods

Normandeau used three Hobo Water Level data loggers which measure temperature and pressure to monitor water levels over a 16-day period on the west side of proposed cable route in Little Bay. The loggers were installed on June 13, 2017, and retrieved June 29, 2017, which time period captured large spring and neap tide cycles. The data loggers were set to record at 15 minute intervals and a single logger was installed at each of two sites in Little Bay (Sites SRP-01 and SRP-02 in Figure B.1). The third logger was installed in the upland adjacent to the site to record ambient atmospheric pressure, needed to correct for water pressure overlying the in-water data loggers. Instrument calibration checks showed the sensors to be performing acceptably prior to, and during the time of deployment.

The site environment consisted of a large, shallow tidal flat on the west side of Little Bay that included both intertidal and subtidal conditions. Based on the 1979 US Fish and Wildlife Service Classification of Wetlands and Deepwater Habitats, the flat is classified as sparsely vegetated and is dominated by silt, sand and clay, with occasional exposed rock. Site SRP-01 was located approximately 2000 feet from shore in subtidal habitat close to the edge of the main channel in Little Bay. Site SRP-02 was approximately 950 feet from shore in the lower intertidal zone. The data loggers were attached to the tops of concrete blocks which were then embedded several inches in the sediment to secure their position. The time, depth of water over the sensor and the depth to sediment were measured at each location. The elevations of the data loggers in NAVD 88 were determined by measuring relative water surface elevation at the shoreline with a transit level and rod compared to a known benchmark surveyed by OSI. The water surface elevation minus the depth of water over the substrate at the data loggers at the same 15-minute time period were used to establish substrate elevations at the data loggers.

Hobo Water Level data loggers record absolute pressure while deployed, a value which includes the ambient atmospheric pressure and thus necessitates a correction to determine the pressure due to overlying water.

Results

The results indicated that both loggers recorded very similar water levels, with the exception of SRP-02, which was exposed at very low tides (Figure B.2). Tidal amplitude ranged from 5.1 feet on the most extreme neap tide (June 13) to 8.7 feet on the highest spring tide (June 25). The predicted tides for the same time period at Dover Point ranged from a neap of 4.97 feet to a spring tide of 9.59 feet.

OSI used the National Oceanic and Atmospheric Administration's (NOAA) Vdatum[2] model to calculate MLLW and estimated it was -2.3 feet NAVD 88. When that elevation was plotted on our Lidar-based topography and ground-surveyed nearshore bathymetry, the MLLW fell very close to shore. This location is clearly higher in the intertidal zone than we have observed during field surveys and higher than that depicted by navigational charts. Using the MLLW from Vdatum put the MHHW very high on the shoreline, which also was suspect.

We adjusted the tidal datum based on the results from the project-specific water level data loggers. While we only had 16 days of record, the results are probably quite representative because of the full range of tides that occurred during that time period. After converting our data logger results to NAVD88 using a surveyed benchmark as described in the methods section, we calculated MLLW and MHHW as shown in Table B.1. We then used the relative differences in the Vdatum model to estimate the other tidal elevations for the site.

Table B.1. Tidal datums calculated from site-specific data and the NOAA Vdatum model for the Seacoast Reliability Project in NAVD88. The Dover, Cocheco River datum3 is also shown as reference because no datum is provided for Dover Point.

	Predicted at Dover, Cocheco River*	OSI from Vdatum	Site-specific Data Loggers
MHHW	13.94	5.2	4.2
MHW	13.58	4.8	3.8
MSL	10.19	1.4	0.4
MLW	6.54	-2.1	-3.1
MLLW	6.28	-2.3	-3.3

*Relative datum, not NAVD88.

[2] https://vdatum.noaa.gov/docs/publication.html

[3] https://tidesandcurrents.noaa.gov/datums.html?id=8420411

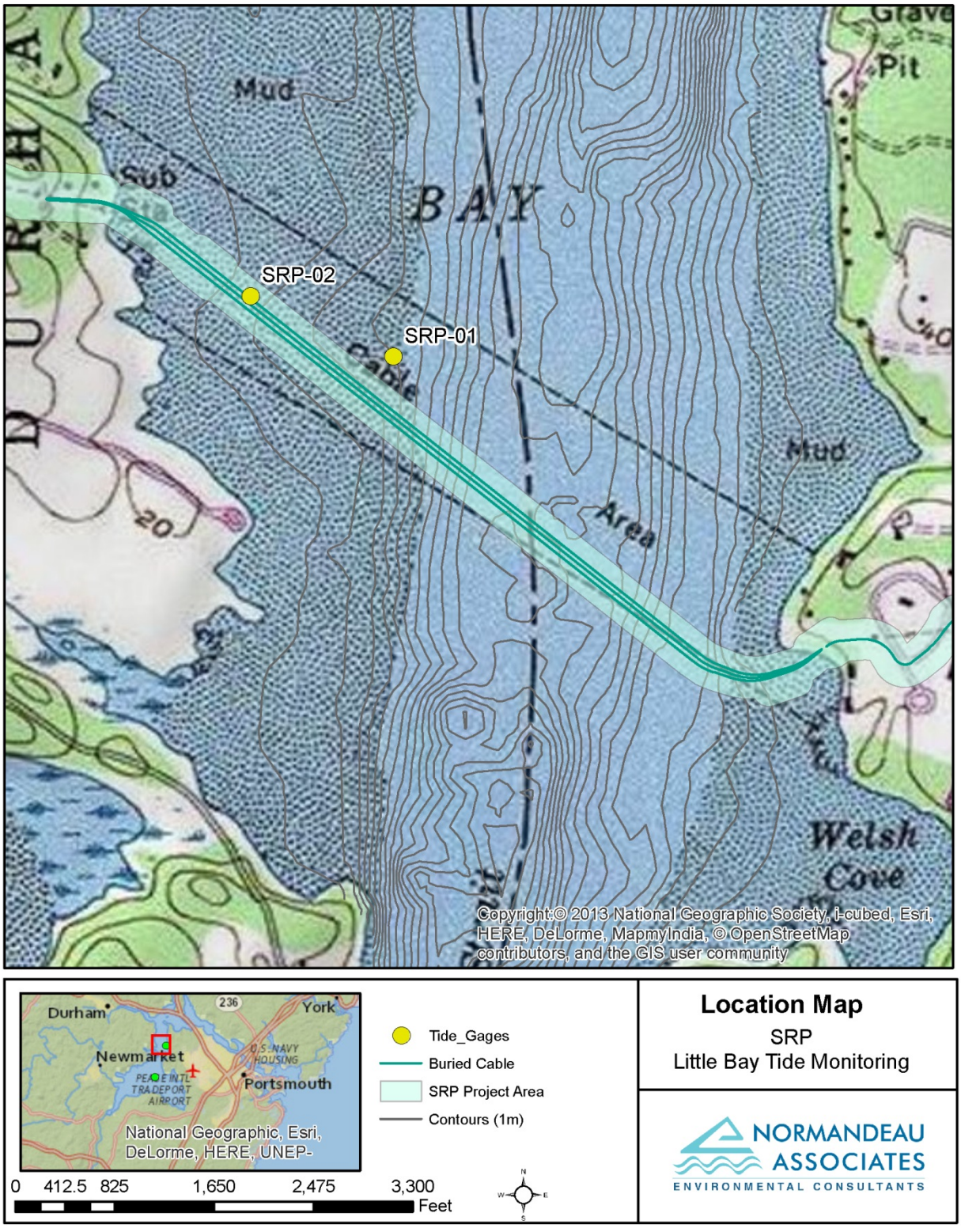

Figure B.1. Location of tidal gages on the west shore of the cable installation for the Seacoast Reliability Project.

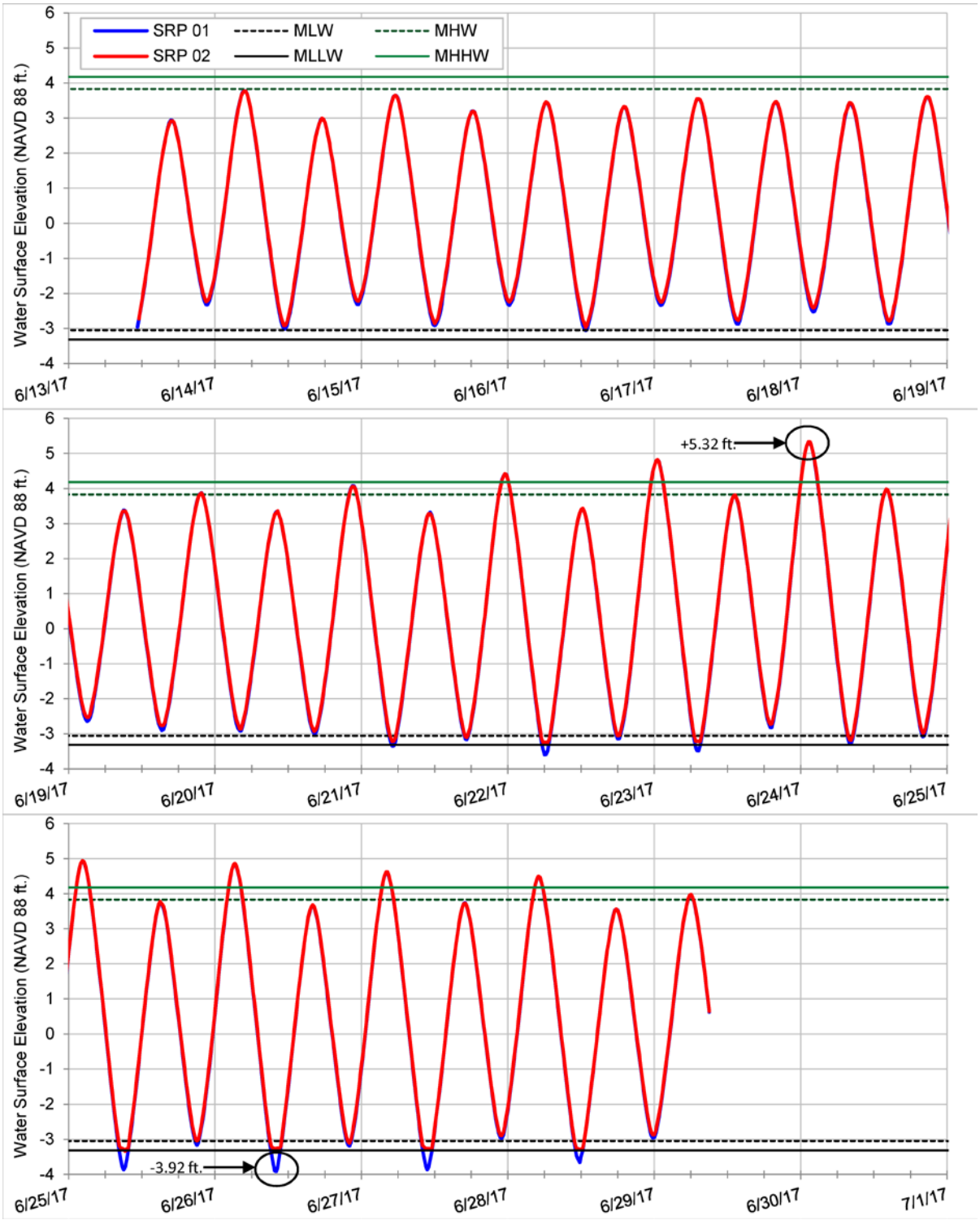

Figure B.2. Water surface elevation at Sites SRP-01 and SRP-02, MLLW, MLW, MHW, and MHHW elevations are also shown.

STATE OF NEW HAMPSHIRE

SITE EVALUATION COMMITTEE

SEC DOCKET NO. 2015-04

APPLICATION OF PUBLIC SERVICE COMPANY OF NEW HAMPSHIRE D/B/A EVERSOURCE ENERGY FOR A CERTIFICATE OF SITE AND FACILITY

&

DEPARTMENT OF ENVIRONMENTAL SERVICES

WETLAND PERMIT APPLICATION NO. 2016-00965

APPLICANT'S WAIVER REQUEST FOR ENV-WT 304.11 (B) (TIME OF YEAR RESTRICTION FOR DREDGING PROJECTS)

Public Service of New Hampshire, d/b/a/ Eversource Energy ("Eversource" or "Applicant"), respectfully requests that that the New Hampshire Department of Environmental Services ("DES") grant a waiver from strict compliance with Env-Wt 304.11(b), which provides that "[d]redging in tidal waters shall be done between November 15 and March 15, and shall not be permitted during a fish migration or larval setting stage of shellfish." Eversource requests this waiver in connection with its Application to the New Hampshire Site Evaluation Committee for a Certificate of Site and Facility to construct the Seacoast Reliability Project, a new 13-mile 115-kilovolt transmission line between the Madbury and Portsmouth substations ("SRP" or the "Project"). The Project includes the burial of three transmission cables under Little Bay between Durham and Newington within an existing charted Cable Corridor (Figure 1). As part of its Application for a Certificate of Site and Facility, Eversource completed and filed a wetlands application with DES, Wetland Permit Application Number 2016-00965.

Eversource proposes to install the underwater portion of the Project across Little Bay between August 1 and December 31, 2018. It would be a significant challenge for Eversource and its contractors to install a transmission cable underwater in freezing temperatures due to the safety and construction challenges, and the fact that cold temperatures present potential risks to the long-term integrity of the cable. Therefore, the proposed timeframe of August 1 to December 31 has been identified as the optimal window to install the cable in non-freezing conditions while avoiding or minimizing impacts to animals, eelgrass, and summer recreation. Eversource has consulted with NH Natural Heritage Bureau (NHB) and NH Fish and Game Department (NHFG), which have concurred on the proposed construction window.

N.H. Code Admin. R. Env-Wt 204.03 – Content of Waiver Requests

a. The name, mailing address, and daytime telephone number of the requestor and, if available, the requestor's email address and fax number;

Barry Needleman, Esq. Bar No. 9446
Adam Dumville, Esq. Bar No. 20715
11 South Main Street, Suite 500
Concord, NH 03301
(603) 226-0400
barry.needleman@mclane.com
adam.dumville@mclane.com

b. If the requestor is making the request on behalf of someone else, the name, mailing address, and daytime telephone number of the person the requestor represents and, if available, an email address and fax number of that person;

Public Service Company of New Hampshire d/b/a Eversource Energy
Kurt I. Nelson
Licensing & Permitting Specialist
13 Legends Drive
Hooksett, NH 03106
kurt.nelson@eversource.com
(603) 634-3256 (office)

c. The location of the property to which the waiver request relates, if other than the mailing address of the requestor or the person the requestor represents;

Little Bay Cable Corridor, Durham, NH to Newington, NH. *See* Figure 1.

d. If the request is for a rule in Env-Wt 200 through Env-Wt 900, the number(s) of the specific section(s) of the rule for which a waiver is sought;

Env-Wt 304.11(b).

e. If the request is for a waiver under RSA 482-A:26, III(b), identification of the specific standard(s) to which a waiver is being requested;

Not applicable.

f. A complete explanation of why a waiver is being requested, including:

1) For a waiver to a rule, an explanation of the operational and economic costs of complying with the rule and, if the requested waiver would extend the duration of a permit, the reason(s) why the permit holder was not able to complete the project within the specified time; or

Strict compliance with Env-Wt 304.11(b) would require Eversource and its contractors to install the underwater cables for the Project in Little Bay *only* from November 15 to March 15, namely, the coldest months of the year. From an operational standpoint, construction at freezing or below-freezing temperatures poses significant risks to the installation methods and requirements, and creates risks to the integrity of the transmission cables.

The potential for icing of the cable lay barge and associated equipment due to freezing air temperatures represents a significant increased risk to the safety of the cable installation crew and imposes significant difficulties to the installation process. In particular, freezing conditions present significant slip hazards, require frequent deicing of the barge and equipment, and can cause delays due to the increased time required for startup of the deck and equipment.

Also, in below-freezing temperatures, the transmission cable is less pliable and more prone to micro-fractures in the cable armor and cover during the jet plow operations. Specifically, in temperatures below 14^{o} F, small cracks and microfractures could result from the bending required as the cable is unspooled and fed to the jet plow. The small cracks and microfractures would be difficult to detect during deployment; however, these cracks and microfractures could have the effect of shortening the life of the cable by allowing seawater to seep in and ultimately cause an electrical failure. Under typical installation, the undersea cables are expected to have a lifespan of decades. Cracks that form during installation could result in premature repairs or replacement of the failed cable.

It is anticipated that installation of the underwater cable portion of the Project across Little Bay will take approximately five months. It would be extremely impracticable and create significant risks for Eversource and its contractor to install the underwater cables during the late fall and winter months (the prescribed dredge window period). At a minimum it would increase the amount of time necessary to complete the work, likely extending beyond the prescribed dredge period in Env-Wt 304.11(b). Requiring Eversource to install the underwater cables only during this timeframe would increase the amount of construction time, increase costs (which are ultimately paid for by the ratepayers), and will impose unreasonable risks to the cable. As described more fully below, any benefit to the environment or to the public from complying with the rule is outweighed by the operational and economic costs to Eversource.

Lastly, the requested waiver will not result in an extension of the duration of the wetlands permit.

Based on the foregoing, it is essential that Eversource install the transmission cable across Little Bay during a time of year when ambient air temperatures are well above freezing.

2) For a waiver under RSA 482-A:26, III(b), a complete explanation of how the statutory criteria of RSA 482-A:26, III(b) will be met;

Not Applicable.

g. If applicable, a complete explanation of the alternate that is proposed to be substituted for the requirement in the rule, including written documentation or data, or both, to support the alternative;

The Applicant proposes to install the underwater cables for this Project across Little Bay from August 1 to December 31, 2018.

The specific construction activities and timeframe for the cable installation in Little Bay are estimated as follows: route clearing and preparation between August 1 and September 1; removal of existing cable between September 1 and 15; installation of new cable via jet plow between September 15 and October 15; and handjetting between September 15 and December 31.

Eversource proposes to install the majority of the underwater cables via lay barge and jet plow between September 15 and October 15 to avoid near-freezing or below-freezing temperatures when the cable is more susceptible to damage. Each of the three jet plow cable installations will occur within an estimated 7 to 13-hour period and will result in a mobile, ephemeral plume of suspended sediments that is expected to dissipate approximately 2 hours after the jet plow pass is completed. The Applicant anticipates that approximately one week will elapse between each cable installation.

Handjetting is required to bury the cable in the nearshore areas that are too shallow for the jet plow. Handjetting is a much slower process, occurring only during the hours around slack high tide, and is anticipated to take weeks. Because the cables will already be in position on the floor of the bay prior to commencing hand jetting, it is not anticipated that below-freezing ambient air temperatures will have a major negative impact on the cable as is expected from using the lay barge and jet plow. However, Durocher Marine, the cable installers, has stated that the dive and hand jet operations are more dangerous, difficult and slower in freezing temperatures because of ice forming on dive gear and water pumps, which poses a risk to diver safety.

During both the jet plow and handjetting phases, all practicable measures will be taken to minimize sediment disturbance and suspension in the water column. These will include: manipulating the jet plow speed and water pressure to maintain minimum sediment suspension; maintaining silt curtains around the entire hand jetting area on the west shore, and as far seaward as effective on the east shore; where currents prohibit silt curtains, handjetting will be limited to periods of low current during slack tides; maintaining erosion and scour protection in the salt marsh work areas during construction and after restoration; and maintaining on-shore erosion

controls during construction to prevent sediment from entering the bay. The Applicant will be required to demonstrate compliance with its 401 Water Quality Certification by extensive monitoring for water quality during and immediately after installation, and post construction monitoring of bathymetry and the benthic community. (The draft WQC Little Bay Environmental Monitoring Plan is provided in Document 9).

The revised Best Management Practices for Construction document for the Project, dated August 31, 2017 (*See* Document 4) will be used by the contractors and environmental monitors to guide the schedule and practices during construction. This document has been reviewed by the NHB and NHFG and their comments have been incorporated (See email provided in Document 10).

h. Whether the waiver is needed for a limited duration and, if so, an estimate of when the waiver will no longer be needed; and

Eversource requests that this waiver be granted for one cable installation season for this Project, namely, August 2018 to December 2018.

i. A complete explanation of why the applicant believes that having the waiver granted will meet the criteria in Env-Wt 204.05 or Env-Wt 204.06, as applicable.

Env-Wt 204.05(a) provides that DES shall grant a waiver to a rule in Env-Wt 300 that will not extend the duration of the wetlands permit if:

1) Granting a waiver will not result in:
    a. An avoidable adverse impact on the environment or natural resources of the state, public health, or public safety;
    b. An impact on abutting properties that is more significant than that which would result from complying with the rule; or
    c. A statutory requirement being waived; and

2) Any benefit to the public or the environment from complying with the rule is outweighed by the operational or economic costs to the applicant.

As described below, the Applicant maintains that the proposed construction window for the Little Bay crossing meets the required criteria specified in Env-Wt 204.05.

GRANTING THE WAIVER WILL NOT RESULT IN AN AVOIDABLE ADVERSE IMPACT ON THE ENVIRONMENT OR NATURAL RESOURCES OF THE STATE, PUBLIC HEALTH, OR PUBLIC SAFETY.

As described in 204.03(g) above, all practicable measures will be taken to minimize sediment disturbance and suspension in the water column during both jet plow and handjetting installation. Due to the relatively clean substrates found in Little Bay, the ephemeral nature of the potential sediment plume and the August to December timeframe for installation, Eversource

has demonstrated through sediment dispersion modeling that the cable installation will not have a significant adverse impact on the environment or natural resources of the State, public health, or public safety. See the Natural Resource Existing Conditions Report (Appendix 7 in the SEC Application for Certificate of Site and Facility, April 12, 2017); Characterization of Sediment Quality Along Little Bay Crossing, December 1, 2016; and Supplement to Characterization of Sediment Quality Along Little Bay Crossing, June 30, 2017) for detailed descriptions of existing substrates, biota and water quality conditions..

In addition, while early life stages of several fish and shellfish species may be present during the proposed construction timeframe, egg and larval abundances of these species are typically lower during September and October (during the main cable installation phase) than during other parts of the year,[1] thereby minimizing impingement and entrainment impacts during jet plowing and handjetting. During the approximate 7-13 hour period anticipated for each of the three jetplow cable installations, habitat for migratory fish species may be temporarily reduced in areal extent due to suspended solids and bottom disturbance that may last for several hours for any given location (see hourly plume predictions in the June 30, 2017 Supplement, Document 1, Figures 3-7 and 3-8). This temporary habitat disturbance is not expected to adversely affect migratory fish species because they are mobile and can avoid the impacted areas as needed.

Moreover, Eversource has sought and received concurrence from NHB and NHFG on the proposed construction window. Such concurrence from regulatory agencies that are charged with the protection of the State's fish, wildlife, and marine resources, and rare species and exemplary natural communities, provides further technical support for the conclusion that the allowance of an underwater cable installation window of August through December will not result in an avoidable adverse impact on the environment or natural resources of the State, or on public health.

The proposed cable installation timeframe will also not result in an avoidable impact on public safety. Prior to installation, the Applicant and its contractor will work with the U.S. Coast Guard ensure that a Notice to Mariners is issued. The DES NH Oil Spill Response Team will also be contacted to ensure their facilities and operations are maintained and fully operational during the cable installation. The Applicant will also coordinate with the Towns of Newington and Durham to maintain public safety during construction. Lastly, any potential impacts to recreational boaters in Little Bay will be minimized due to the fact that the Applicant will install the new cables using the jet plow between September 15 and October 15, when the majority of recreational boaters are off of the Bay for the season.

[1] Jury, S.H., J.D. Field, S.L. Stone, D.M. Nelson, and M.E. Monaco. 1994. Distribution and abundance of fishes and invertebrates in North Atlantic estuaries. ELMR Rep. No. 13. NOAA/NOS Strategic Environmental Assessments Division, Silver Spring, MD. 221 p.

GRANTING THE WAIVER WILL NOT RESULT IN AN IMPACT ON ABUTTING PROPERTIES THAT IS MORE SIGNIFICANT THAN THAT WHICH WOULD RESULT FROM COMPLYING WITH THE RULE.

Shifting the time of year when the cable installation is performed will not result in any greater potential impacts to abutting property owners. The construction methodology and potential impacts from construction—whether completed during August through December or during any other time of the year—will remain the same. In addition, because the requested installation period will occur during August and September, contractors can typically work more efficiently (longer daylight, warmer temperatures), which will shorten the overall work period when compared to performing construction during the colder months with shorter days.

Therefore, granting the waiver will not result in an impact on abutting properties that is more significant than that which would result from complying with the rule.

GRANTING THE WAIVER WILL NOT RESULT IN A STATUTORY REQUIREMENT BEING WAIVED.

The time of year restrictions found in Env-Wt 304.11(b) are not a statutory requirement. Therefore, granting the waiver will not result in a statutory requirement being waived.

ANY BENEFIT TO THE PUBLIC OR THE ENVIRONMENT FROM COMPLYING WITH THE RULE IS OUTWEIGHED BY THE OPERATIONAL OR ECONOMIC COSTS TO THE APPLICANT.

As described above, requiring Eversource and its contractors to comply with the prescribed dredge window in Env-Wt 304.11(b) would create significant operational hazards and potentially increase construction costs significantly. If required to install the transmission lines at below-freezing temperatures, Eversource may be forced to repair and/or replace the transmission lines earlier that what is currently anticipated—any such costs would be paid for by New Hampshire rate-payers. Granting the waiver will not result in any additional impacts on abutting properties, nor will a grant of the waiver result in any avoidable adverse impacts to the environment or natural resources of the state, public health, or public safety.

Therefore, Eversource respectfully requests that DES grant its request for a waiver from strict compliance with Env-Wt 304.11(b).

Respectfully Submitted,
Public Service Company of New Hampshire d/b/a
Eversource Energy

By its attorneys,

McLANE MIDDLETON
PROFESSIONAL ASSOCIATION

Dated: September 15, 2017

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Public Service Company of New Hampshire d/b/a
Eversource Energy

By: _____
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Licensing & Permitting Specialist
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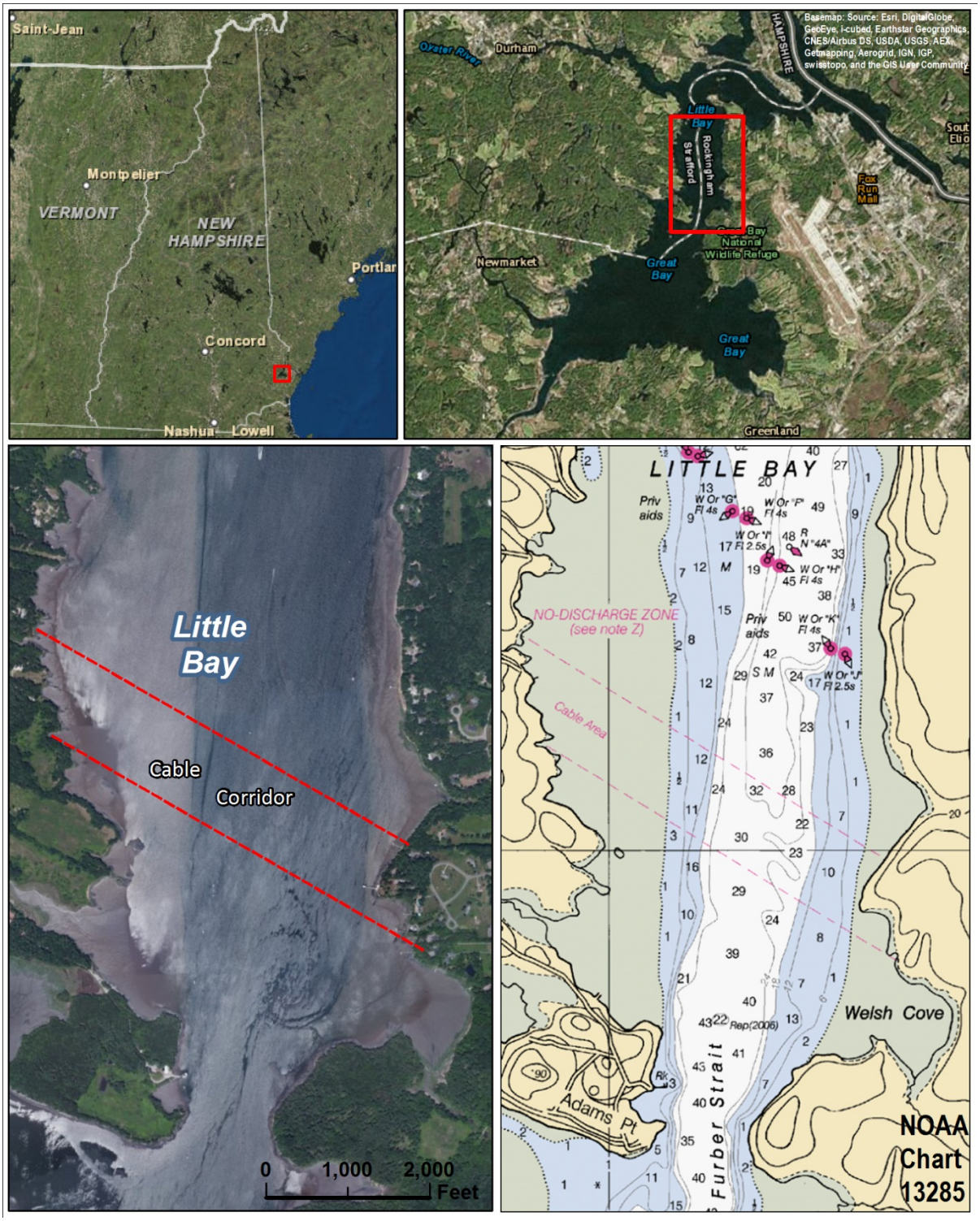
(603) 634-3256 (office)

Figure 1. Location of the proposed Seacoast Reliability Project cable crossing within the charted Cable Area in Little Bay, Durham and Newington, NH.



To: Nadine Miller, Preservation Project Reviewer, Division of Historical Resources (DHR)

Date: July 26, 2017

Subject: Seacoast Reliability Project (R&C #6528) - Avoidance, Minimization, and Mitigation

From: Mark Doperalski, Cultural Resources Specialist, Eversource Energy

This memorandum describes avoidance, minimization, and mitigation measures proposed by the applicant, Eversource Energy, to help facilitate discussions pertaining to adverse effects identified by the DHR upon historic resources as part of the proposed Seacoast Reliability Project (Project).

The DHR, in a letter dated June, 20, 2017 to the U.S. Army Corps of Engineers (USACE), identified four resources that would be adversely affected by the proposed Project. Those resources include the Newmarket and Bennett Roads Farms Historic District, Durham Point Historic District, Little Bay Underwater Cable Terminal Houses Historic District, and the Alfred Pickering Farm. The DHR has expressed particular concern regarding physical impacts to historic stone walls and features that contribute to the rural character of the Durham Point Historic District and Newmarket and Bennett Roads Farms Historic District, physical impacts to the Little Bay Underwater Cable Terminal Houses Historic District, and visual changes introduced due to the use of larger scale towers upon the Alfred Pickering Farm.

Eversource Energy proposes the following avoidance, minimization, and mitigation measures. The discussion of these measures is organized below by resource.

Newmarket and Bennett Roads Farms Historic District:
There are nine stone wall segments (WP-12 through WP-20) within the Newmarket and Bennett Roads Farms Historic District that are intersected by the proposed Project corridor (see attached map set; pages 8-10). Impacts to all nine walls will be avoided by the Project through implementation of the measures listed by wall in Table 1. An example of timber matting over a stone wall segment is depicted in Figure 1.

Table 1. Proposed Avoidance Measures

Stone Wall ID	Proposed Measure
WP-12	Mat over stone wall for access and construction pad
WP-13	Use existing opening for access
WP-14	Use existing opening for access
WP-15	Mat over stone wall for access and construction pad
WP-16	Mat over stone wall for access
WP-17	Mat over stone wall for access
WP-18	Use existing opening for access
WP-19	Use existing opening for access
WP-20	Do not cross

Figure 1. Timber Matting Over Stone Wall Segment

Durham Point Historic District:

There are seven stone wall segments (WP-32 through WP-35B; and WP35D) as well as one granite quarry (27ST119 – Langmaid Road Quarry) within or directly adjacent to the Durham Point Historic District that are intersected by the Project corridor (see attached map set; pages 14-16). Impacts to six of the seven walls will be avoided by the Project through implementation of the measures listed by wall in Table 2. In the case of WP-33, the Project proposes to minimize impacts by widening one exiting breach and repairing a second existing breach with the stone removed from the first.

Table 2. Proposed Avoidance and Minimization Measures

Stone Wall ID	Proposed Measure
WP-32	Mat over stone wall for access and construction pad
WP-33	Two existing openings: rebuild one, widen one
WP-34	Mat Over Stone Wall for Access
WP-35	Use existing Opening for Access
WP-35D	Use existing Opening for Access
WP-35B	Use existing Opening for Access
WP-35A	Mat Over Stone Wall for Access

Regarding the stone quarry, the Project will be able to avoid most impacts by routing access around the quarry features. There are two locations, one an access point and the second a work pad location associated with structure F107-83/84, where avoidance through moving project components is not possible. In both cases timber matting will be used to avoid impacts to quarry features.

Little Bay Underwater Cable Terminal Houses Historic District:
Placement of proposed Project components within the Little Bay Underwater Cable Terminal Houses Historic District requires the cable terminal house on the western shoreline to be moved from its present location as well as the removal of sections of the historic underwater cables. The Project proposes to stabilize and move the cable terminal house 50 feet to the north of its current location during construction. Once construction has been completed the Project proposes to permanently place the cable terminal house in a location 12 feet to the west of and 15 feet to the north of its current location (see Figure 2). The cable terminal house would be placed on a new foundation constructed either of field stone or concrete faced with field stone. This new location will allow future maintenance of the electric line without impacting the cable terminal house. It will also remove the structure from within the tidal zone, which will increase the longevity of the historic structure and allow restoration of intertidal habitat at this location. Prior to moving the cable terminal house, Historic American Engineering Record (HAER) documentation will be completed for the structure. Additionally, the Project proposes to increase public awareness of the historic district through the placement of interpretive signage at a frequently used access point to Little Bay.

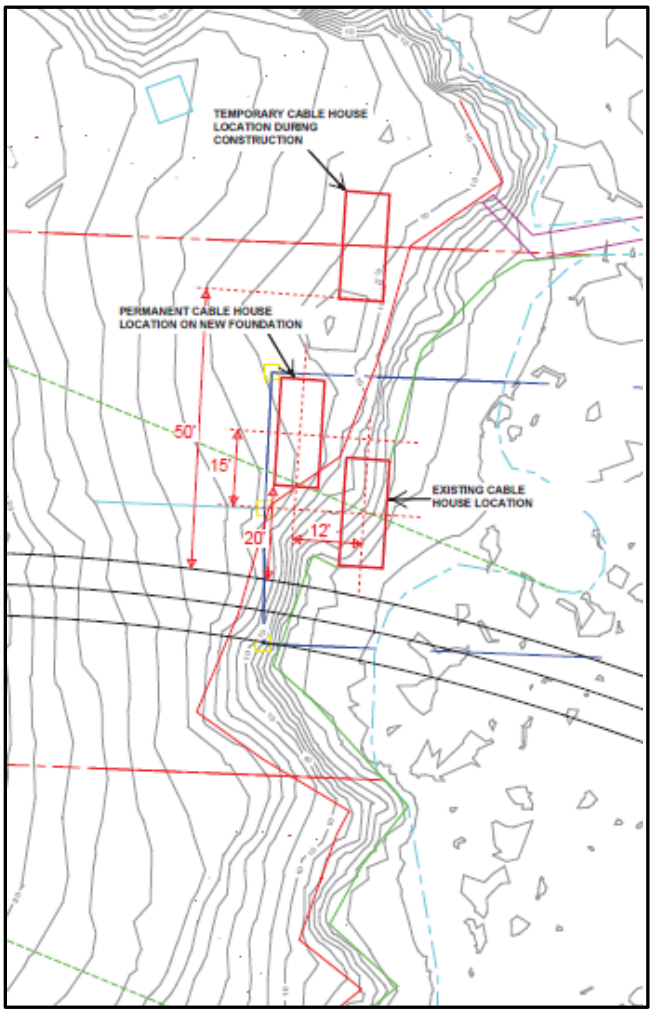


Figure 2. Proposed Cable Terminal House Relocation

Alfred Pickering Farm:
Currently, an existing electric distribution line runs across the Alfred Pickering Farm property and is visible from several portions of the property. The Project proposes to replace the existing distribution line with a transmission line of larger size within the same corridor. The Project design minimizes adverse visual effects on the Alfred Pickering Farm. First, the distribution line will be removed from this corridor to reduce structure heights. Based on 3-D and photo overlay modeling, the reduced structure heights will not rise above the existing tree line. Longer span lengths will require only one structure within the National Register eligible boundary of the property and it will be placed out of view in a wooded area. The only structure (F107-104/107) in view from the Pickering Farm buildings or from Little Bay Road will be located on the adjacent parcel to the west, in the field north of a newly constructed house (see attached map set; page 21). This structure will be 65.5 feet tall. Existing trees along the northern edge of the corridor will minimize the presence of the structure in the view. Second, the Project will use a weathering steel structure, which will reduce visual impact of the structure by reducing the visual contrast against the backdrop of the existing trees. Last, the Project proposes that, with landowner permission, vegetative screening consisting of a tall growing tree species be planted on the southern edge of the corridor. The structure (F107-104/107) will initially be visible against the wooded background but will not rise above the treetops and would eventually be blocked by the tall growing vegetative screening along the southern edge of the corridor.

NHDES-W-06-012

WETLANDS PERMIT APPLICATION

Land Resources Management
Wetlands Bureau
Check the status of your application: www.des.nh.gov/onestop

RSA/Rule: RSA 482-A/ Env-Wt 100-900

Administrative Use Only	*Administrative Use Only*	*Administrative Use Only*	File No.:
			Check No.:
			Amount:
			Initials:

1. REVIEW TIME:
Indicate your Review Time below. Refer to Guidance Document A for instructions.

☒ Standard Review (Minimum, Minor or Major Impact) ☐ Expedited Review (Minimum Impact only)

2. PROJECT LOCATION:
Separate applications must be filed with each municipality that jurisdictional impacts will occur in.

ADDRESS: **Multiple - Linear Tranmission Line ROW - See USGS Map(s)** TOWN/CITY: **Multiple - See Maps**

TAX MAP: **Multiple - See Att.** BLOCK: LOT: UNIT:

USGS TOPO MAP WATERBODY NAME: **Multiple - See Mapping** ☐ NA STREAM WATERSHED SIZE: **Various** ☐ NA

LOCATION COORDINATES (If known): **43 6'29.33"N, 70 52'35.96"W** ☒ Latitude/Longitude ☐ UTM ☐ State Plane

3. PROJECT DESCRIPTION:
Provide a brief description of the project outlining the scope of work. Attach additional sheets as needed to provide a detailed explanation of your project. DO NOT reply "See Attached" in the space provided below.

The Seacoast Reliability Project proposes construction of a new 12.9 mile long 115-kilovolt transmission line within an existing distribution line ROW between the existing PSNH Madbury and Portsmouth substations. This version of the application form provides updated impact numbers for Little Bay based on revised cable burial depth and concrete mattresses. Please refer to the revised Environmental Maps (Sept. 2017) and the Supplemental Submarine Impact Assessment Report (Sept. 2017) for details.

4. SHORELINE FRONTAGE

☐ NA This lot has no shoreline frontage. SHORELINE FRONTAGE: **240 LF within Project ROW**

Shoreline frontage is calculated by determining the average of the distances of the actual natural navigable shoreline frontage and a straight line drawn between the property lines, both of which are measured at the normal high water line.

5. RELATED PERMITS, ENFORCEMENT, EMERGENCY AUTHORIZATION, SHORELAND, ALTERATION OF TERRAIN, ETC.

SEC App. for Cert. of Site and Facility, NHDES Shoreland, 401, AoT, & others. See SEC App for list.

6. NATURAL HERITAGE BUREAU & DESIGNATED RIVERS:
See the Instructions & Required Attachments document for instructions to complete a & b below.

a. Natural Heritage Bureau File ID: NHB **15** - **3561** .

b. ☒ Designated River the project is in ¼ miles of: **Oyster River & Lamprey River Watershed** ; and
date a copy of the application was sent to the Local River Management Advisory Committee: Month: **4** Day: **6** Year: **2016**
☐ NA

7. APPLICANT INFORMATION (Desired permit holder)

LAST NAME, FIRST NAME, M.I.: **Nelson, Kurt I.**

TRUST / COMPANY NAME: **Public Service Company of New Hampshire d/b/a Eversource Energy, Inc.**

MAILING ADDRESS: **13 Legends Dr.**

TOWN/CITY: **Hooksett** STATE: **NH** ZIP CODE: **03106**

EMAIL or FAX: **kurt.nelson@eversource.com** PHONE: **603-634-3256**

ELECTRONIC COMMUNICATION: By initialing here: **KIN**, I hereby authorize NHDES to communicate all matters relative to this application electronically

8. PROPERTY OWNER INFORMATION (If different than applicant)

LAST NAME, FIRST NAME, M.I.:

TRUST / COMPANY NAME: MAILING ADDRESS:

TOWN/CITY: STATE: ZIP CODE:

EMAIL or FAX: PHONE:

ELECTRONIC COMMUNICATION: By initialing here _____, I hereby authorize NHDES to communicate all matters relative to this application electronically

9. AUTHORIZED AGENT INFORMATION

LAST NAME, FIRST NAME, M.I.: **Allen, Sarah** COMPANY NAME: **Normandeau Associates, Inc.**

MAILING ADDRESS: **25 Nashua Road**

TOWN/CITY: **Bedford** STATE: **NH** ZIP CODE: **03110**

EMAIL or FAX: **sallen@normandeau.com** PHONE: **603-637-1158**

ELECTRONIC COMMUNICATION: By initialing here **SA**, I hereby authorize NHDES to communicate all matters relative to this application electronically

10. PROPERTY OWNER SIGNATURE:

See the Instructions & Required Attachments document for clarification of the below statements

By signing the application, I am certifying that:

1. I authorize the applicant and/or agent indicated on this form to act in my behalf in the processing of this application, and to furnish upon request, supplemental information in support of this permit application.
2. I have reviewed and submitted information & attachments outlined in the Instructions and Required Attachment document.
3. All abutters have been identified in accordance with RSA 482-A:3, I and Env-Wt 100-900.
4. I have read and provided the required information outlined in Env-Wt 302.04 for the applicable project type.
5. I have read and understand Env-Wt 302.03 and have chosen the least impacting alternative.
6. Any structure that I am proposing to repair/replace was either previously permitted by the Wetlands Bureau or would be considered grandfathered per Env-Wt 101.47.
7. I have submitted a Request for Project Review (RPR) Form (www.nh.gov/nhdhr/review) to the NH State Historic Preservation Officer (SHPO) at the NH Division of Historical Resources to identify the presence of historical/ archeological resources while coordinating with the lead federal agency for NHPA 106 compliance.
8. I authorize NHDES and the municipal conservation commission to inspect the site of the proposed project.
9. I have reviewed the information being submitted and that to the best of my knowledge the information is true and accurate.
10. I understand that the willful submission of falsified or misrepresented information to the New Hampshire Department of Environmental Services is a criminal act, which may result in legal action.
11. I am aware that the work I am proposing may require additional state, local or federal permits which I am responsible for obtaining.

Property Owner Signature	Print name legibly	Date
	KURT I NELSON	9/15/2017

MUNICIPAL SIGNATURES

11. CONSERVATION COMMISSION SIGNATURE

The signature below certifies that the municipal conservation commission has reviewed this application, and:

1. Waives its right to intervene per RSA 482-A:11;
2. Believes that the application and submitted plans accurately represent the proposed project; and
3. Has no objection to permitting the proposed work.

⇨	Print name legibly	Date

DIRECTIONS FOR CONSERVATION COMMISSION

1. Expedited review ONLY requires that the conservation commission's signature is obtained in the space above.
2. Expedited review requires the Conservation Commission signature be obtained **prior** to the submittal of the original application to the Town/City Clerk for signature.
3. The Conservation Commission may refuse to sign. If the Conservation Commission does not sign this statement for any reason, the application is not eligible for expedited review and the application will reviewed in the standard review time frame.

12. TOWN / CITY CLERK SIGNATURE

As required by Chapter 482-A:3 (amended 2014), I hereby certify that the applicant has filed four application forms, four detailed plans, and four USGS location maps with the town/city indicated below.

⇨ Town/City Clerk Signature	Print name legibly	Town/City	Date

DIRECTIONS FOR TOWN/CITY CLERK:

Per RSA 482-A:3,I

1. For applications where "Expedited Review" is checked on page 1, if the Conservation Commission signature is not present, NHDES will accept the permit application, but it will NOT receive the expedited review time.
2. IMMEDIATELY sign the original application form and four copies in the signature space provided above;
3. Return the signed original application form and attachments to the applicant so that the applicant may submit the application form and attachments to NHDES by mail or hand delivery.
4. IMMEDIATELY distribute a copy of the application with one complete set of attachments to each of the following bodies: the municipal Conservation Commission, the local governing body (Board of Selectmen or Town/City Council), and the Planning Board; and
5. Retain one copy of the application form and one complete set of attachments and make them reasonably accessible for public review.

DIRECTIONS FOR APPLICANT:

1. Submit the single, original permit application form bearing the signature of the Town/ City Clerk, additional materials, and the application fee to NHDES by mail or hand delivery.

13. IMPACT AREA:

For each jurisdictional area that will be/has been impacted, provide square feet and, if applicable, linear feet of impact

Permanent: impacts that will remain after the project is complete.

Temporary: impacts not intended to remain (and will be restored to pre-construction conditions) after the project is complete.

JURISDICTIONAL AREA	PERMANENT Sq. Ft. / Lin. Ft.		TEMPORARY Sq. Ft. / Lin. Ft.	
Forested wetland	26	☐ ATF	4514	☐ ATF
Scrub-shrub wetland	511	☐ ATF	238443	☐ ATF
Emergent wetland	204	☐ ATF	43108	☐ ATF
Wet meadow	37	☐ ATF	20566	☐ ATF
Intermittent stream	0	☐ ATF	0	☐ ATF
Perennial Stream / River	0 / 0	☐ ATF	523 / 176	☐ ATF
Lake / Pond	0 / 0	☐ ATF	0 / 0	☐ ATF
Bank - Intermittent stream	0 / 0	☐ ATF	0 / 0	☐ ATF
Bank - Perennial stream / River	0 / 0	☐ ATF	see above / 352	☐ ATF
Bank - Lake / Pond	0 / 0	☐ ATF	0 / 0	☐ ATF
Tidal water	8681 / n/a	☐ ATF	268531 / n/a	☐ ATF
Salt marsh	0	☐ ATF	1456	☐ ATF
Sand dune	0	☐ ATF	0	☐ ATF
Prime wetland	31	☐ ATF	34976	☐ ATF
Prime wetland buffer	n/a	☐ ATF	n/a	☐ ATF
Undeveloped Tidal Buffer Zone (TBZ)	0	☐ ATF	0	☐ ATF
Previously-developed upland in TBZ	11	☐ ATF	21166	☐ ATF
Docking - Lake / Pond	n/a	☐ ATF	n/a	☐ ATF
Docking - River	n/a	☐ ATF	n/a	☐ ATF
Docking - Tidal Water	n/a	☐ ATF	n/a	☐ ATF
TOTAL	9501 / 0		633283 / 528	

14. APPLICATION FEE: See the Instructions & Required Attachments document for further instruction

☐ Minimum Impact Fee: Flat fee of $ 200

☒ Minor or Major Impact Fee: Calculate using the below table below

Permanent and Temporary (non-docking)	**642,784** sq. ft.	X $0.20 =	$ **128,556.80**
Temporary (seasonal) docking structure:	sq. ft.	X $1.00 =	$
Permanent docking structure:	sq. ft.	X $2.00 =	$
Projects proposing shoreline structures (including docks) add $200 =			$ **n/a**
Total =			$ **128,556.80**
The Application Fee is the above calculated Total or $200, whichever is greater =			$ **128,556.80**

NORMANDEAU ASSOCIATES
Environmental Consultants

Public Service Company of New Hampshire
Seacoast Reliability Project

Madbury, Durham, Newington & Portsmouth, NH

New Hampshire Department of Environmental Services
401 Water Quality Certification Application

Revised Environmental Monitoring Plan for Little Bay

Prepared For:
Public Service Company of New Hampshire
d/b/a Eversource Energy
780 North Commercial Street
Manchester, NH 03101

Dated:
September 15, 2017

Submitted By:
Normandeau Associates, Inc.
25 Nashua Road
Bedford, NH 03110

www.normandeau.com

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Seacoast Reliability Project
Little Bay Environmental Monitoring Plan

The 401 Water Quality Certification application prepared for the Seacoast Reliability Project (SRP) acknowledges that short-term exceedances of allowable turbidity increases are anticipated to occur during construction. In anticipation of water quality monitoring being required as a condition of the Water Quality Certification, Public Service Company of New Hampshire (PSNH) proposes the following environmental monitoring plan.

Environmental monitoring associated with the installation (burial via jet plow) of three electric transmission cables across Little Bay for SRP includes three components: water quality monitoring during construction, recovery of benthic habitat conditions (i.e., bathymetry) along the installations, and recovery of the benthic infaunal community after construction. The general approaches to these surveys are described in this document, and have been refined based on the draft permit conditions issued by New Hampshire Department of Environmental Services (NHDES) on November 10, 2016, and further discussions with NHDES.

1.0 Water Quality Monitoring During Construction

As has been described in the SRP natural resource impact reports[1], the installation of buried cables will cause suspension of sediments into the water column resulting in the creation of a tidally-driven plume. The Water Quality Certification Application has demonstrated that the suspended sediment plume projected to occur generated during cable installation will not have deleterious effects on sensitive resources in Little Bay. A mixing zone is proposed for the project to define a plume assimilation area beyond which water quality standards will not be exceeded as defined in the United States Environmental Protection Agency (EPA) document "Technical Support Document for Water Quality-based Toxics Control (EPA, 1991) and authorized in NH Code of Administrative Rules Chapter Env-Wq 1707. The mixing zone is based on the results of sediment plume dispersion modeling that predicts the concentrations of excess suspended sediments (TSS) caused by the installation (RPS 2017). There is no simple correlation between suspended sediments and turbidity, the parameter NHDES uses to determine impairment. Measurement of turbidity allows real-time data evaluation and feedback so that adjustments to installation activities can be implemented quickly while TSS sampling requires laboratory analysis causing a delay in response. PSNH therefore proposes to conduct a field survey measuring turbidity during cable installation in order to verify that the NHDES turbidity criterion of < 10 Nephelometric Turbidity Units (NTUs) above background has been met at the edge of the proposed mixing zone.

[1] See Natural Resource Impact Assessment Report (Appendix 34 of the original April 12, 2016 application, and the Supplemental Little Bay Impact Assessment Report (Document 5 of this Supplement, dated September 15, 2017)

As shown by the water quality model (RPS 2017), a plume of excess suspended sediments will cross the bay in conjunction with the jet plow. The width and length of the plume will vary with the tidal stage. During ebbing and flooding tides, the plume will be narrow and elongated; during slack tides, the plume will be shorter and wider. At no time is the plume predicted to encompass more than a fraction of the width of the bay. Because of the ephemeral nature of the predicted suspended sediment plume, which varies in extent and magnitude with the position of the jet plow combined with water depth, current speed and direction, all minimum mixing zone criteria defined in Env-Wq 1707.02 are expected to be met. Model results show suspended sediments at any given time are concentrated in the vicinity of the jet plow and decrease rapidly down-current. The maximal effects are predicted to be temporarily concentrated in a shifting and transient plume; therefore zones of passage for mobile aquatic organisms will be maintained throughout the installation process and, as demonstrated in the Water Quality Certification Application, the residual effects of the jet plow installation are not expected to be deleterious to aquatic life or designated uses.

Suspended sediments cannot be measured in real time, so turbidity is proposed as a surrogate and is the parameter that NHDES uses as a criterion for water quality. According to Env-Wq 1700.11, turbidity in Class B waters such as Little Bay shall not exceed naturally occurring levels by more than 10 NTUs, specifically stating "For purposes of state enforcement actions, if a discharge causes or contributes to an increase in turbidity of 10 NTUs or more above the turbidity of the receiving water upstream of the discharge or otherwise outside of the visible discharge, a violation of the turbidity standard shall be deemed to have occurred." As the installation operation via jet plow will take place over a discrete period of time (about 7-13 hours for each cable depending on jet plow advance rate) and the activity will constantly progress across the bay (rather than remaining in one location), PSNH believes that monitoring should document conditions along the mixing zone boundaries to demonstrate the project meets water quality criterion.

1.1 General Water Quality Monitoring Procedures

As allowed under New Hampshire Surface Water Quality Regulation Env-Wq 1707, PSNH proposes to establish a mixing zone for monitoring during construction, and for a period of one week following completion of each cable installation to account for a period when resuspension of sediments redeposited after initial disturbance by the jet plow may occur (Figure 1-1). Within the mixing zone, exceedances of turbidity increases over 10 NTUs above background levels could occur. The proposed mixing zone complies with all Minimum Criteria established in Env-Wq 1707.02. Monitoring will take place at the edge of the proposed mixing zone, as determined by model results presented in RPS 2017. Reference stations will be located up current of the planned cable route centerline while monitoring stations will be located down current of the centerline. During high slack and ebbing tides, the southern station will be considered the reference station and the northern station will be considered the mixing zone or impact station. During low slack and flooding tides, the location of the reference and mixing zone stations will reverse.

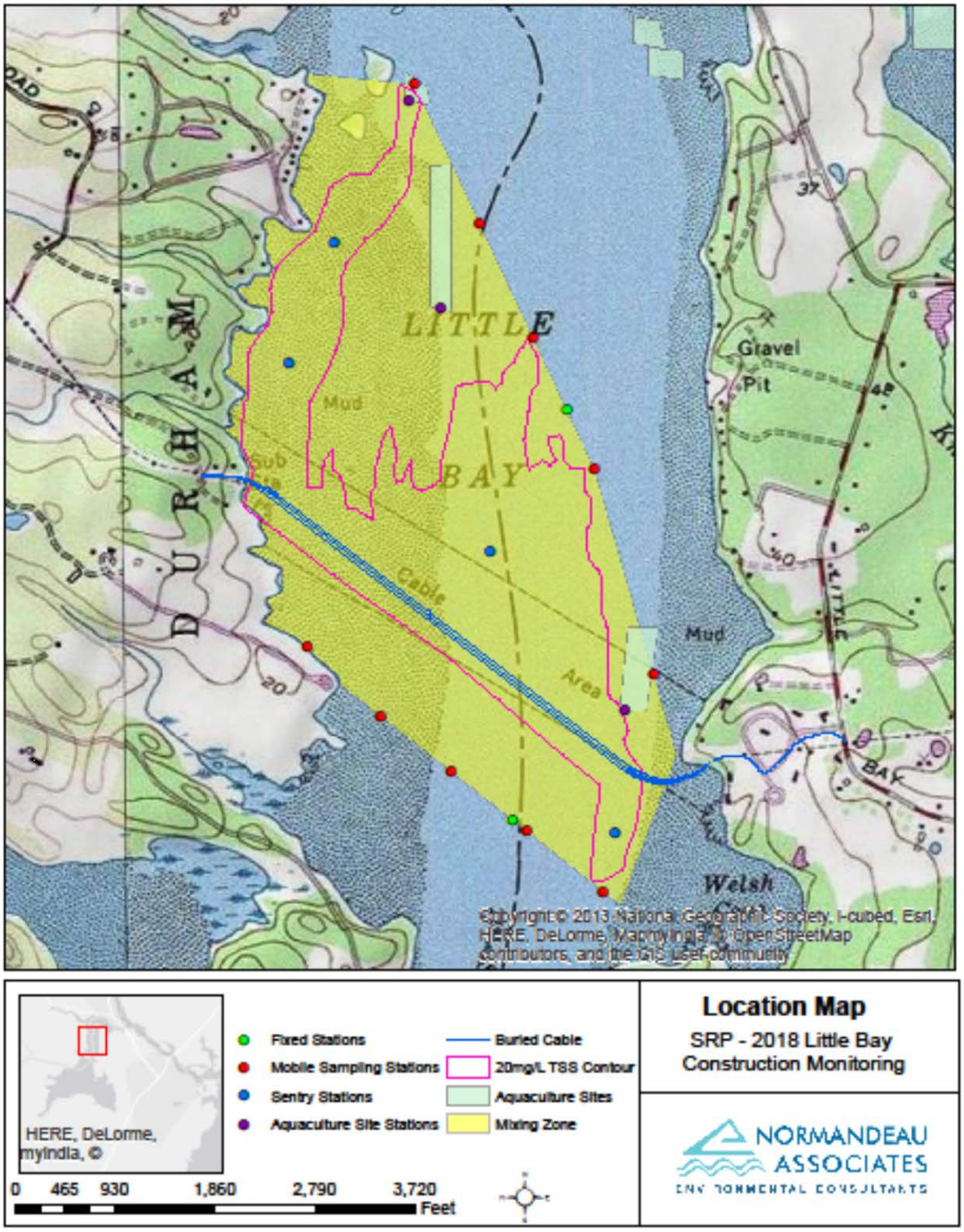

Figure 1-1. Site map showing locations of mixing zone, mobile monitoring and fixed monitoring stations

The mixing zone boundaries are justified based on the suspended sediments modeling results which show values of 20 mg/L or more of total suspended sediments occurring, for brief periods (1 hour or less) during peak currents, within the proposed mixing zone in some locations. Total suspended solids (TSS) samples collected in 2016 and 2017 on the cable corridor show poor correlation with turbidity ($R^2 = 0.46$, n = 32 samples, Figure 1-2; Appendix A), however a conservative estimate based on those data is that 20 mg/L TSS is likely less than 10 NTU turbidity at this site (no sample less than or equal to 21 mg/L TSS had a corresponding turbidity reading higher than 8.8 NTU). Therefore, the predicted 20 mg/L suspended sediments contour is used as a conservative estimate of TSS to define the mixing zone boundary based on the sediment dispersion modeling. Based on the sediment dispersion model, brief water quality exceedances in some areas of the monitoring transect may occur, but are not anticipated to exceed 1 hour.

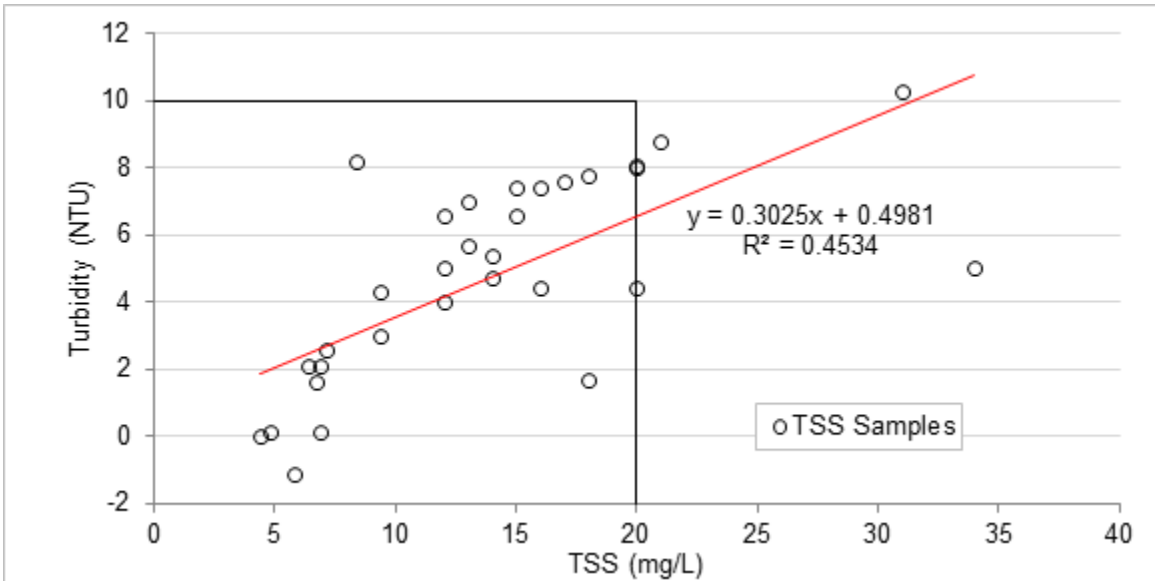

Figure 1-2. Comparison of TSS and Turbidity from 32 samples collected in Little Bay in 2016 and 2017. 20 mg/L TSS and 10 NTU turbidity lines highlighted for reference

Turbidity monitoring will be composed of mobile monitoring performed from boats and fixed station monitoring with deployed instrumentation at select locations. Mobile monitoring will occur at the edge of the mixing zone and will repeatedly sample multiple established stations. Two monitoring boats will be deployed simultaneously at the proposed mixing zone boundary - one in an up-current position to document background turbidity and one in a down-current position to document construction effects. There will be a series of five stations north and south of the cable route (Figure 1-1; Table 1-1). Each station down current and up current of the jet plow will be occupied hourly during the installation. At each mobile station with sufficient water depths (>6 feet), turbidity will be measured using a turbidity probe at the near-surface (within 3 feet of the surface), mid-depth, and near-bottom (within 3 feet of the substrate). As the tide ebbs, water levels on the tidal flats will drop. When water levels fall below 6 feet at a station, water quality sampling will reduce to two samples: near surface and near bottom.

When water depths drop below 4 feet, water sampling will be reduced to one mid-column sample. When water depths fall below 2 feet, no sampling will occur because the act of sampling will stir up turbidity.

Table 1-1. Proposed SRP Little Bay environmental monitoring station coordinates

Mobile Sampling Stations	
Latitude (Decimal Degrees)	**Longitude (Decimal Degrees)**
43.0948	-70.8578
43.0964	-70.8605
43.0979	-70.8631
43.0994	-70.8655
43.1012	-70.8681
43.1155	-70.8641
43.1004	-70.8560
43.1056	-70.8580
43.1090	-70.8601
43.1119	-70.8619
Sentry Stations	
43.1084	-70.8686
43.1115	-70.8670
43.1036	-70.8617
43.0963	-70.8574
Fixed MZ Stations	
43.0967	-70.8610
43.1072	-70.8590
Aquaculture Site Stations	
43.0995	-70.8570
43.1098	-70.8633
43.1151	-70.8643

Sentry stations will be occupied by a third monitoring team to provide an "early-warning" of higher-than expected turbidity. This approach will enable the implementation of adaptive management protocols before an elevated turbidity plume reaches sensitive receptors. There will be four sentry stations (Figure 1-1 and Table 1-1): two located north of the route along the west side of the bay (protective of the Fat Dog and Joe King oyster farms), one north of the route in the channel, and one south of the route near the end of the jet-plow installation (protective of resources in Great Bay). Monitoring will follow the same procedures used at the mobile monitoring stations with one exception. The sentry stations will be occupied only for the several hour period during each installation during which the dispersion model predicts the plumes could occur in the general vicinity. Any measurement above New Hampshire's

turbidity standard at a sentry station will not be considered an exceedance because these stations will be located inside the proposed mixing zone.

Water samples will be collected at each depth from the mobile and sentry stations for analysis of TSS, total nitrogen, dissolved and particulate copper and arsenic, and fecal coliform bacteria. Collections will be made hourly for the four-hour period when the jet plow is located within the vicinity of each particular station. Therefore, water samples will sometimes be collected from adjacent monitoring stations but each station will not be sampled for water every hour.

Two continuously monitoring data loggers will be set at fixed stations located mid-channel at the mixing zone boundary to measure continuous turbidity conditions during construction and for a one week period following each cable installation to document any prolonged water quality effects (e.g. due to unconsolidated sediment resuspension). The fixed station monitors will be deployed at a depth approximately 3 ft above the channel bed to document maximum plume effects. In addition, continuously recording turbidity probes will be deployed near the southern boundary of three aquaculture leases , as shown in Figure 1-1, at depths approximately 3 ft above the channel bed to document turbidity at those locations.

The water quality monitoring plan is summarized in Table 1-2.

Table 1-2. Summary of water quality monitoring procedures

Sampling protocol		Stations		
		Mobile	**Sentry**	**Fixed/Aquaculture**
Depths	<6 feet	Near Surface, mid-water column, near bottom		Near bottom
	4-6 feet	Near surface and near bottom		
	2-4 feet	Mid-water column		
	<2 feet	No sampling		

(continued)

Table 1-2. (cont).

Sampling protocol	Stations		
	Mobile	**Sentry**	**Fixed/Aquaculture**
Real time collections - Frequency and duration	Hourly, starting one hour prior to jet plow and continuing for two hours after jet plow Increased to 15 minute intervals for up to 45 minutes if minor exceedance detected (prompts monitoring downcurrent locations at 100 ft intervals to identify extent of exceedance). Longer duration prompts adaptive management response.	Hourly, starting one hour prior to jet plow and continuing for two hours after jet plow Duration based on dispersion model predictions	Continuous, installed within one week prior to first cable installation and continuing for two weeks after third cable installation
Real time collections - parameters	Turbidity DO Salinity		Turbidity DO Salinity
Water collections - frequency and duration	Hourly for four hours while jet plow is within vicinity of station		n/a
Water collections - parameters	Turbidity TSS Nitrogen (total and ammonia) Copper (total & dissolved) Arsenic (total & dissolved) Fecal coliforms		n/a

Mobile monitoring will be initiated one hour prior to the startup of the jet plow and continue for two hours after jet plowing has been completed or longer if indicated by turbidity results. Data collected prior to jet plow startup is considered to be reference data regardless of the location of the station. Water quality monitoring will be conducted using YSI 6920 multiparameter sondes or equivalent with a turbidity resolution of 0.1 NTU and accuracy of +/- 2% (minimum 0.3 NTU accuracy). QA/QC procedures will follow manufacturer guidelines as

well as the USGS publication "Guidelines and Standard Procedures for Continuous Water Quality Monitors: Station Operation, Record Computation, and Data Reporting" (USGS, 2006).

Other information to be recorded will include date, time, water depth, tide stage, weather conditions, and other relevant observations.

1.2 Determination of Compliance with Turbidity Criterion

The field team performing the water quality monitoring will be in contact with the Environmental Monitor and Engineer on the jet plow vessel to coordinate an immediate response, if turbidity results indicate the need (see evaluation below). Because PSNH plans to install three cables in close proximity to one another, results of water quality monitoring during the first installation can also be used to make adjustments to the later installations.

Monitoring data will be evaluated as follows:

- Mobile monitoring will document turbidity at three depths in the water column (near-surface, mid-column, and near-bottom) at reference and impact stations, where water depths allow. Turbidity impacts will be evaluated at like depths between reference and impact stations for each sample time. These data will be downloaded daily during the monitoring periods for evaluation.
- If turbidity at any impact station exceeds the reference station value by more than 10 NTUs then two actions will occur: 1) the construction team environmental monitor will be notified of an exceedance and sediment reduction measures will be implemented, and 2) the turbidity exceedance will be characterized by taking turbidity measurements every 15 minutes at the edge of the mixing zone and at 100 ft intervals downcurrent of the observed exceedance until excess turbidity is shown to be less than 10 NTU. Hourly sampling at the remaining mobile station monitoring will continue during the exceedance characterization.
- If turbidity at any impact station exceeds the reference station value by more than 10 NTUs for two or more consecutive hours, then three actions will occur: 1) the construction team environmental monitor will be notified, as above; and 2) the exceedance will be characterized, as above; and 3) the construction team environmental monitor will evaluate the nature of the exceedance and take corrective action as necessary (see below).

Preliminary data will be provided to regulatory agencies within 48 hours of completion of the jet plow crossing to enable further evaluations if required. Further evaluations could include comparison of the impact station results to the long term database maintained for the CICEET buoy in the middle of Great Bay. If the absolute value of the impact data falls within the range of observations for the fall months, then it could be considered to be consistent with natural

variability. If it is determined that the impact station results are outside the range of natural variability, then the marine contractor will be required to modify their operation of the jet plow for the subsequent installation(s). The most likely factors that could be changed are the advancement rate across the bay and the pressure directed through the water chambers on the plow blade.

Final quality controlled monitoring data will also be formatted as requested by NHDES for submission to the NHDES Environmental Monitoring Database within one month of completion of the construction monitoring.

2.0 Bathymetric Monitoring

Substrate condition, including microtopography and grain size distribution, is one of the dominant factors affecting benthic habitat. The installation of the three cables will temporarily affect bathymetry along an approximately 100-ft wide swath crossing Little Bay, potentially resulting in areas of excess deposition adjacent to the cables and areas of depression over the cables. The changes in microtopography could influence the composition and distribution of benthic infauna and the use of the substrate by epibenthic species (e.g., lobsters, crabs, and horseshoe crabs). Grain size distribution will be characterized during benthic infauna sampling (see below).

Based on discussions with PSNH's marine contractor, Durocher Marine, it is not expected that there will be a substantial (i.e., more than a few inches) depression over each cable. Predictions for redeposition of sediments mobilized during cable installation indicated that the bulk of the sediments will settle back into the jet plow trench and with limited mounding of sediments adjacent to the cables. It is expected that normal currents and storm action will redistribute any displaced sediments resulting in natural restoration of bathymetry to the relatively smooth condition that existed prior to the cable installation.

PSNH proposes to conduct a detailed bathymetric survey immediately following cable installation, using a single beam or multibeam sonar system to map the sediment surface. If results indicate bathymetric changes in excess of six inches above or below the surrounding topography, a second survey will be conducted in the spring to incorporate the effects of natural processes, such as winter storms or ice activity. This timing is reasonable because peak benthic infaunal recruitment will occur during the spring and summer months. The survey area will extend at least 100 ft north and south of the 100-ft wide cable route for a minimum total width of 300 ft. The survey will cover the entire jet plow installation route. The data will be examined for evidence of a depression directly over any of the cables or mounding adjacent to the cables. If such changes are noted and the benthic infaunal survey to be conducted in the late summer/early fall (see Section 3) indicates that benthic infaunal recruitment has been very limited then a follow-up survey will be conducted a year later. If after two years, bathymetric changes have persisted and infaunal recruitment has continued to be insufficient, PSNH will discuss with the agencies what mitigation would be required. If adequate infaunal recruitment

has occurred in the first year, no follow up bathymetric survey and no mitigation would be required.

3.0 General Benthic Monitoring Approach

3.1 Benthic Infaunal Community Monitoring

Installation of the three cables across Little Bay will unavoidably disturb the estuarine substrate in approximately 6.3 acres through a combination of displacement into the water column, compression by the jet plow skids, and redeposition of suspended sediments back on to the bay floor. As described in the Impact Report, the benthic infaunal community in this footprint will be impacted. It is expected that the substrate will be restored to its approximate pre-construction condition, including grain size distribution and bathymetry, by natural processes within several months. Because the in-water cable installation is planned to take place during the fall, recruitment of infaunal organisms into the disturbed area is likely to be limited until the following spring through summer when benthic reproduction is typically at its peak. PSNH proposes to document the recovery of the infaunal community to demonstrate that there is no long term degradation of this resource in the project footprint and that the benthic community within the area of disturbance is functioning the same as that outside the disturbance.

Baseline sampling was conducted in early fall 2014 along three transects running perpendicular to the charted Cable Area in different depth strata (Figure 3-1). Samples were collected at five stations on each transect using a 0.04 m^2 benthic grab. This design was selected to enable a characterization of the benthic infaunal community in the project area. It will also provide an indication of spatial variability, although a single year does not capture the full range of natural temporal variability that occurs in a system like Little Bay and does not account for events such as storms that affect large areas. In general, the baseline collections showed that within a depth stratum, the transects represented a single, fairly consistent community across the proposed construction zone indicating that a similar gradient-type design for post-installation monitoring should be effective in documenting recovery. For that reason, PSNH proposes a similar study design for additional baseline monitoring (to be conducted in late summer just before in-water installation activities begin) and the post-construction monitoring, locating stations along the transects so that they fall both within and well outside the predicted area of disturbance.

Pre-construction baseline and post-construction benthic monitoring will include analysis of benthic grab samples for grain size, total organic carbon (TOC), and benthic infauna collected from five stations along each of the three transects occupied during the baseline survey. On each transect, one of the stations will be located within the 100-ft wide area of disturbance and the remaining stations will be located outside the disturbed area, two stations to the north and two to the south. Station locations sampled in 2014 will be re-evaluated to confirm whether they remain suitable for impact analysis as the eastern portion of the cable route has been shifted slightly south since the initial baseline sampling. Sampling will take place in September to capture the majority of the annual peak benthic reproductive period and to allow

comparisons to the baseline survey as appropriate (e.g., magnitude of spatial variability within a depth zone). Triplicate benthic grab samples will be collected at each station.

3.2 Determination of Recovery of Benthic Resource Function

Evaluation of recovery of benthic infaunal resources will be based on a series of parameters and measures, including: percent fines (silt + clay), percent sand, total abundance, species diversity and evenness, relative abundance of opportunistic species, specific dominant species, and feeding guilds.

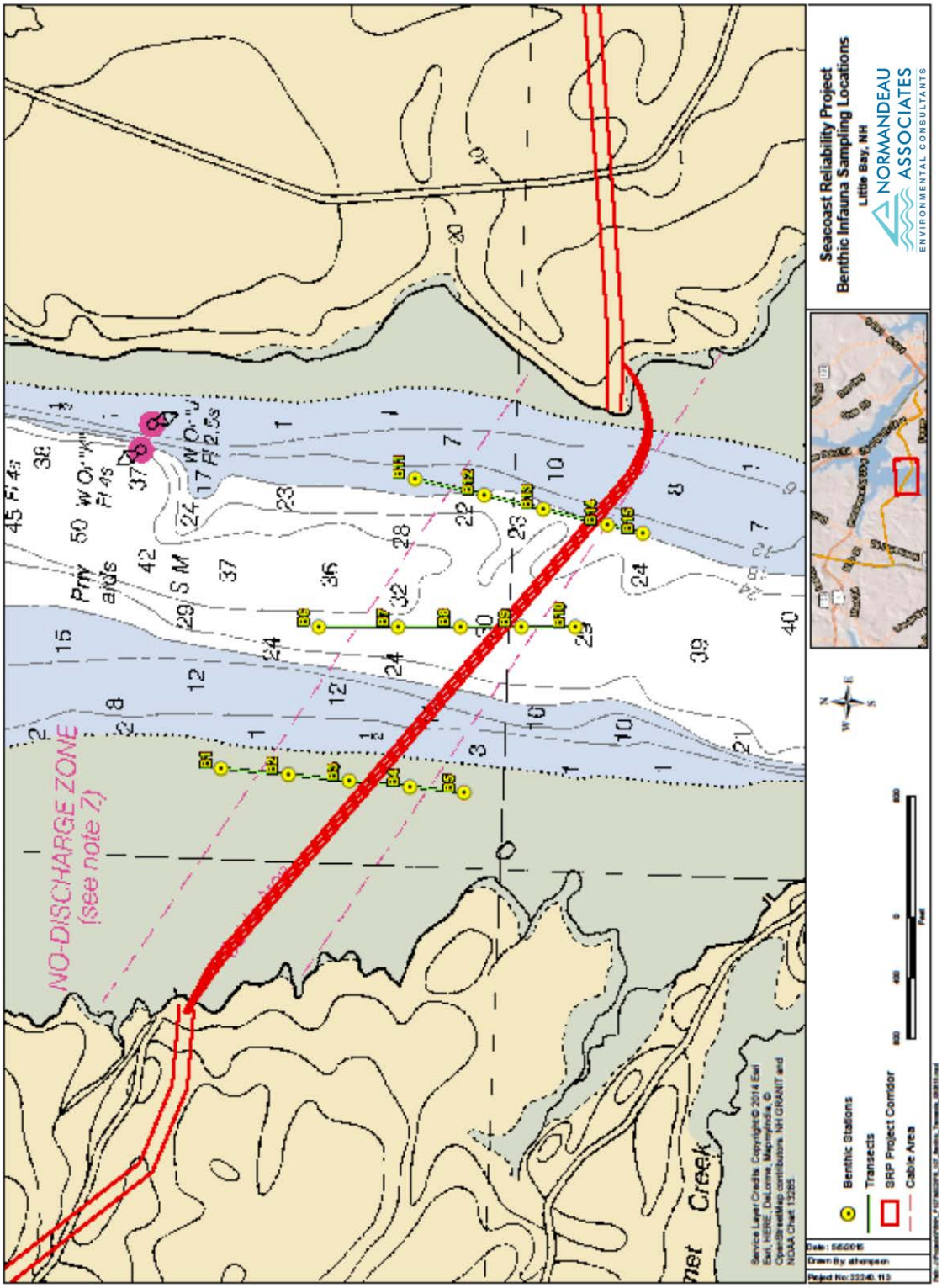

Figure 3-1. Location of 2014 benthic infaunal baseline collections.

Comparisons will be made across the stations along a specific transect. Suggested criteria for evaluating recovery of the benthic infaunal community, as have been used in other monitoring programs (e.g. MWRA's harbor and outfall monitoring program and the HubLine and Northeast Gateway Lateral gas pipeline monitoring programs), are presented in Table 3-1.

Table 3-1. Criteria for Measuring Successful Restoration of Benthic Habitat

Parameter	Criterion (Comparison of Impact Station to range in Non-impact Stations within same depth zone)
Percent Fines	Within 10%
Percent Sand	Within 10%
Total Infauna Abundance	Within 20% (higher or lower)
Species Diversity (Shannon Weiner H')	No more than 10% lower than range
Evenness (Pielou's J')	No more than 10% lower than range
Relative Abundance of Opportunistic Species (e.g., *Polydora cornuta*, *Streblospio benedicti*, and *Capitella capitata*)	On tidal flat, no more than 3-fold difference between impact station and non-impact stations (comparable to range in baseline) In channel – no more than 4-fold difference (range in baseline was 0-186 per grab) unless explainable by differences in grain size and TOC On slope – no more than 4-fold difference (comparable to range in baseline)
Similarity of Dominant Species	Three numerical dominants in impact station are among the dominants (i.e., those taxa that combined make up ≥75% of total abundance) in at least one of the non-impact stations and their relative abundances are within 10%
Similarity of Community Structure	Based on Bray-Curtis similarity, impact station clusters at a similarity value of 60% or higher to at least one other non-impact station
Feeding Guilds	Distribution of species within feeding guilds similar among stations along the transect; no shift from predominantly subsurface deposit feeding to surface deposit feeding community

Sediment grain size is one of the primary factors affecting infaunal community structure. A 10 percent difference in either percent fines or percent sand could potentially result in an altered community and should be considered as an alert. However, it should not stand alone as an indication of project-related change in the benthos. If the criteria based directly on infauna parameters show no or limited differences between the impact station and non-impact stations, then the change in sediment grain size distribution would be considered to be inconsequential.

If the preponderance (i.e., four or more) of the seven biological criteria show similarity between impact stations and non-impact stations along a depth transect, then it will be concluded that benthic infaunal community recovery has occurred. If the preponderance of the criteria shows differences between impact stations and non-impact stations along a depth transect, then greater weight will be given to species diversity, similarity of community structure, and feeding guilds because these criteria each integrate multiple aspects of community structure. The number of opportunistic organisms (e.g., *Polydora, Streblospio* or *Capitella* were examples observed in the 2014 infauna sampling) can vary widely temporally as many have multiple reproductive cycles per year. Therefore, if "relative abundance of opportunists" is one of the criteria suggesting a lack of recovery, the other criteria will be recalculated without these species to get a sense of the magnitude of their influence. If this re-analysis causes other criteria to be met, then PSNH will conclude that recovery has occurred.

Should the results of the survey conducted in the year following installation indicate that any of the impact stations has not recovered biologically, then the survey will be repeated a second year for the affected transect(s). Lack of recovery after two years would suggest a more long-term change in infaunal community structure and the need for mitigation, to be discussed with the regulatory agencies.

Appendix A – Turbidity and TSS Data Collected in Little Bay, 2016-2017

Introduction

In September, 2016, Normandeau Associates, Inc. (Normandeau) installed water quality monitoring equipment in Little Bay Estuary at Newington, New Hampshire in the vicinity of the SRP proposed cable route. Turbidity and other water quality data were monitored continuously at one monitoring station (Station SRP-01) located within an active oyster aquaculture lease area (Bay Point Oyster Company) approximately 500 feet north of the proposed cable route (Figure A.1). Water quality monitoring commenced on September 8, 2016 and continued through December 13, 2016. Water samples were collected weekly prior to October 25 and collected once every two weeks after that date at the same monitoring station (SRP-01) and laboratory analyzed for total suspended solids (TSS). Supplemental data were collected on May 26, 2017 to characterize turbidity and TSS spatially as a channel cross section. A one day sampling effort encompassed a partial tide cycle (low tide, mid-flood, high tide, mid-ebb tide) and consisted of repeated measurements at 5 sampling stations distributed across the cable area (Figure A.1).

Methods

All water quality measurements and water samples during the 2016 sampling period were collected from a single sampling station – SRP-01 – located at 43.09967 °N 70.85634 °W (Figure A.1). This station was located on the southern edge of an aquaculture plot licensed to Bay Point Oyster Company, LLC and within the charted cable area. Water turbidity was measured using a YSI 6920 V2 multi parameter water quality sonde equipped with a YSI 6136 fouling resistant turbidity sensor. Secondary water quality parameters were also collected including temperature, conductivity, pH, and dissolved oxygen. The sonde was deployed using an anchor and buoy system with the sonde located at a relatively constant elevation above the bed surface by using a submerged buoy. The sensor depth was approximately 4 ft above the bed surface and the observed total depth of water at the monitoring station varied between approximately 8 and 20 ft depending on tide. This position was chosen as the lower half of the water column was predicted to be most impacted by the jetplow sediment plume according to the RPS 2015 report, *Modelling Sediment Dispersion from Cable Burial for Seacoast Reliability Project, Little Bay, New Hampshire* (RPS 2015).

The YSI sonde was deployed on September 8, 2016 and was maintained with weekly site visits through October 25, 2016. Site visits were then reduced to a twice-monthly schedule through conclusion of the study on December 13, 2016. A crew of two Normandeau field personnel performed the installation and maintenance of the instrument and collection of water samples. The water quality sonde was set to record measurements at a 15-minute interval. During site visits, the data was downloaded from the sonde and the sensors were recalibrated using manufacturer recommended methods and quality assurance/quality

control (QA/QC) criteria. During each site visit a single grab sample was collected from the monitoring station at the approximate depth of the sonde for laboratory analysis of total suspended solids (TSS). A submersible electric pump with attached tubing was used to pump water from the approximate sonde depth and was then collected in a sample bottle. Water samples were collected in a laboratory-supplied sample container and preserved on ice according to laboratory protocol. Envirosystems, Inc. of Hampton, NH was used for the laboratory analysis of TSS.

After each site visit, data downloaded from the water quality sonde was quality controlled and collated into a project database. Where QA/QC criteria indicated need for data corrections or censorship, we did so following standard established guidelines and procedures for water quality data review and publication (USGS, 2006).

The 2017 sampling event was a one day effort and was designed to supplement the 2016 efforts with spatially distributed data in the cable crossing area. The study was intended to document any changes with depth or channel position (in a cross section) of water turbidity. 5 stations were established in a transect across Little Bay as shown in Figure A.1. The stations were each sampled on four tide stages – low slack, running flood, high slack, and running ebb tides. Stations were accessed by boat and a YSI 6920 V2 multiparameter sonde, as described above, was used for turbidity measurements at 1 meter (3.28 ft.) depth intervals from the water surface to within 0.6 meters (1.97 ft) of the channel bottom. A column composite water sample was also collected for TSS analysis by lowering weighted tubing through the water column, crimping the tubing at the water surface, extracting the filled tubing, and transferring to a sample container. A turbidity reading was measured in the sample container with the YSI sonde to compare against TSS results. All turbidity readings were recorded on field data sheets and all TSS samples were analyzed at Envirosystems, Inc., as above.

TSS Results

During the 2016 monitoring period, grab samples were collected from station SRP-01 during each site visit and submitted for laboratory analysis of TSS. Samples were collected from a depth of approximately 4 feet off the channel bed to compare with turbidity readings from the YSI water quality sonde. TSS results were low from the beginning of the study through early November and ranged from 4.4 to 9.4 mg/L as shown in Table A.1. On November 23 and December 13 higher TSS concentrations of 16 and 18 mg/L, respectively, were documented. Turbidity readings recorded by the deployed YSI 6920 V2 sonde from the nearest timestamp to the time of TSS sample collection are also shown in Table A.1.

During the 2017 water quality monitoring event column composite water samples were collected and submitted for laboratory analysis of TSS. Each of 5 station was sampled four times at different tide stages, as described above, resulting in 20 total TSS samples. TSS results and concurrent turbidity readings are shown in Table A.2.

Table A.1. Total suspended solids laboratory results from grab samples at Station SRP-01

Sample Date and Time	TSS (mg/L)	Turbidity (NTU)
9/8/16 - 12:30	6.9	0.1
9/16/16 - 11:00	7.1	2.6
9/21/16 - 13:00	6.7	1.6
9/28/16 - 10:13	6.9	2.1
10/5/16 - 11:38	5.8	-1.1
10/10/16 - 10:30	4.4	0.0
10/17/16 - 12:12	6.4	2.1
10/25/16 - 9:15	9.4	3.0
11/8/16 13:08	5.4	-2.1
11/23/16 13:11	16	4.4
12/6/16 13:30	4.8	0.1
12/13/16 13:04	18	1.7

Table A.2. Total suspended solids laboratory results from composite samples at Stations LB-01, LB-02, LB-03, LB-04, and LB-05

Station	Sample Date and Time	TSS (mg/L)	Turbidity (NTU)
LB-01	5/26/2017 10:30	12	6.6
LB-01	5/26/2017 13:00	34	5
LB-01	5/26/2017 15:56	13	5.7
LB-01	5/26/2017 16:45	12	5
LB-02	5/26/2017 8:57	31	10.3
LB-02	5/26/2017 12:45	21	8.8
LB-02	5/26/2017 15:41	20	8.1
LB-02	5/26/2017 16:59	16	7.4
LB-03	5/26/2017 9:26	20	8
LB-03	5/26/2017 11:38	15	6.6
LB-03	5/26/2017 14:45	9.4	4.3
LB-03	5/26/2017 17:43	17	7.6
LB-04	5/26/2017 9:45	13	7
LB-04	5/26/2017 11:50	8.4	8.2
LB-04	5/26/2017 15:03	12	4
LB-04	5/26/2017 17:15	14	5.4
LB-05	5/26/2017 10:05	15	7.4
LB-05	5/26/2017 12:15	18	7.8
LB-05	5/26/2017 15:19	14	4.7
LB-05	5/26/2017 16:30	20	4.4

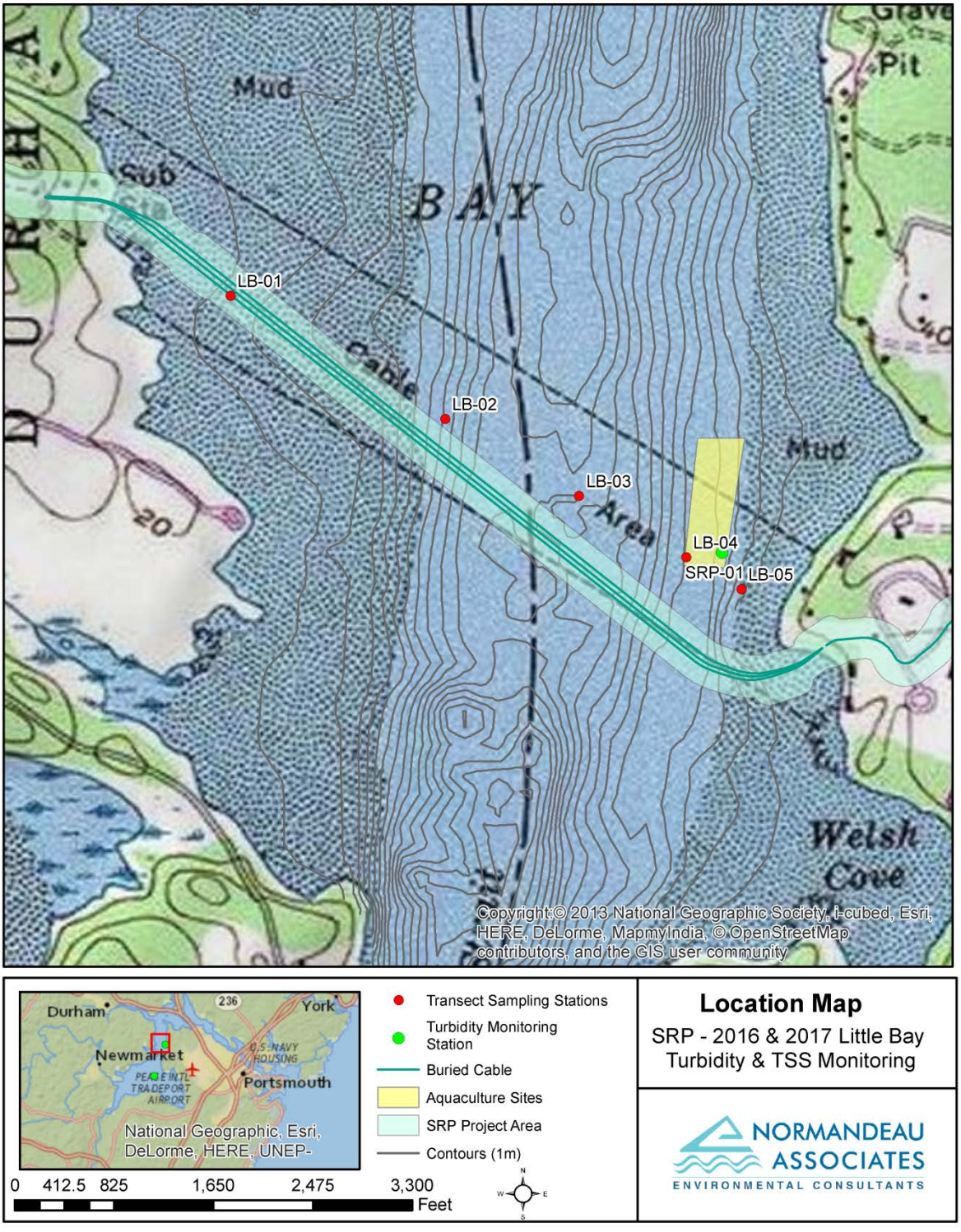

Figure A.1. Location map showing TSS and turbidity monitoring stations

From: Pelletier, Rene
To: Sarah Allen
Subject: FW: Fisheries BMP and TOY restrictions
Date: Monday, August 28, 2017 7:27:53 PM

FYI

Rene Pelletier, P.G.
Assistant Director, Water Division
N.H. Dept. of Environmental Services
P.O. Box 95, 29 Hazen Drive
Concord, N.H. 03302-0095
603-271-2951
Rene.pelletier@des.nh.gov

From: Normandeau, Glenn
Sent: Friday, August 25, 2017 1:09 PM
To: Pelletier, Rene
Subject: FW: Fisheries BMP and TOY restrictions

Rene,
Comments from Cheri

From: Patterson, Cheri
Sent: Friday, August 25, 2017 1:03 PM
To: Normandeau, Glenn; Henderson, Carol
Subject: Re: Fisheries BMP and TOY restrictions

I just finished reading the Confidential BMP's and Construction Plan report. I just would like to get a hold of Sarah to fix a couple of items in the report to correct some life stage issues in the tables. Other than that I am fine with the report and am fine with the jetplow seasonal restrictions. I think they have gone above and beyond the precautions the Environmental Team expressed.

Cheri Patterson
Supervisor of Marine Programs
NH Fish and Game Department
225 Main Street
Durham, NH 03824
(603)868-1095 – office
(603)868-3305 – fax

"NH Fish and Game Department: Connecting you to life outdoors"

From: Normandeau, Glenn
Sent: Friday, August 25, 2017 12:46 PM
To: Henderson, Carol; Patterson, Cheri
Subject: FW: Fisheries BMP and TOY restrictions

Where are we with this? I don't have any problems. How about you?
Glenn

Glenn Normandeau
Executive Director
NH Fish & Game Department - Connecting You to the Outdoors
glenn.normandeau@wildlife.nh.gov
603-271-3511

From: Pelletier, Rene
Sent: Friday, August 25, 2017 12:34 PM
To: Normandeau, Glenn
Subject: FW: Fisheries BMP and TOY restrictions

We really need you to weigh in on this subject ASAP. Thanks

Rene Pelletier, P.G.
Assistant Director, Water Division
N.H. Dept. of Environmental Services
P.O. Box 95, 29 Hazen Drive
Concord, N.H. 03302-0095
603-271-2951
Rene.pelletier@des.nh.gov

From: Sarah Allen [mailto:sallen@normandeau.com]
Sent: Wednesday, August 09, 2017 2:15 PM
To: Henderson, Carol; Patterson, Cheri; Mike R. Johnson (Mike.R.Johnson@noaa.gov); Lefebvre, Lindsey E CIV USARMY CENAE (US) (Lindsey.E.Lefebvre@usace.army.mil)
Cc: Wiggin, Dori; Pelletier, Rene; kurt.nelson@eversource.com; dena.champy@eversource.com; Ann Pembroke
Subject: Fisheries BMP and TOY restrictions

Carol, Cheri and Mike,
DES is continuing review of the Seacoast Reliability Project under the SEC process. DES is looking for confirmation that you are in agreement with Eversource's proposed work window for cable installation in Little Bay. The work is proposed for mid-Sept through mid-October, 2018, which is outside the NH dredge window of Nov 15-Mar 15. Eversource is unable to work during the dredge window because the cable is difficult to handle during cold conditions, and the cable manufacturer has said the cable warranty would be at risk if attempted. The proposed time frame was selected to

avoid impacts to spring fish migrations, and the summer recreational boating season on Little Bay. Please see the attached BMPs for construction that address protection of rare species and EFH, section 2.2 (Fisheries).

If you have any additional questions or comments, do not hesitate to contact me. Please address your DES response to Dori Wiggin and cc me. Your prompt response is appreciated as the project is in the final review stages with DES.

Many thanks,
Sarah

SARAH ALLEN, *Sr. Principal Wetland Scientist*
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Please consider the environment before printing this e-mail.

NORMANDEAU ASSOCIATES
Environmental Consultants

Public Service of New Hampshire
Seacoast Reliability Project

Madbury, Durham, Newington & Portsmouth, NH

Essential Fish Habitat Assessment

Prepared For:
Public Service of New Hampshire
780 North Commercial Street
Manchester, NH 03101

Submitted on:
September 19, 2017

Prepared by:
Normandeau Associates
25 Nashua Rd
Bedford, NH 03110

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1.0 Introduction

The proposed Seacoast Reliability Project ("SRP" or "Project") is a new, 115 kilovolt AC electric power transmission line to be owned and operated by Public Service Company of New Hampshire d/b/a Eversource Energy ("PSNH"). It runs approximately 12.9 miles from PSNH's Madbury Substation in Madbury, New Hampshire, through the Towns of Durham and Newington to PSNH's Portsmouth Substation in Portsmouth, New Hampshire. The SRP includes an approximately 0.9-mile submarine segment within the existing charted Cable Area of Little Bay (Durham/Newington, NH; Figure 1).

The submarine crossing will consist of three cables installed in the sediments using predominantly jet plow technology, with hand jetting and trenching with an excavator near the shore. The specific construction activities and timeframe for the cable installation in Little Bay are estimated as follows: route clearing and preparation between August 1 and September 1; removal of existing cable between September 1 and 15; installation of new cable via jet plow between September 15 and October 15; and handjetting between September 15 and December 31.

This report describes the habitat requirements for species having Essential Fish Habitat (EFH) designation within the proposed Project Area in Little Bay. For each species, the EFH requirements were compared to the existing Little Bay habitat to evaluate the likelihood of that species' occurrence within the proposed Project Area. The potential impacts from the project are discussed relative to the life stages of EFH species likely to be present during the construction work period of August-December.

2.0 Description of Habitat and Proposed Action

2.1 Essential Fish Habitat Description

The Magnuson-Stevens Act of 1976 was established to promote conservation of marine fishery (shellfish and finfish) resources. This included the establishment of eight regional fishery management councils ("FMCs") that develop fishery management plans to properly manage fishery resources within their jurisdictional waters. The 1986 and 1996 amendments to the Magnuson Act, renamed the Sustainable Fisheries Act, recognized that many fisheries are dependent on nearshore and estuarine habitats for at least part of their lifecycles and included evaluation of habitat loss and protection of critical habitat. The marine environments important to marine fisheries are designated as essential fish habitat (EFH) and are defined to include "those waters and substrates necessary to fish for spawning, breeding, feeding, or growth to maturity." The act further mandates that the National Marine Fisheries Service (NMFS) coordinate with other federal agencies to avoid, minimize, or otherwise offset adverse effects on EFH that could result from proposed activities

NMFS uses a grid (10′ latitude by 10′ longitude squares) for geographic designations of EFH and also designates EFH for estuaries and rivers that are outside of the grid (NOAA 2013a). The EFH designations for the Great Bay estuary (NH/ME) include estuarine species as well as marine species from the EFH square (southeast corner at 43°00′ N, 70°40′ W), which partially overlaps the estuary (NOAA 2013b; Figure 2). For each species and life stage, EFH

designation is based on three salinity zones: tidal freshwater (0.0 - < 0.5 parts per thousand (ppt)), mixing water/brackish (0.5 – 25.0 ppt), and seawater (> 25 ppt, Table 1). The project location in Little Bay is fully within the area of the Great Bay estuary designated as seawater zone (NOAA 2013c; Figure 3).

2.2 Existing Habitat at Project Location

The characteristics of the existing habitat in Little Bay at the project location were used to determine the likelihood of EFH presence or absence for each fish species and lifestage with EFH designation in the seawater zone of the Great Bay estuary. See the Natural Resource Existing Conditions Report (Appendix 7 in the SEC Application for Certificate of Site and Facility, April 12, 2017); Characterization of Sediment Quality Along Little Bay Crossing, December 1, 2016; and Supplement to Characterization of Sediment Quality Along Little Bay Crossing, June 30, 2017) for detailed descriptions of existing substrates, biota and water quality conditions. In general, the conditions used for the EFH evaluation of the proposed Project Area were:

- Salinity >25 ppt year-round due to the Little Bay designation as seawater zone;
- Dissolved oxygen (DO) levels similar to Great Bay (3.7 to 17.4 mg/l; NERRS 2014)
- Mean water temperature ranges from 2 to 24°C (36 to 75°F) (NERRS 2014)
- Maximum depth range of 9.3 to 12.3 m (30.6 to 40.2 ft) at the deepest area of the cable corridor
- Substrate of fine sand, silt and soft mud in the intertidal zone
- Substrate of fine to medium sand, silts, clay, and shell fragments in deeper areas

3.0 EFH Species

3.1 Great Bay Estuary EFH Species

The seawater salinity zone of the Great Bay estuary is designated as potential EFH for at least one life stage of 12 finfish and one shellfish species (Table 1). The specific EFH criteria for each life stage of these 13 species were used to determine potential EFH presence by month at the project location (Table 2). The determination of EFH presence at the project location does not imply historic or current use by that species or life stage, only that the EFH criteria are met. For any species and life stage identified as having EFH at the project location, all potential Project-related EFH impacts were evaluated.

3.1.1 Atlantic Cod (*Gadus morhua*)

Primary EFH Reference: Lough 2004.
The Great Bay estuary contains EFH for Atlantic Cod eggs and larvae in the seawater zone (Table 1). Cod Egg EFH is surface waters from fall through spring, with temperatures <12°C (54°F), salinities 32-33 ppt, and bottom depths <110 m (360.9 ft) (Table 2). Larvae have a minimum EFH depth of 30 m (98.4 ft), and the maximum depth of the project location is 12.3 m (40.4 ft). The Project area contains EFH for Atlantic Cod eggs, and likely does not contain EFH for Atlantic Cod larvae.

Atlantic Cod spawning generally occurs on gravel and cobble substrate in geographic areas where the eggs and larvae are likely to be retained (Fahay 1983, Hutchings et al. 1993). The intertidal zone and deeper areas of the Little Bay cable corridor have a fine sand and soft mud substrate, with some areas of exposed compact gravel. Although spawning would not likely occur within the proposed Project Area due to the soft substrate, Atlantic Cod eggs are buoyant and pelagic and are likely transported into the Great Bay estuary from nearshore Atlantic Ocean spawning grounds. Atlantic Cod eggs and larvae are relatively "common" in Great Bay (Jury *et al*. 1994). The maximum Great Bay water temperature from January through March meets the Atlantic Cod egg EFH criteria of <12°C (54°F). Monthly mean water temperature in Great Bay is <12°C (54°F) in November, December, and April, although the maximum temperatures during those months may exceed 12°C (54°F). Atlantic Cod egg EFH may be present at the Project Area from November through April (Table 3).

3.1.2. Atlantic Halibut (*Hippoglossus hippoglossus*)

Primary EFH Reference: Carginelli *et al*. 1999

The seawater zone of the Great Bay estuary contains EFH for Atlantic Halibut eggs, larvae, juveniles, adults, and spawning adults (Table 1). Atlantic Halibut Egg EFH includes temperatures 4-7°C (39-45°F), salinities <35 ppt, and bottom depths <700 m (2,296.6 ft) (Table 2). EFH for larvae is surface waters with salinity 30-35 ppt (Table 2). Ichthyoplankton surveys in the Piscataqua River in 2000-2003 did not collect any Atlantic Halibut eggs or larvae (NAI 2004). Spawning is believed to occur on rough or rocky slopes of the continental shelf outer bank at depths of 183 to 700 m (600.4 to 2,296.6 ft) (Scott and Scott 1998, Haug 1990), although the EFH depth requirement is defined as <700 m (2,296.6 ft). The maximum depth at the project location does not meet the EFH depth requirement of Juvenile (20 m; 65.6 ft) or Adult (100 m; 328.1 ft) Atlantic Halibut.

Atlantic Halibut eggs are buoyant and drift suspended in the water column at 54-90 m (177.2-295.3 ft) (Collette and Klein-MacPhee 2002). Additionally, Atlantic Halibut are uncommon in the Gulf of Maine, where there is no present-day spawning population (Collette and Klein-MacPhee 2002). The overall scarcity of this species in the geographic region and the shallow depths of the cable corridor suggest that Atlantic Halibut egg or larvae are highly unlikely to occur at the project location in Little Bay. However, the project location meets EFH criteria for Atlantic Halibut eggs and spawning adults from November through March, and for larvae with no defined period of occurrence (Table 3).

3.1.3. Atlantic Herring (*Clupea harengus*)

Primary EFH Reference: Stevenson and Scott 2005.

The Great Bay estuary contains EFH for larval and juvenile Atlantic Herring in the seawater zone (Table 1). The minimum EFH depth requirements for these life stages are 50 m (164 ft) for larvae and 15 m (49.2 ft) for juveniles (Table 2). Due to insufficient depth, EFH is not present at the project location for any life stage of Atlantic Herring.

3.1.4. Atlantic Mackerel (*Scomber scombrus*)

Primary EFH Reference: Studholme *et al*. 1999.

The seawater zone of the Great Bay estuary contains EFH for Atlantic Mackerel eggs, larvae, and juveniles. The habitat for these life stages is pelagic waters with minimum depths of 0 m for eggs and juveniles, and 10 m (32.8 ft) for larvae (Table 2). The EFH criteria do not define a period of occurrence for any Atlantic Mackerel life stage. Based on EFH temperatures and periods of occurrence described by Jury *et al*. (1994), the proposed project location likely provides EFH for Atlantic Mackerel eggs in May and June, for larvae in May, June and August, and for juveniles from August through December (Table 3).

3.1.5. Atlantic Sea Scallop (*Placopecten magellanicus*)

Primary EFH Reference: Hart 2004.
The seawater zone of the Great Bay estuary contains EFH for juvenile and adult Atlantic Sea Scallops (Table 1). The water depth at project location is shallower than that described for juveniles and adults EFH (18-110 m) (59.1-360.9 ft). Due to insufficient depth, EFH is not likely present at the project location for any life stage of Atlantic Sea Scallop.

3.1.6. Bluefish (*Pomatomus saltatrix*)

Primary EFH Reference: Shepherd and Packard 2006.
The Great Bay seawater zone contains EFH for juvenile and adult Bluefish (Table 1). Both life stages are described as pelagic. Juveniles are common in Great Bay from June through October (Jury *et al*. 1994), and prefer salinities 23-33 ppt but may occur in salinities as low as 3 ppt (Table 2). Juveniles have a preferred temperature range of 19-24 °C (66-75°F), and may use tidal creeks during the day. Adults are highly migratory and prefer salinities > 25 ppt and temperatures of 14-16 °C (57-61°F). Both juveniles and adults occur in North Atlantic estuaries from June through October. The project location in Little Bay likely contains juvenile Bluefish EFH from June through October, and adult Bluefish EFH in October.

3.1.7. Haddock (Melanogrammus aeglefinus)

Primary EFH Reference: Brodziak 2005.
The Great Bay seawater zone contains EFH for egg and larval Haddock (Table 1). The project location bottom depth is shallower than the EFH ranges described for both egg (50-90 m) (164-295.3 ft) and larval (30-90 m) (98.4-295.3 ft) life stages. Haddock EFH is likely not present at the project location.

3.1.8. Pollock (*Pollachius virens*)

Primary EFH Reference: Cargnelli *et al*. 1999.
The seawater zone of Great Bay contains EFH for eggs, larvae, and juvenile Pollock (Table 1). The project location does not meet the EFH depth requirements of eggs (30-270 m) (98.4-885.8 ft). Larval Pollock EFH is pelagic waters over 10-250 m (32.8-820.2 ft) bottom depths. Juvenile EFH is bottom habitats of vegetation, sand, mud, or rocks at depths of 0-250 m (0-820.2 ft), and includes the intertidal zone throughout the summer. Great Bay water temperatures exceed the EFH maximum for larvae and juveniles during summer months (June-September). Pollock EFH is likely present at the project location for larvae from October through May, and for juveniles during May and October (Table 3).

3.1.9. Red Hake (*Urophycis chuss*)

Primary EFH Reference: Steimle *et al.* 1999.
The seawater zone of the Great Bay Estuarine Reserve contains EFH for juvenile and adult Red Hake (Table 1). Juvenile EFH is bottom habitat with shell fragment substrate, including areas with an abundance of live scallops. Juvenile Red Hake EFH is likely not present at the project location due to the dominant sand and mud substrate although this life stage has been reported to be common in Great Bay from July through October (Jury *et al*. 1994). Adult EFH is described as bottom habitat in depressions in sand and mud, with a temperature requirement of <12°C (54°F). The mean temperature in Great Bay from 2009-2014 was <12°C (54°F) from November through April. Although adult Red Hake are common in Great Bay from July through October (Jury *et al.* 1994), water temperatures during that time period exceed EFH criteria. Adult Red Hake EFH is likely present at the project location in the months of March, April, November and December (Table 3).

3.1.10. White Hake (*Urophycis tenuis*)

Primary EFH Reference: Chang *et al.* 1999a.
The Great Bay seawater zone contains EFH for eggs, juvenile and adult White Hake (Table 1). Eggs are pelagic and occur in August and September, with no other EFH conditions specifically described. Hake eggs (*Urophycis* and *Phycis* spp.) are found in temperatures 4-25°C (39-77°F) (Berrien and Sibunka 1999). Juveniles have pelagic and demersal stages, with the pelagic stage occurring in May-September. The habitat of demersal juveniles and adults is depths >5 m (16.4 ft), with substrates of mud or fine-grained sand. The project location likely contains EFH for White Hake eggs (August, September), juveniles (May, June, and September), and adults (March-May, October and November; Table 3).

3.1.11. Windowpane Flounder (*Scophthalmus aquosus*)

Primary EFH Reference: Chang *et al.* 1999b.
The seawater zone of Great Bay contains EFH for eggs, larvae, juvenile, adult, and spawning adult Windowpane Flounder (Table 1). The project location meets EFH bottom depth requirements for all life stages. Eggs are found in surface waters and larvae are pelagic, with both stages occurring February-November. Windowpane eggs and larvae were identified in ichthyoplankton samples collected from 2001-2003 in the Piscataqua River (NAI 2004). Juvenile, adult, and spawning adult EFH is bottom habitats with fine sand or mud substrate, with spawning adults occurring February-December. Juveniles may occur in the summer, and adults may be found at the project location all year (Collette and Klein-McPhee 2000). The project location contains EFH for all life stages of Windowpane Flounder. EFH for eggs and larvae is likely present during February-June and September-November, and juvenile EFH is likely present June-October (Table 3). Adult Windowpane EFH may be present year-round, and spawning adult EFH is likely present February-June and September-December (Table 3).

3.1.12. Winter Flounder (Pseudopleuronectes americanus)

Primary EFH Reference: Pereira *et al.* 1999.
The seawater zone of Great Bay contains EFH for egg, larval, juvenile, adult, and spawning adult Winter Flounder (Table 1). The proposed project location meets the EFH criteria for

bottom depth and substrate for all life stages (Table 2). The EFH period of occurrence is February through June for eggs and spawning adults, and March through July for larvae. Juvenile Winter Flounder spend their first year in shallow inshore waters at temperatures <30°C (86°F). Adult Winter Flounder occupy inshore waters from fall through spring, and prefer temperatures <15°C (59°F). The project location likely contains EFH during some portion of the year for each life stage of Winter Flounder (Table 3).

Winter flounder commonly spawn in water < 5 m (16.5 ft) deep in estuaries and bays. The demersal eggs adhere to the substrate, which is most commonly sand, but may also be mud, gravel, or algal mats. Winter Flounder eggs have been found in water temperatures < 10°C (50°F) at salinities ranging from 10 to 30 ppt (Collette and Klein-MacPhee 2002). Spawning is typically described as occurring in estuaries, coastal ponds, or backwaters. Additionally, the demersal eggs remain adhered to the substrate at the spawning location, and larvae and juveniles do not disperse far from the spawning area (Perlmutter 1947). Spawning in waters with restricted flow and low turnover rates has been found to keep developing larvae in nursery habitat (Crawford and Carey 1985, Monteleone 1992). Winter Flounder spawning and subsequent egg deposition and larval development in the vicinity of the Little Bay cable corridor may be limited due to tidal water flow. Adult Winter Flounder are abundant in Great Bay during all months of the year (Jury *et al*. 1994). Juveniles and adults have the potential to use habitat within the cable corridor when temperature requirements are met, particularly during high tide when the maximum amount of habitat is accessible.

3.1.13. Yellowtail Flounder (*Limanda ferruginea*)

Primary EFH Reference: Johnson *et al.* 1999.
The Great Bay seawater zone contains EFH for egg and larval Yellowtail Flounder (Table 1). The minimum EFH depth requirement for eggs is 30 m (98.4 ft). The proposed project location has a maximum depth of 12.3 m (40.4 ft), and therefore does not contain EFH for Yellowtail Flounder eggs. The cable corridor meets the larval EFH criteria of 10-90 m (32.8-295.3 ft) depth and <17°C (63°F) temperature. In the Great Bay seawater zone, Yellowtail Flounder larvae are described as "rare" with a period of occurrence of April-September (Jury *et al*. 1994). Yellowtail Flounder larvae were identified from ichthyoplankton surveys conducted from 2001-2003 in the Piscataqua River downstream of the project location (NAI 2004). The proposed project location likely contains EFH for Yellowtail Flounder larvae.

4.0 Impacts to EFH Species

For the thirteen species with EFH designation in the Great Bay estuary, the proposed Project Area in upper Little Bay was determined to meet the EFH requirements for at least one life stage of ten species at some point during the year (Table 4). The remaining three species, Atlantic Herring, Atlantic Sea Scallop and Haddock, have life cycle requirements, primarily water depths, that result in no EFH present in the Project Area. One or more lifestages of nine of the ten species is expected to be in Little Bay in August-December during the proposed cable installation work window. Yellowtail Flounder has no EFH lifestage within the Project area during the construction window. Of the remaining nine species, Atlantic Cod only have surface water EFH (planktonic eggs); Atlantic Mackerel (larvae, juveniles

and adults) and Bluefish (juveniles and adults) only have pelagic (mid-water) EFH. White Hake eggs, Pollock larvae, and White Hake eggs and larvae are also planktonic. The other life stages of Atlantic Halibut (eggs), Pollock (juveniles), Red Hake (adults), White Hake (juveniles and adults), Windowpane Flounder (juveniles, adults, and spawning adults), and Winter Flounder (juveniles and adults) present in the Project Area are demersal (benthic).

During the approximate 7-13 hour period anticipated for each of the three jet plow cable installations, EFH for the demersal species will be temporarily reduced in areal extent due to suspended solids and bottom disturbance that may last for several hours for any given location. During that period, EFH for pelagic species will be temporarily degraded by increased suspended sediments for a short period in a narrow band perpendicular to the cable route during installation of each cable (see hourly plume predictions in the June 30, 2017 Supplement, Document 1, Figures 3-7 and 3-8).

The jet plow water pumps may require up to 1000 m^3 of seawater per hour. Extrapolating for three 13-hour runs, the total water volume required for pumping could equal approximately 0.2% of the mid-tide volume of Little Bay (see calculations in the Natural Resource Impact Assessment, Appendix 34 of the April 12, 2016 application, Section 5.5). While early lifestages of several EFH fish species (Atlantic Cod, Atlantic Halibut, Atlantic Mackerel, Pollock, White Hake and Windowpane Flounder) may be present during the installation period and may be subject to entrainment, egg and larval abundances of these species are typically lower during September and October than during other parts of the year (Jury et al. 1994), therefore minimizing impacts to those species.

Probes in the nearshore areas indicate that shallow rock will prohibit achieving the full burial depth required for the cable in some locations. In those areas, up to 8,681 square feet of concrete mattresses will be installed to protect the cable from damage from anchoring, boats, fishing, vandalism and ice. Of the 2,382 square feet of concrete mattresses estimated on the west shore, approximately 95% (2,269 square feet) will be above mean lower low water (MLLW) and the remainder below. Of the 5661 square feet of mattresses estimated on the east shore, approximately 25% (1,395 square feet) will be above MLLW, and the remainder below. Four of the 8x20-foot concrete mattresses (640 square feet) may be required within the channel although subbottom profiling indicates that will likely not be necessary. In most areas, the concrete mattresses will replace soft substrate. If the overlying sediment is thicker than the mattresses (9 inches), the mattresses are expected to become partially or fully embedded in the sandy silt substrate. In the very nearshore where soft sediments are thinner, the mattresses will more likely remain exposed and are expected to become colonized with macroalgae and associated epifauna, such as barnacles, mussels and oysters, similar to the rocks in the area. Exposed concrete mattresses will reduce the preferred habitat for most demersal EFH species expected to occur in the project area. As this area is very small relative to the available habitat, this loss is unlikely to affect the ability of any fish species to use the bay for any purpose, including feeding, reproduction, and refuge. Where concrete mattresses become embedded, fishes that feed on benthic infauna will continue to be able to feed once colonization has occurred. Where concrete mattresses become colonized with macroalgae, availability of refuge will be increased and small fish, including juvenile Pollock, will benefit.

The buried cables have the potential to emit magnetic fields into the sediments and overlying water column. Demersal pelagic fishes, including some EFH species, potentially could be exposed to these fields, particularly in the shallow portions of the crossing where cables will be buried with only 3.5 feet of cover. Normandeau et al. (2011) found, however, that the magnetic fields emitted from low voltage AC cables such as the SRP are unlikely to be detectable by most fishes. Eversource has agreed to perform magnetic field measurements upon completion of the project. A plan for this monitoring has not been established at this time, but it will be provided the regulatory agencies for review and comment when it is prepared.

None of the underwater activities involved in installing the cables in Little Bay will generate percussive sounds. Although some rock removal will be required in the intertidal zones, this activity will occur at low tide, in the dry, minimizing sound transmission into the water.

No other impacts to EFH from the project are anticipated.

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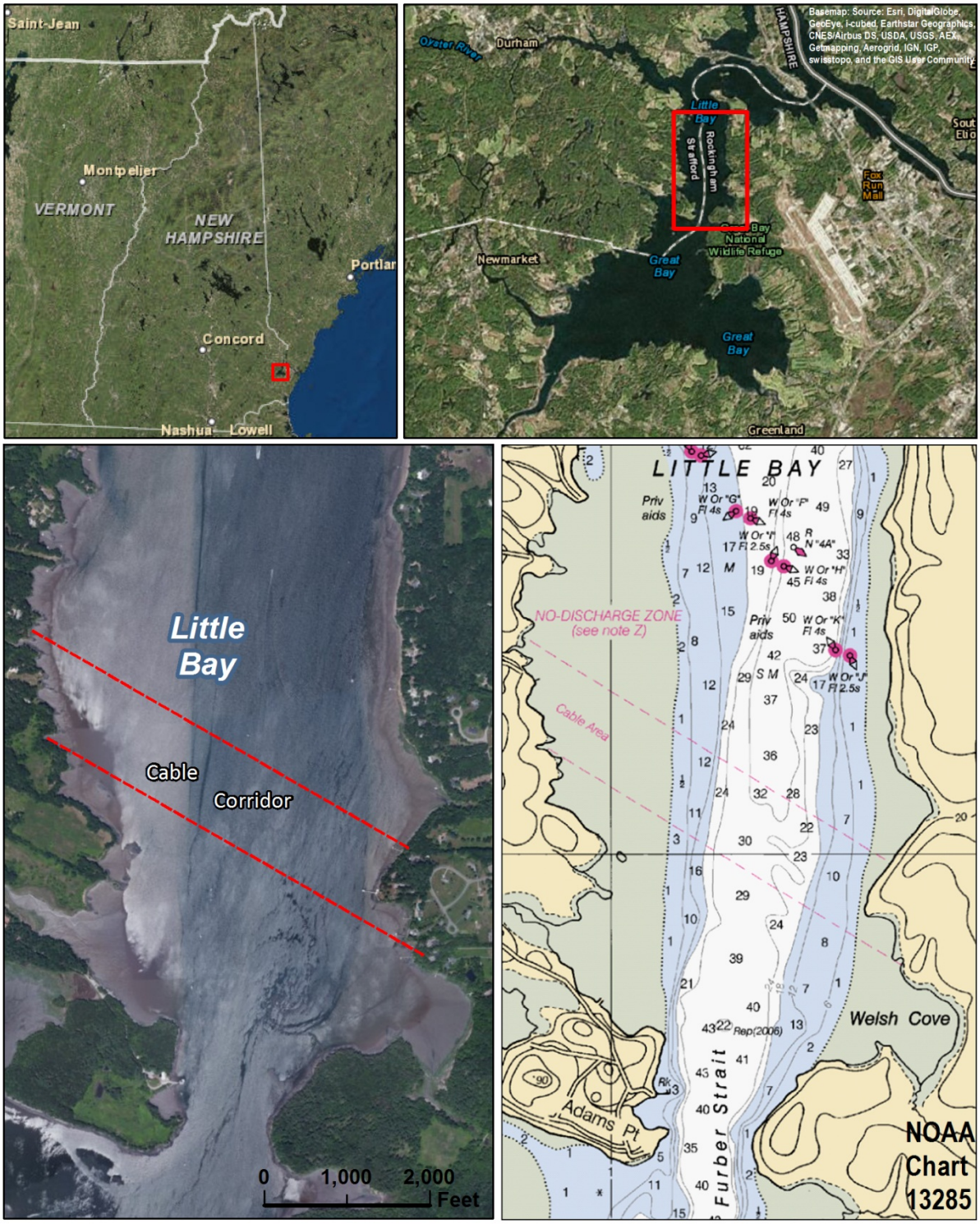

Figure 1. Location of the proposed cable crossing within the charted Cable Area in Little Bay.

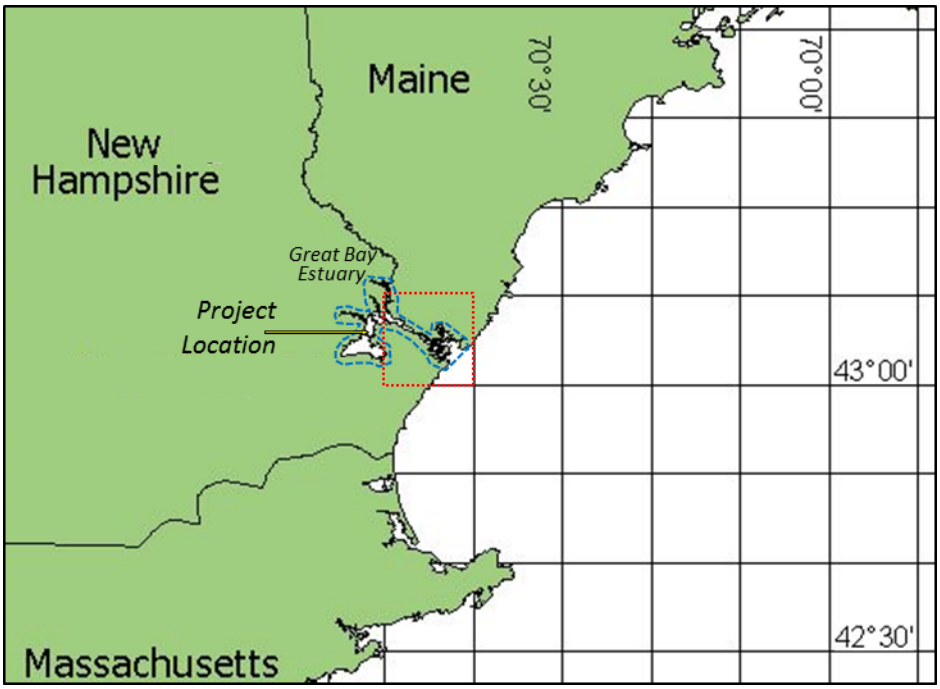

Figure 2. Essential Fish Habitat (EFH) for the Great Bay estuary (dashed blue outline) includes species within the estuary and also species within the EFH grid which overlaps a portion of the estuary (dashed red outline). Figure is modified from NOAA (2013a)

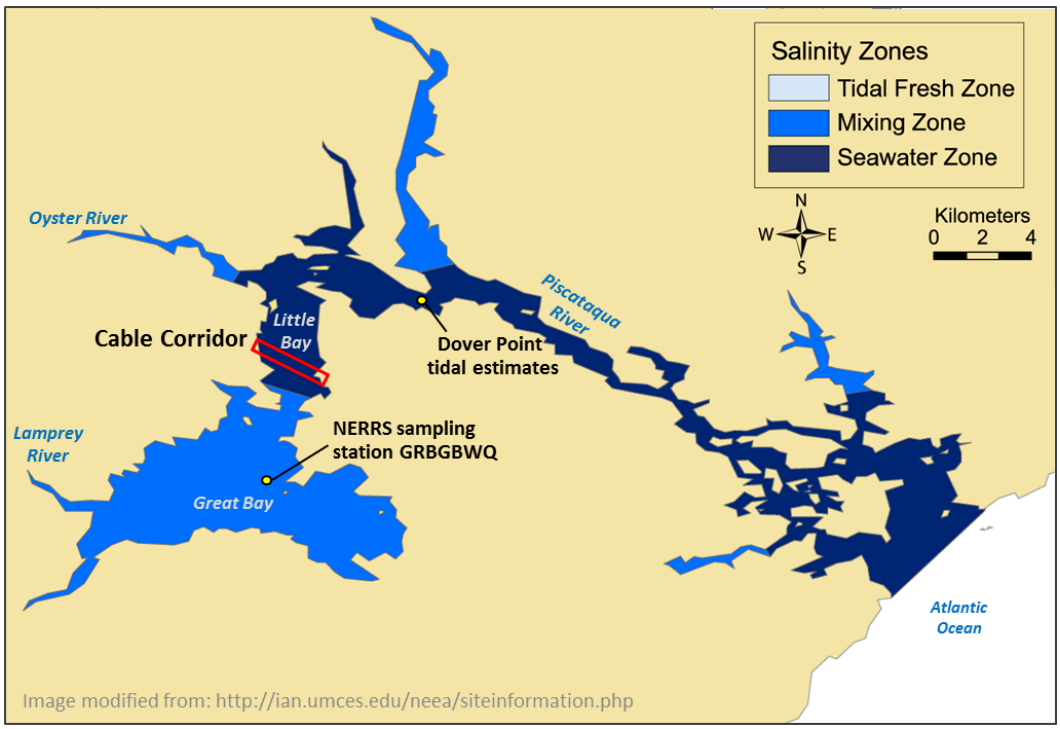

Figure 3. Salinity zones of the Great Bay estuary showing the location of the Little Bay cable corridor, and sampling stations used for estimates of water temperature, dissolved oxygen, and tide levels (modified from: NOAA 2013c)

Table 1. Summary of Essential Fish Habitat (EFH) Designations for the Great Bay Estuary (New Hampshire/Maine). Only species and life stages with saltwater EFH were evaluated for the proposed Little Bay cable crossing project.

Species	Salinity Zone*				
	Eggs	**Larvae**	**Juveniles**	**Adults**	**Spawning Adults**
Atlantic Cod (*Gadus morhua*)	S	S			
Atlantic Halibut (*Hippoglossus hippoglossus*)	S	S	S	S	S
Atlantic Herring (*Clupea harengus*)		M,S	M,S		
Atlantic Mackerel (*Scomber scombrus*)	M,S	M,S	S		
Atlantic Salmon (*Salmo salar*)			F,M		
Atlantic Sea Scallop (*Placopecten magellanicus*)			S	S	
Bluefish (*Pomatomus saltatrix*)			M,S	M,S	
Haddock (*Melanogrammus aeglefinus*)	S	S			
Pollock (*Pollachius virens*)	S	S	S		
Red Hake (*Urophycis chuss*)			S	S	
White Hake (*Urophycis tenuis*)	S		S	S	
Windowpane Flounder (*Scopthalmus aquosus*)	S	S	S	S	S
Winter Flounder (*Pleuronectes americanus*)	M,S	M,S	M,S	M,S	M,S
Yellowtail Flounder (*Pleuronectes ferruginea*)	S	S			

* Freshwater (F): salinity <0.5ppt

Mixing Zone (M): 0.5 < salinity <25ppt

Seawater (S): salinity > 25ppt

Table 2. Descriptions for life stages of species with Essential Fish Habitat (EFH) designations for the Great Bay estuary saltwater zone (salinity >25ppt). The specific requirements for each life stage was used to determine EFH presence at the proposed Little Bay cable crossing project location.

Species	Lifestage	Temp. (°C)	Salinity (ppt)	Bottom Depth (m)	Habitat	Period of Occurance[1]	EFH Present at Project Location
Atlantic Cod (*Gadus morhua*)	Eggs	<12	32 - 33	<110	Surface waters	Fall-Spring	Yes
	Larvae	<10	32 - 33	30-70	Pelagic waters	Spring	No
Atlantic Halibut *(Hippoglossus hippoglossus)*	Eggs	4 - 7	<35	<700	Pelagic waters to the sea floor	Between late fall and early spring, peak Nov and Dec.	Yes
	Larvae		30 - 35		Surface waters		Yes
	Juveniles	>2		20 - 60	Bottom habitats with a substrate of sand, gravel, or clay		No
	Adults	<13.6	30.4-35.3	100-700	Bottom habitats with a substrate of sand, gravel, or clay		No
	Spawning Adults	<7	<35	<700	Substrate of soft mud, clay, sand, or gravel; rough or rocky bottom locations along slopes of outer banks	Between late fall and early spring; peak Nov and Dec	No
Atlantic Herring *(Clupea harengus)*	Larvae	<16	32	50 - 90	Pelagic waters	Between August and April, peaks from Sept. - Nov.	No
	Juveniles	<10	26 - 32	15-135	Pelagic waters and bottom habitats		No
Atlantic Mackerel *(Scomber scombrus)*	Eggs	5 - 23	18 - >30	0 - 15	Pelagic waters		Yes
	Larvae	6 - 22	>30	10-130	Pelagic waters		Yes
	Juveniles	4 - 22	>25	0 - 320	Pelagic waters		Yes
Atlantic Sea Scallop (*Placopecten magellanicus*)	Juveniles	<15		18-110	Bottom habitats with a substrate of cobble, shells, and silt		No
	Adults	<21	>16.5	18-110	Bottom habitats with a substrate of cobble, shells, coarse/gravelly sand, and sand		No
Bluefish *(Pomatomus saltatrix)*	Juveniles	19-24	23 - 36		Pelagic waters	N. Atlantic estuaries: Jun-Oct Mid-Atlantic estuaries: May-Oct S. Atlantic estuaries: Mar-Dec	Yes
	Adults	14-16	>25ppt		Pelagic waters	N. Atlantic estuaries: Jun-Oct Mid-Atlantic estuaries: Apr-Oct S. Atlantic estuaries: May-Jan	Yes

Table 2. Continued

Species	Lifestage	Temp. (°C)	Salinity (ppt)	Bottom Depth (m)	Habitat	Period of Occurance	EFH Present at Project Location
Haddock (*Melanogrammus aeglefinus*)	Eggs	<10	34 - 36	50 - 90	Surface waters	Mar-May, peak in April	No
	Larvae	<14	34 - 36	30 - 90	Surface waters	Jan-Jul, peak in April and May	No
Pollock (*Pollachius virens*)	Eggs	<17	32 - 32.8	30-270	Pelagic waters	Oct-Jun; peaks Nov-Feb	No
	Larvae	<17		10-250	Pelagic waters	Sep-Jul; peaks Dec-Feb	Yes
	Juveniles	<18	29 - 32	0 - 250	Bottom habitats with aquatic vegetation or a substrate of sand, mud or rocks	Intertidal zone throughout summer	Yes
Red Hake (*Urophycis chuss*)	Juveniles	<16	31 - 33	<100	Bottom habitats with substrate of shell fragments, including areas with an abundance of live scallops		No
	Adults	<12	33 - 34	10-130	Bottom habitats in depressions with a substrate of sand and mud		Yes
White Hake (*Urophycis tenuis*)	Eggs				Surface waters	Aug-Sep	Yes
	Juveniles	<19		5 - 225	Pelagic stage - pelagic waters; Dermersal stage - Bottom habitat with seagrass beds or substrate of mud or fine-grained sand	Pelagic stage May-Sep	Yes
	Adults	<14		5 - 325	Bottom habitats with substrate of mud or fine-grained sand in deep water		Yes
Windowpane Flounder (*Scophthalmus aquosus*)	Eggs	<20		<70	Surface waters	Feb-Nov, peaks May and Oct in Mid Atlantic; Jul-Aug on GB	Yes
	Larvae	<20		<70	Pelagic waters	Feb-Nov, peaks May and Oct in Mid Atlantic; Jul-Aug on GB	Yes
	Juveniles	<25	5.5 - 36	1 - 100	Bottom habitats with substrate of mud or fine grained sand		Yes
	Adults	<26.8	5.5 - 36	1 - 75	Bottom habitats with substrate of mud or fine grained sand		Yes
	Spawning Adults	<21	5.5 - 36	1 – 75	Bottom habitats with substrate of mud or fine grained sand	Feb – Dec Peak in May in Mid. Atlantic	Yes

Continued

Table 2. Continued

Species	Lifestage	Temp. (°C)	Salinity (ppt)	Bottom Depth (m)	Habitat	Period of Occurance	EFH Present at Project Location
Winter Flounder *(Pseudopleuronectes americanus)*	Eggs	<10	10 - 30	<5	Bottom habitats with a substrate of sand, muddy sand, mud, and gravel	February to June, peak in April on GB	Yes
	Larvae	<15	4 - 30	<6	Pelagic and bottom waters	March to July, peaks in April and May on GB	Yes
	Juveniles	<25	10 - 30	1 - 50	Bottom habitats with a substrate of mud or fine grained sand		Yes
	Adults	<25	15 - 33	1 - 100	Bottom habitats including estuaries with substrate of mud, sand, gravel		Yes
	Spawning Adults	<15	5.5-36	<6	Bottom habitats including estuaries with substrate of mud, sand, gravel	Feb – Jun	Yes
Yellowtail Flounder *(Limanda ferruginea)*	Eggs	<15	32.4 - 33.5	30 - 90	Surface Waters	Mid-March to June; peaks in Aprl to June in southern NE	Yes
	Larvae	<17	32.4 - 33.5	10 - 90	Surface waters	March to April in New York bight; May to July in southern NE and southeastern GB	Yes

1. Geographic Areas: Gulf of Maine (GOM), George's Banks (GB), Southern New England (NE)

Table 3. Periods of occurrence and water temperatures for species and life stages determined to have EFH within the proposed Project Area in Little Bay.

Species	Life Stage	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Note
Atlantic Cod	Eggs	●	●	●	●	●	●			●	●	●	●	
Atlantic Halibut	Eggs	●	●	●	●							●	●	
	Larvae													1
	Spawning	●	●	●	●							●	●	
Atlantic Mackerel	Eggs					o	o							2
	Larvae					o	o	o	o					2
	Juveniles								o	o	o	o	o	2
Bluefish	Juveniles						●	●	●	●	●			
	Adults						●	●	●	●	●			
Pollock	Larvae	●	●	●	●	●	●	●		●	●	●	●	
	Juveniles					o	●	●	●	●	o			3
Red Hake	Adults			o	o	o	o	o	o	o	o	o	o	2
White Hake	Eggs								●	●				4
	Juveniles					●	●	●	●	●				
	Adults			o	o	o	o				o	o		5
Windowpane Flounder	Eggs		●	●	●	●	●	●	●	●	●	●		
	Larvae		●	●	●	●	●	●	●	●	●	●		
	Juveniles						o	o	o	o	o			6
	Adults	o	o	o	o	o	o	o	o	o	o	o	o	6
	Spawning		●	●	●	●	●	●	●	●	●	●	●	
Winter Flounder	Eggs		●	●	●	●	●							
	Larvae			●	●	●	●	●						
	Juveniles	o	o	o	o	o	o	o	o	o	o	o	o	6
	Adults	o	o	o	o	o					o	o	o	6
	Spawning		●	●	●	●	●							
Yellowtail Flounder	Larvae			o	●	●	●	●	●	o				2
Total meeting EFH temperature and time-of-year requirements (● or ●)		4	9	10	9	8	5	1	2	6	6	7	5	

Description	
	Mean and max water temp meets EFH
	Mean water temp meets EFH / Max water temp does not meet EFH
	Mean and max water temp do not meet EFH / Within period of occurrence
	Mean and max water temp do not meet EFH / Not within period of occurrence
●	EFH defined period of occurrence
o	Period of occurrence when not defined by EFH (see notes)

Notes

1. No EFH defined period of occurrence; larval timing and distribution not known; spawning not believed to occur in Gulf of Maine (Collette and Klein McPhee 2000)
2. Period of occurrence from Jury et al. (1994).
3. EFH period only described for intertidal juveniles (Cargnelli *et al*. 1999b)
4. Temperature range from Berrien and Sibunka 1999.
5. Period of occurrence from Fahay and Able (2011).
6. Period of occurrence from Collette and Klein McPhee (2000)

Table 4. Fish species and life stages with EFH in the SRP Project area that may be subject to temporary or permanent impacts resulting from construction within the August-December window.

Species	Life Stage	Water Region	Impact Type		
			Permanent	Temporary	
			Area[a]	Area[b]	Duration[c]
Atlantic Cod	Eggs	Surface		6.22 – 35.34 acres	23 to 41 hours
Atlantic Halibut	Eggs	Surface to Bottom			
	Spawning Adults	Demersal	≤ 8,681 ft²		
Atlantic Mackerel	Larvae	Pelagic			
	Juveniles	Pelagic			
Bluefish	Juveniles	Pelagic			
	Adults	Pelagic			
Pollock	Larvae	Pelagic			
	Juveniles	Demersal	≤ 8,681 ft²		
Red Hake	Adults	Demersal	≤ 8,681 ft²		
White Hake	Eggs	Surface			
	Juveniles	Pelagic to Demersal	≤ 8,681 ft²		
	Adults	Demersal	≤ 8,681 ft²		
Windowpane Flounder	Eggs	Surface			
	Larvae	Pelagic			
	Juveniles	Demersal	≤ 8,681 ft²		
	Adults	Demersal	≤ 8,681 ft²		
	Spawning Adults	Demersal	≤ 8,681 ft²		
Winter Flounder	Juveniles	Demersal	≤ 8,681 ft²		
	Adults	Demersal	≤ 8,681 ft²		

a. Maximum area of concrete mattresses
b. Excess total suspended solids (TSS) concentration ≥10 ppt.
c. Three jet plowing events of 7 to 13 hours, plus TSS plume persistence of 39 minutes after each plowing event.