EVERSOURCE ENERGY

13 Legends Drive
Hooksett, NH 03106

October 2, 2019

Mr. David Price
NHDES Wetlands Bureau,
Pease Office
222 International Dr., Suite. 175
Portsmouth, NH 03801

Re: Seacoast Reliability Project - SEC Docket 2015-04
Wetlands Permit Amendment Request
Minor Construction-Related Change
Submarine Cable Re-alignment

Dear Mr. Price,

Public Service Company of New Hampshire d/b/a Eversource Energy ("Eversource") hereby submits to the New Hampshire Department of Environmental Services ("Department" or "NHDES") a request for a minor modification to the Department's October 29, 2018 Revised Final Decision, which authorized Eversource to construct portions of the Seacoast Reliability Project ("SRP" or "Project") in Little Bay. Eversource and its submarine contractors have identified a need to make a micro adjustment to the submarine cable alignment within the existing NOAA charted cable area in Little Bay to avoid newly formed and identified obstructions caused by tidal currents. The result of the micro-adjustment will result in an increase length of each of the threes cables in the Bay of eight (8) feet and shift a portion of the cables in the channel a maximum distance of 96-feet from the current alignment. Attached to this request is Eversource's ***Description and Technical Justification*** for the required minor submarine cable realignment in the channel of Little Bay

On January 31, 2019, the New Hampshire Site Evaluation Committee (SEC) issued a Certificate of Site and Facility to Eversource to construct the Project (the "Certificate"). The Certificate provides that:

> NHDES is authorized to monitor the construction and operation of the Project to ensure that the terms and conditions of the Wetlands Permit, the Alteration of Terrain Permit, the Shoreland Protection Permit, and the Certificate are met . . . . ;
>
> NHDES is authorized to specify the use of any appropriate technique, methodology, practice or procedure approved by the Subcommittee within the Certificate, as may be necessary, to effectuate conditions of the Certificate, the Wetlands Permit, the Alteration of Terrain Permit, and the Shoreland Protection Permit; . . .
>
> NHDES is authorized to specify the use of any appropriate technique, methodology, practice or procedure approved by the Subcommittee within the Certificate, as may be necessary, to effectuate conditions of the Section 404 General Permit (the New Hampshire Programmatic General Permit) . . . .

The Department has previously authorized prior minor modifications to its October 29, 2018 Revised Final Decision. Specifically, on September 10, 2019, the Department recommended approval of nine changes in

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temporary wetlands impacts.[1] Letter from DES Assistant Director Rene Pelletier to SEC Administrator Pamela Monroe, Docket 2015-04 (Sept. 10, 2019). Based on the foregoing, the Department is authorized to review and approve the requested micro-adjustment as a minor modification pursuant to the wetlands approval and the Certificate.

The micro-adjustment, as described in the attached ***Description and Technical Justification***, only slightly increases the overall permitted temporary impacts in Little Bay, namely, by 360-sq ft, and does not alter the permitted permanent wetland impact. The Project is currently approved through the September 10, 2019 amendment with 601,561 square feet of total impacts (592,091 square feet of temporary impacts and 9,470 square feet of permanent impacts). This minor construction related change results in an increase the temporary impact in Little Bay from 269,987 square feet to 270,347 which represents a 0.13% increase of impact in Little Bay and a 0.06% increase in total project impacts. As discussed further in the ***Description and Technical Justification***, the proposed micro-adjustment does not rise to the level of a significant amendment of the NHDES Revised Final Decision pursuant to NH RSA 482-A:3, XIV(e) because the requested minor modification: (1) does not increase the proposed acreage or dredge area by 20 percent or more; (2) does not alter the location of the permitted footprint because all temporary wetland impacts are within the existing NOAA charted cable corridor; and (3) does not introduce new or different impacts to a new or different prime wetland or surface water. In addition, the minor route alignment will not impact a wetland of a different classification as originally permitted and will not require permits for filling or dredging in non-wetland areas.

Based on the foregoing, and pursuant to the Certificate and the NHDES Revised Final Decision, Eversource respectfully requests that the Department approve this micro route adjustment as a minor modification under the Certificate and wetland approval.

If you have any questions regarding this notification, please contact Sarah Allen (sallen@normandeau.com, 603-637-1158) or me (kurt.nelson@eversource.com, 603-634-3256).

Sincerely,

Eversource Energy

Kurt I. Nelson
Sr. Licensing and Permitting Specialist

Cc: Gregg Comstock, NHDES
Ted Diers, NHDES
Pam Monroe, SEC Administrator

[1] The Department's recommended approval was adopted by the SEC Administrator on September 25, 2019 and approved as a minor modification consistent with RSA 162-H:4, III-a and page 3 of the Certificate that contains a condition authorizing the NHDES to specify the use of any appropriate technique, methodology, practice or procedure approved by the Subcommittee within the Certificate, as may be necessary, to effectuate conditions of the Certificate, the Wetlands Permit, the Alteration of Terrain Permit, and the Shoreland Protection Permit. Letter from SEC Administrator Pamela Monroe to Attorney Barry Needleman, Docket 2015-04 (Sept. 25, 2019).

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SEACOAST RELIABILITY PROJECT
SUBMARINE CABLE REALIGNEMNT
DESCRIPTION AND TECHNICAL JUSTIFICATION

October 2, 2019

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SEACOAST RELIABILITY PROJECT
SUBMARINE CABLE REALIGNEMNT
DESCRIPTION AND TECHNICAL JUSTIFICATION

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DESCRIPTION AND TECHNICAL JUSTIFICATION

1.0 EXECUTIVE SUMMARY

In the course of the approval process through the NH Site Evaluation Committee (NHSEC), Eversource conducted a thorough and comprehensive assessment of the submarine cable crossing area of Little Bay for the Seacoast Reliability Project (SRP). Recent preconstruction bathymetric survey data conducted in August and September 2019 show the presence of sand drifts (or waves) in the current alignment that are problematic for the jet plow installation.

The Eversource project team has assessed viable alternatives to address the sand wave issue and determined that a micro cable realignment to avoid problematic sand wave formations, which is common industry practice, will mitigate this issue. Specifically, the proposed cable realignment will shift a portion of the three conductors a maximum horizontal distance of 96-ft south in the channel of Little Bay while remaining with the NOAA charted cable corridor. No change is required with the cable landing in the near shore areas. The realignment will add an approximate linear distance of eight (8) ft for each of the cables.

As presented herein, Eversource has evaluated current survey and assessment data in the Little Bay cable corridor, including, the results of the jet plow trial, evaluation of the sediment dispersion model, mixing zone boundary, water quality monitoring plan, sediment characterization data, bathymetric survey, benthic monitoring and eel grass survey results, which demonstrate that sufficient preconstruction assessments have been conducted to allow for the cable realignment.

In addition, as a conservative measure, sediment sampling was conducted along the route realignment to confirm consistency with previous assessment data.

Eversource requests that the New Hampshire Department of Environmental Services (“Department” or NHDES”) allow for a minor modification to the Wetland Bureau October 28, 2019 (amended September 10, 2019) Revised Final Decision included in Appendix I of the Site Evaluation Committee (SEC) January 31, 2019 Decision and Order Granting Application for Site and Facility for this cable realignment.

2.0 BATHYMETRIC SURVEY 2019

Bathymetric Surveys

During the period 20-23 April 2013, a marine geophysical investigation was conducted by Ocean Surveys, Inc. (OSI) within a charted cable corridor across Little Bay. This investigation was performed under contract to Power Engineers, Inc. and was designed to aid in the planning of the proposed Little Bay cable crossing.

As shown on Figure 1, the 2013 bathymetric survey showed that significant sand ripple topography was evident in the channel in the southern half of the corridor. At the time, large sand waves were not observed.

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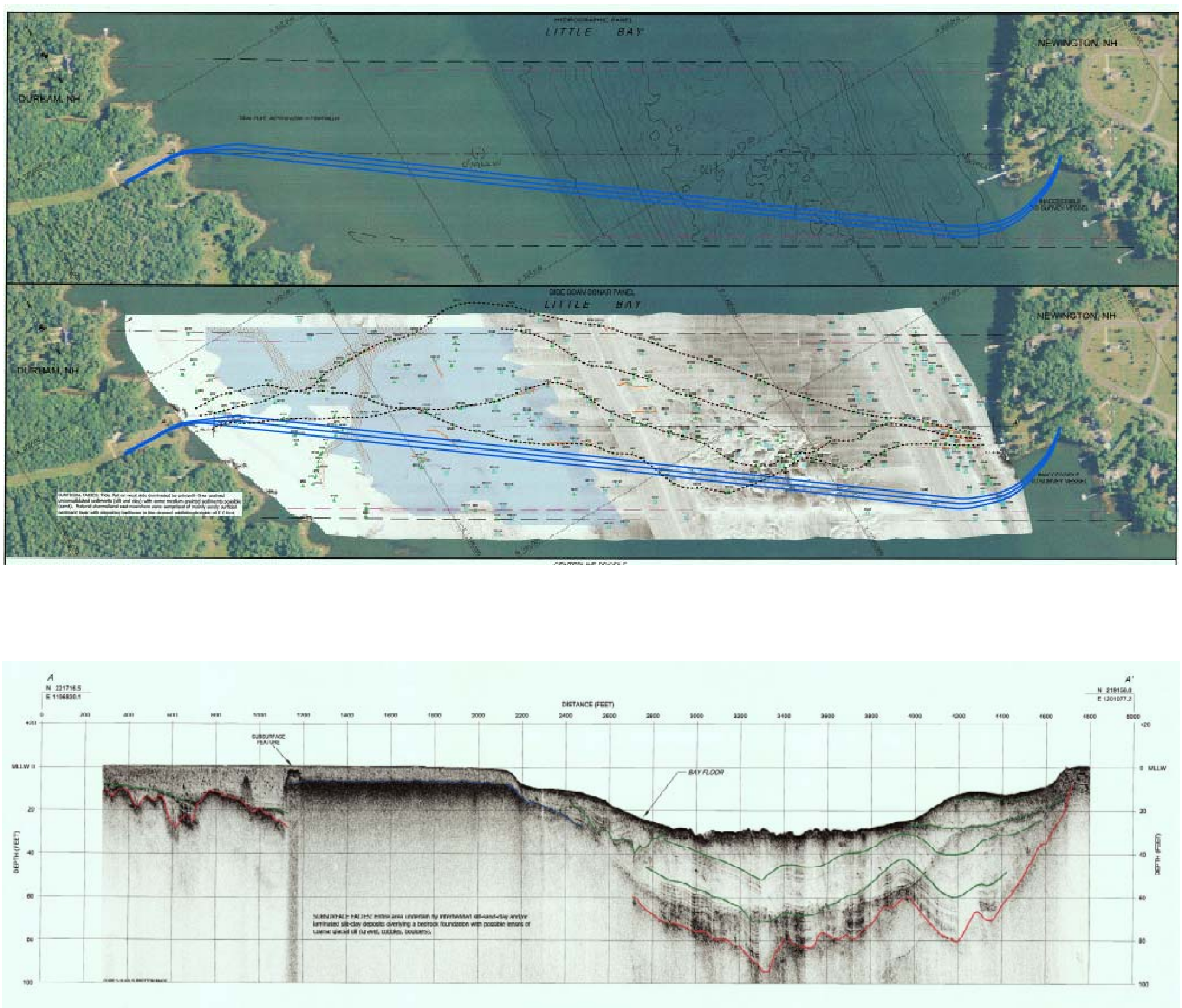

Figure 1: 2013 Cable crossing route bathymetric survey

On 28 August 2019, OSI performed a pre-construction bathymetric survey along the permitted cable alignments. A 230-meter corridor centered on the original cable alignment was surveyed using a multibeam echosounder. During this survey, sand waves were observed as large as 12-ft, and an 8-ft high sand wave was observed on the cable route as shown on Figure 2. Side slopes on the sand wave were estimated to be at least 30˚. Subsequent bathymetric surveys were performed on September 15, 16 and 17, 2019. All subsequent surveys showed that the sand waves had not changed substantially in size or position.

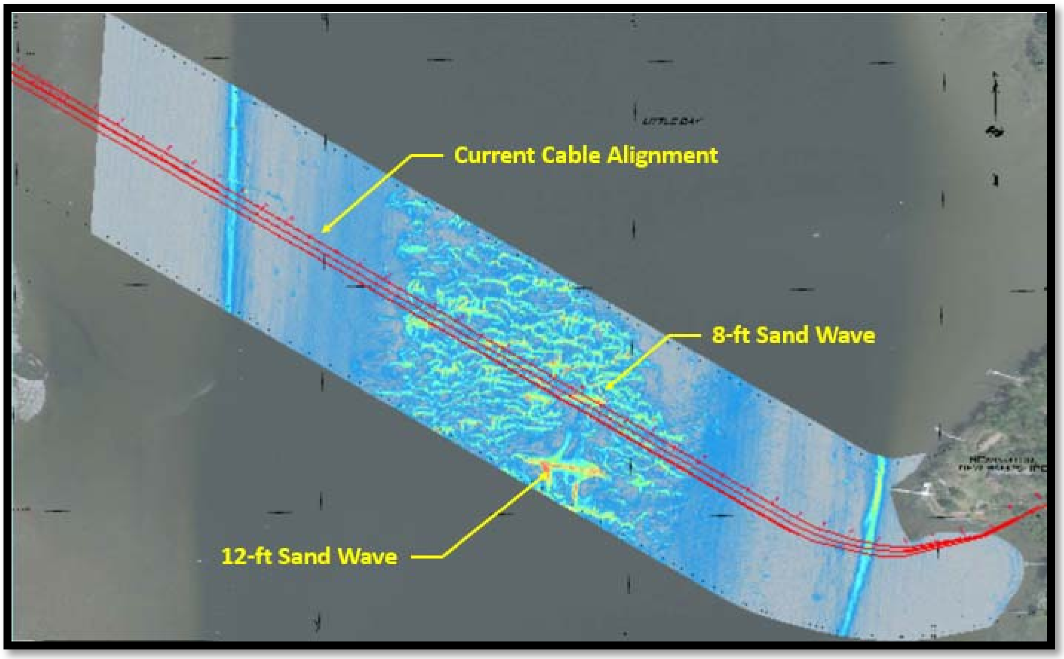

Figure 2: 2019 Bathymetric survey within the charted cable corridor

Explanation of Sand Waves

Sand waves typically occur in shallow estuaries and are induced by tidal currents. The interaction of the oscillatory tidal flow along areas of sand leads to a steady streaming of sediment that forms waves of sand along the seabed. When the displacement of the sediment dragged by this steady streaming is directed toward the crests of smaller mega ripples, the amplitude of the mega-ripples increases and larger sand waves are formed. Sand ripples, mega-ripples and sand waves tend to be mobile and are driven by seasonal tides or storm events.

3.0 ASSESSMENT OF ALTERNATIVES

Review of Alternatives

In the submarine cable installation industry, there are several methods available to avoid sand waves or reduce the height of sand waves to allow target burial below the mean depth of the seabed. The following methods are listed below:

1. **Wait for the sand wave to migrate off the cable path.**

   Sand waves in Little Bay are likely driven by tidal currents and storm events and will change in both size and location over time. A previous cable route survey, performed in 2013, did not indicate sand waves of this magnitude in the vicinity of the cable route. However, an eight (8) ft high sand wave with a 30° slope was first observed on the SRP cable route during a bathymetric survey that was performed on August 28, 2019. Subsequent bathymetric surveys were performed on September 13, 14 and 15, 2019 and again on September 17, 2019. These subsequent surveys showed that the sand wave had remained stationary and there was no indication that the sand wave would move off the route before the scheduled start of installation.

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2. **Re-route the cables around the sand wave.**

   Cable route engineers determined that a slight shifting of the cables to the south could avoid the majority of the sand waves and south of the larger, more problematic sand wave in question. This slight realignment added approximately eight (8) ft of submarine cable to each segment and all cables would remain within the charted Cable Area as designated on NOAA nautical chart 13285.

3. **Mechanical dredging of the sand wave.**

   Typical dredging operations using either a towed dredging tool, bucket dredge or water lift could be performed just prior to the installations. The dredged material could be side cast or stored in hopper barges for disposal at an upland facility.

   This option would require mobilization of a complete standalone spread and support vessels. This would add significant time to the project, increase turbidity in the bay and require additional permitting.

4. **Modify and re-rig equipment to add additional control interface with the jet sled.**

   This action would require modifications to the installation barge including:

   - Adding a section to the crane boom that would allow the barge mounted crane to stabilize the plow with a set of 2-way spreaders hooked to the front skids to prevent the jet sled from tipping on side slopes during burial.
   - Adding 1000-lb lift bags to the low side of the jet sled plow to prevent tipping.
   - Utilizing a longer jet tool could provide burial in natural bottom along the entire route but would generate more turbidity in the tidal flats and would result in a burial depth that exceeds that allowed by the current SEC Certificate.

   This option would require additional mobilization and plow operating time to cross the channel. As well, the larger crane boom would require the removal and temporary storage of the non-active cable reels onto a storage barge or port of convenience. Should a port storage option be selected, the crane would need to be de-rigged and re-rigged for every trip back to port to get the next reel.

   Cable burial across severe sand wave formations could result in future cable exposures and suspension with sand wave movements after installation.

Preferred Alternative

Having considered the various options available and their associated impacts, realigning the cable paths around the sand wave was determined to be the most effective and efficient way forward. Avoidance of the sand waves will greatly reduce the risk of damage to the jet sled and/or the cable, allow full burial depth and provide better long-term security for the cables.

4.0 SUBMARINE CABLE REALIGMENT

A proposed reroute of all three cables is shown on the *Amended Engineering Drawings* provided in Appendix A and *Amended Environmental Maps* (Sheets 20 through 22) in Appendix B. The realignment consists of an approximately 4° shift southward from the existing alignment of the three conductors starting in the western mudflats to a maximum horizontal distance southward of approximately 96 ft in the channel of Little Bay. The alignment then shifts northward approximately 6˚ meeting with the existing alignment in the eastern mudflats. The proposed reroutes will add approximately eight (8)-ft of cable to each cable segment. Avoidance of the sand wave will greatly reduce the risk of damage to the jet sled and/or the cable, allow full burial depth and provide better long-term security for the cables. All three proposed cable re-routes have been engineered to maintain positioning of the cables within the charted Cable Area corridor a shown in Figure 3 below.

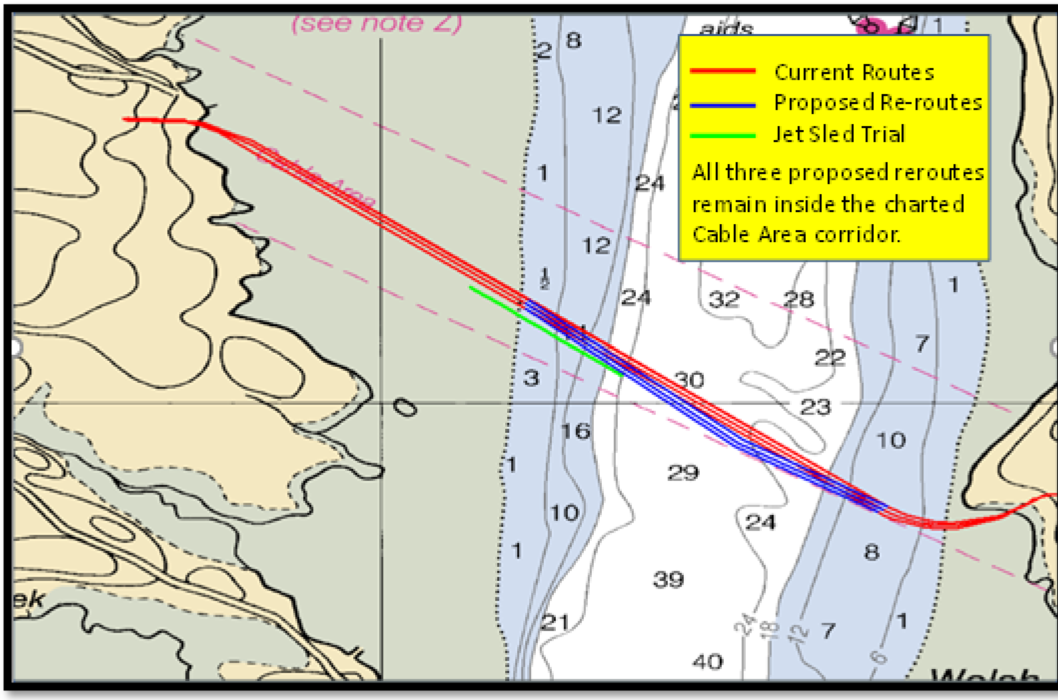

Figure 3: Cable realignment within the charted cable corridor

Allowance for minor variations during installation

To allow for preferential jet plow navigation, there may be minor variations in the horizontal as-laid cable path on the order of approximately ±10-ft. These slight variations are routine in the industry, and may be necessary to adjust the jet plow towing angle to maintain heading or pulling the cable inside the angle of an alter course. Alignment variations are achieved through adjustment of cable tension and do not require anchor changes.

Installation Rate of Advancement

Based on operational information obtained during the jet plow trial, current bathymetric conditions and the considerations for cable realignment, and as discussed in the *Seacoast Reliability Jet Plow Trial Summary Report* submitted to the Department on September 18, 2019 with an updated report submitted on October 2, 2019, the following jet plow installation schedule and target rates of advancement are proposed:

- Day #1-3 Position jet sled on west tidal flats, float cable 1st end to shore, pull to riser structure and secure.
- Day #4- **Cable burial** via jet plow across tidal flats while divers remove cable

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floats 1,900 linear ft at 5.6 ft/min rate of advancement (approximately 6.0 hr jet plow duration on ebb tide starting at high slack tide).
- Day #5- **Cable burial** via jet plow across channel - 2,735 linear ft at 7ft/min rate of advancement (6.5 hr jet plow duration with intermittent stoppages for anchor cable adjustment.) (**Jet plow burial complete**).
- Day #6- Cable 2nd end floating, land on east shore, pull into man hole.

5.0 ENVIRONMENTAL ASSESSMENT OF CABLE REALIGNMENT

Eversource has conducted a thorough evaluation of the environmental considerations for the submarine cable realignment and provides the following assessment in support of the submarine cable realignment.

Jet Plow Trial Results

On September 9, 2019, Eversource successfully conducted the submarine cable Jet Plow Trial in Little Bay and provided the results to the Department in a report entitled *Seacoast Reliability Jet Plow Trial Summary Report* dated September 18, 2019. The results of the trial indicate that:

- The jet plow sediment plume model predictions were conservative and predictive of plume migration
- No compliance exceedances of water quality monitoring criteria, as defined under the NHDES approved Water Quality Monitoring Plan, were observed at mixing zone boundary stations.
- Installation of the cables using the jet plow can be accomplished in compliance with State water quality criteria.

An updated *Jet Plow Trial Summary Report* that addresses comments from NHDES will be provided to the Department by October 2, 2019.

Sediment Characterization

A comprehensive sediment sampling effort was conducted along the original cable alignment with two (2) rounds of sampling conducted at twelve (12) vibracore sampling stations (C1 through C12) across the Bay in September 2016 and May 2017. Results of the sediment characterization are summarized in the following reports submitted to the NHDES and the New Hampshire Site Evaluation Committee (NHSEC):

- *Characterization of Sediment Quality Along Little Bay Crossing – Durham to Newington, NH dated December 1, 2016*
- *Supplement to Characterization of Sediment Quality Along Little Bay Crossing – Durham to Newington, NH dated June 30, 2017*

Figure 4, below, from the June 2017 Sediment Quality Report shows the vibracore sample locations across the original alignment.

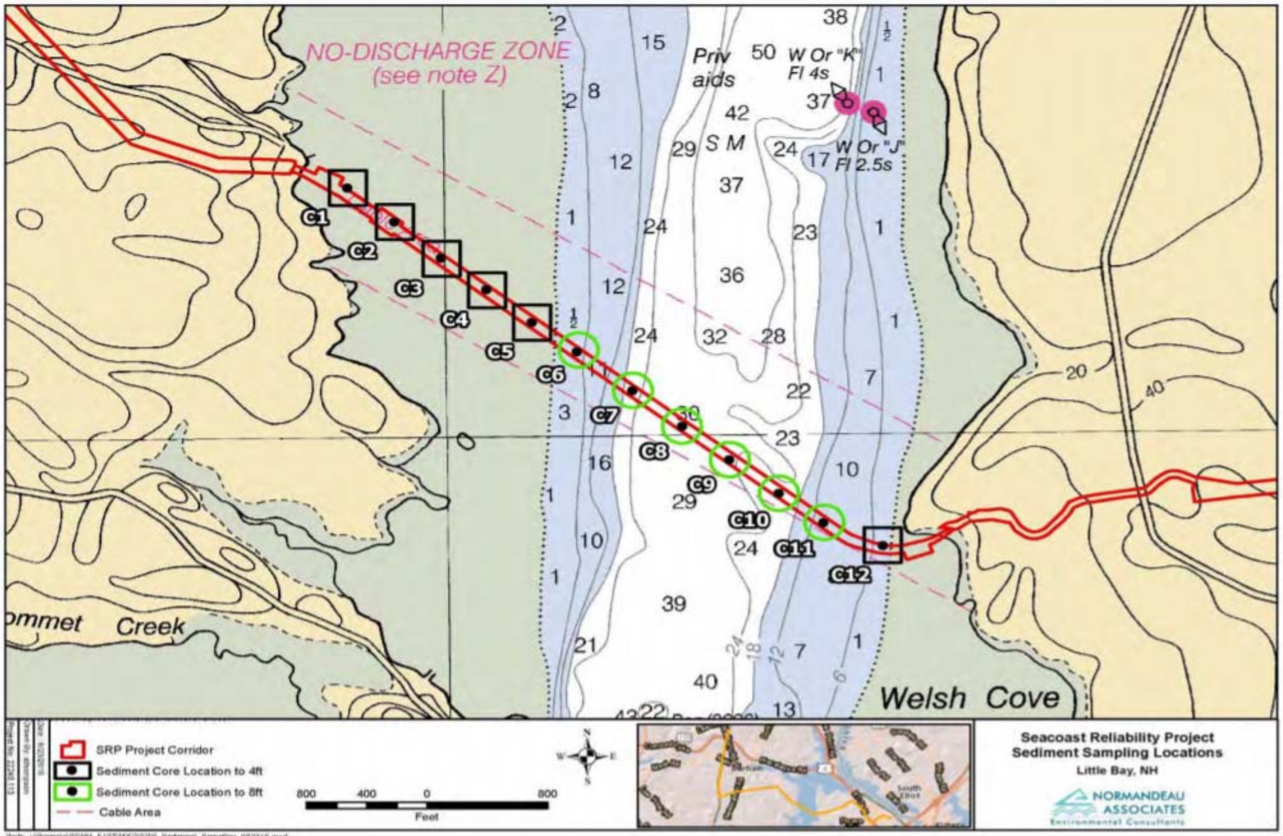

Figure 4: Vibracore sediment sample locations 2016 and 2017

Sediments were sampled for grain size analysis and for several potential contaminants. The results of that analysis determined that there were only two potential contaminants, copper and arsenic, that were conservatively included as compliance analytes in the water quality monitoring plan for jet plow activities to confirm that these analytes are not bio-available at concentrations of concern in the water column.

No exceedances of water quality criteria were exceeded at compliance boundaries a defined by the Water Quality Monitoring Plan during the jet plow trial on September 9, 2019.

Supplemental Sediment Characterization 2019

As conservative measure, sediment sampling was conducted along the route realignment to confirm consistency with previous assessment data. On September 24, 2019 Normandeau conducted vibracore sampling at four (4) locations (COR-1 through COR-4) along the cable realignment route in the Channel of Little Bay as shown on Figure 5A and 5B.

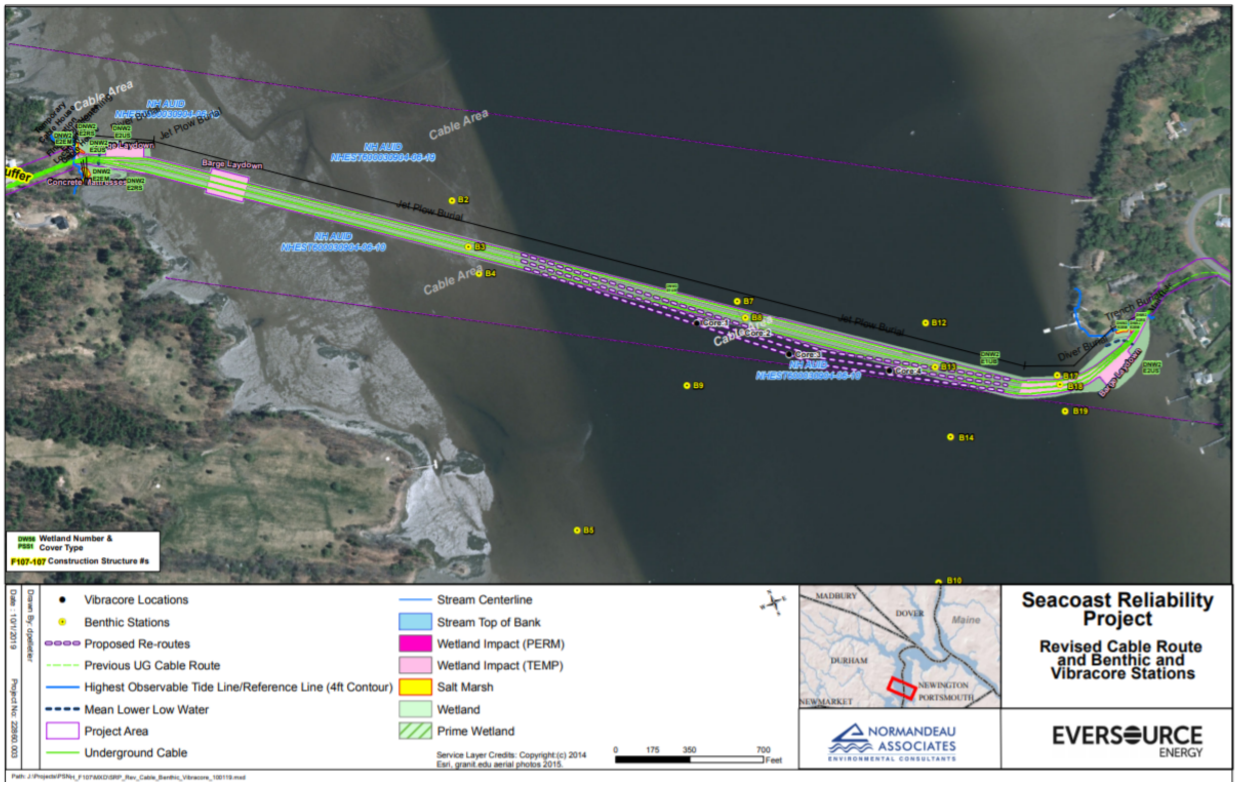

Figure 5A: Cable realignment vibracore sample locations 2019

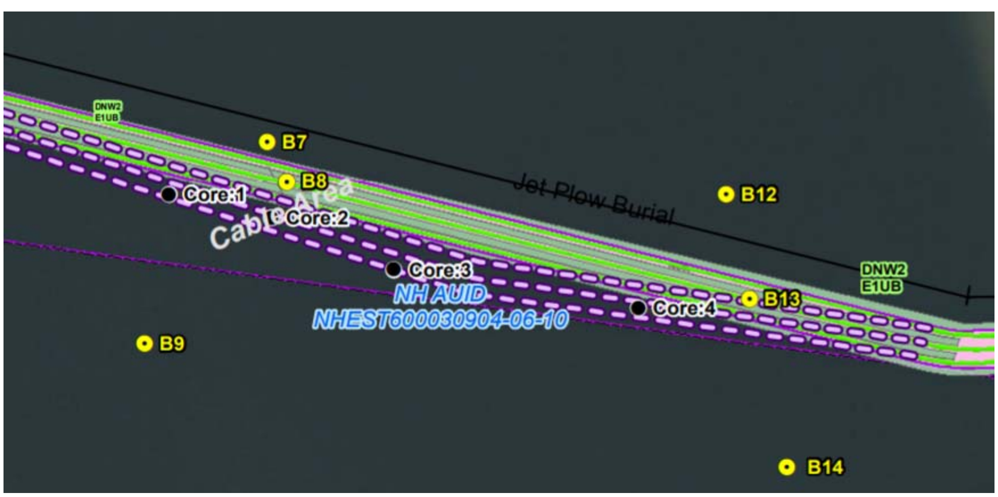

Figure 5B: Close view of vibracore sample locations 2019

Sample penetration depths ranged from 2 to 5.5 feet. Collections were made using a Rossfelder Model P-3, low frequency vibro-percussive vibracore. Coring tubes were 3-inch diameter semi-rigid Cellulose Acetate Butyrate (CAB) tubes with disposable stainless-steel core catchers riveted to the tube. The use of CAB tubes allows samples to be collected without an outer housing or core barrel that needs to be decontaminated between sample locations. Sampling locations were documented using a Trimble GeoXT GPS with an accuracy of < 1 meter.

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Each core was documented with boring logs that are provided in Appendix C. Each segment identified for chemical analysis was placed into a disposable aluminum container, homogenized with disposable aluminum utensils and then subsamples were placed into containers provided by the analytical laboratories. Separate equipment was used for homogenizing each sample to eliminate the risk of cross-contamination.

Samples were stored in containers provided by the laboratories on wet ice until delivery to the analytical laboratory. Sediment samples are being tested at Enthalpy Analytical Laboratory in Hampton, NH for typical dredge material analytes (grain size, a suite of metals, specific PAHs, and specific PCBs). Eversource expects to be able to provide these results to the Department on October 4, 2019.

Grain Size Analysis

The laboratory analytical report for grain size analysis is provided in Appendix C. A summary of 2019 grain size results are provided in Table 1. At most stations the percent fines (silt plus clay) in sediment is similar to that reported in 2016 and 2017. Differences observed represent the variability typical of marine substrates.

Table 1: Sediment grain size analysis

Station	COR-1/001	COR-2/002	COR-3/003	COR-4A/004	COR4B/005
Penetration Depth (inches)	66	24	25	0-17 of 28	17-28 of 28
Grain size					
% Total Gravel	1	1	9	3	0
% Coarse Sand	3	34	13	22	3
% Medium Sand	31	51	31	63	3
% Fine Sand	41	8	31	9	3
% Silt	15	5	11	2	52
% Clay	9	1	5	1	39

Bulk Sample Analysis

The sediment chemical analysis is also being conducted at Enthalpy Laboratory in Hampton, NH. The analytical results are anticipated to be complete by October 4, 2019. The analytical results and summary will be forwarded to the Department in a supplement once available.

Water Quality Monitoring Considerations

Eversource has evaluated the submarine cable realignment relative to compliance with the NHDES approved *Seacoast Reliability Project Water Quality Monitoring Plan Revised Final Report* dated September 6, 2019 including the following:

- Changes in the timing of the installation resulting from the cable realignment and by operational information obtained during the Jet Plow Trial on September 9, 2019

- The efficacy and appropriateness of the current mixing zone boundary as defined by existing sediment dispersion models
- Nearfield and compliance boundary monitoring station locations
- The results of the jet plow trial as summarized in the *Jet Plow Trial Summary Report* provided to the Department on September 18, 2019.

The submarine cable realignment is characterized as follows:

- The cable realignment consists of a minor horizontal shift (a maximum distance of 96-ft) southward in the channel of Little Bay.
- The cable installation will remain within the existing NOAA charted cable corridor.
- No alterations to burial depths are proposed.
- Sediment characteristics are similar along the original and realignment route.
- The additional length of burial of approximately 8-ft for each cable is di minis with respect to sediment dispersion model predictions.
- As discussed in Section 4.0, the jet plow installation schedule required for the cable realignment will span a minimum of two calendar days.

Eversource's consultant RPS/ASA, who conducted the sediment dispersion modelling for the project as presented in the following reports provided to NHDES and the NHSEC:

- *Modeling Sediment Dispersion from Cable Burial for Seacoast Reliability Project, Little Bay, New Hampshire* dated December 15, 2015
- *Revised Modeling Sediment Dispersion from Cable Burial for Seacoast Reliability Project, Upper Little Bay, New Hampshire* dated June 27, 2017

has reviewed the proposed operational plan relative to the current mixing zone boundary and has provided a technical memorandum provided in Appendix D. RPS' conclusions and recommendations are as follows:

- Based on the combination of modeling results from various scenarios, it is suggested that the permitted mixing zone is suitable for delineating the area where expected excess concentrations would exceed 20 mg/L from jet plow operations regardless of the tide stage at the time of crossing the channel and of the minor deviation from the original route within the channel.
- While there are some model predicted deviations of the 20 mg/L contour outside this mixing zone, they are at the further extents close to where the concentrations drop and are based on conservative assumptions which may have resulted in an overestimate of the plume.
- The assumptions have been observed to be conservative based on comparison of the maximum observed TSS during the jet plow trial which were all considerably lower than the model predicted maximum at these locations.
- Further it is suggested that the route adjustment will not significantly change the model predictions, and therefore the previously completed modeling is deemed a useful proxy for the adjusted route.

Bathymetric Monitoring

In accordance with the NHDES approved *Seacoast Reliability Project Benthic Community Monitoring Plan* dated September 5, 2019, a detailed bathymetric survey was conducted in August 28, 2019 using a multibeam echosounder to map the sediment surface. A 230-meter (755-ft) corridor was mapped along the original cable alignment resulting in an approximately 100-acre survey area. Sufficient preconstruction survey area exists to characterize the naturally-occurring bathymetric conditions in the project area and can accommodate the relatively minor horizontal shift in a portion of the cable alignment of 96 feet.

Benthic Habitat Monitoring

The original design for the benthic infaunal community monitoring stations as described in the *Seacoast Reliability Project Benthic Community Monitoring Plan* dated September 5, 2019, included four (4) transects in different depth zones. A detail of the benthic sample locations relative to the cable realignment are shown on Figure 6.

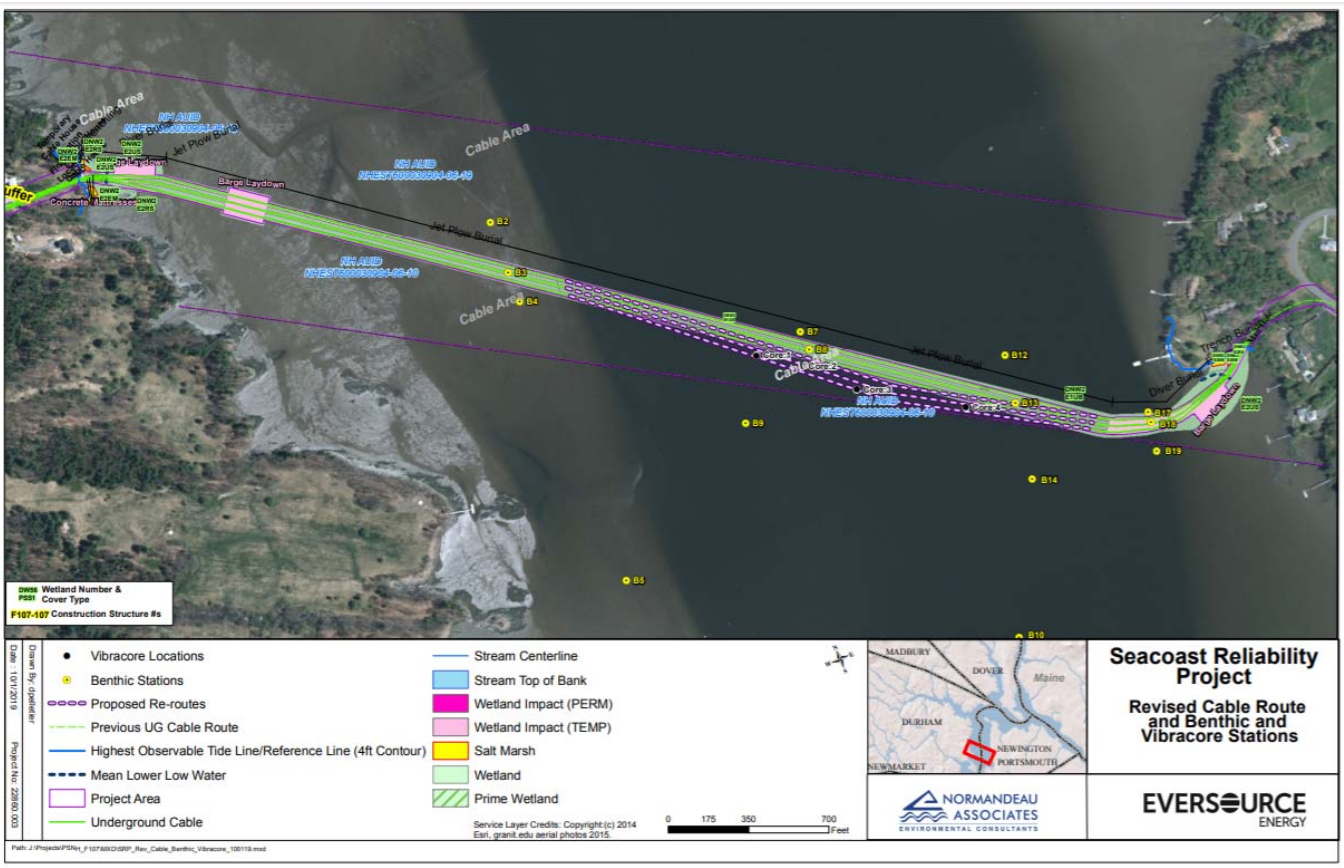


Figure 6: 2019 Preconstruction benthic sample locations near the proposed cable realignment.

On each transect, five (5) stations were spaced to represent unaffected habitat both north and south of the cable route as well as impacted habitat (i.e., direct impact of the jet plow and indirect impact from redeposition of sediments disturbed by the jet plow) within and adjacent to the cable route. Three (3) of the four (4) transects are located outside the area that will be affected by the realignment. Along the transect located within the channel (Stations B6 – B10), Stations B7 - B9 were located in the predicted impact area. As a result of the proposed realignment, the route will be slightly farther from Stations B7 and B8 and slightly closer to Station B9 than for the original alignment. All of these impact stations will still be within the area predicted to experience redeposition however, therefore it can be concluded that they will still represent baseline conditions from which to assess from the effects of cable installation through the channel.

Data on benthic infaunal community in the channel collected in 2014 and reported in the *Seacoast Reliability Project Madbury, Durham, Newington & Portsmouth, NH Natural Resource Existing Conditions Report Report* dated March 2016 indicated the dynamic nature of the estuarine substrate in the channel. All community indicators (abundance, number of unique taxa, diversity and evenness) were more variable in the channel than either the tidal flat or the channel slope. The dominant taxa in the channel were similar to those on the channel slope although the rank order, based on abundance, differed. The three (3) most abundant species (all polychaetes) are all surface deposit feeders, a feeding strategy that suggests instability in the habitat, such as mobile sediments. The information obtained from the multiple bathymetric surveys conducted in September 2019 that shows frequent movement of surficial sediments in the channel, supports this interpretation.

Given this evidence, relocating impact stations along the channel transect and re-collection of baseline data are unlikely to provide additional insights into pre-construction conditions that would assist in interpretation of post-construction monitoring data.

Eelgrass Survey

There is no eelgrass affected by the cable realignment. The cable realignment is proposed within the channel of Little Bay where eelgrass does not naturally occur, nor has it been observed during pre-construction surveys.

6.0 CONCLUSIONS

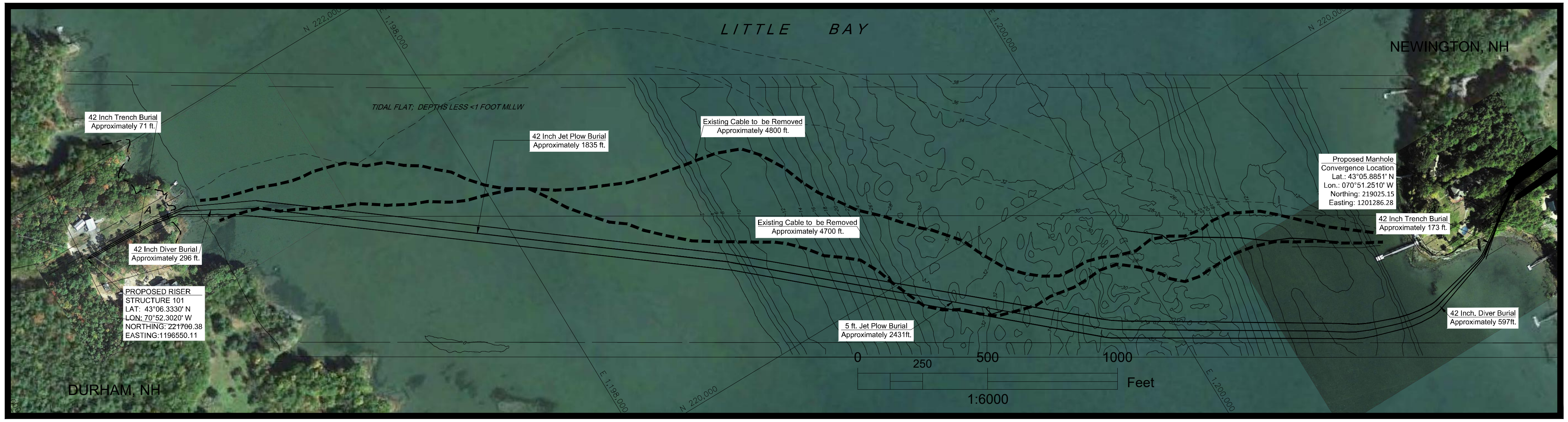
Eversource has presented this description and technical justification for a submarine cable alignment needed to navigate problematic bathymetric conditions observed during preconstruction surveys of the cable corridor. Eversource has evaluated current pre-construction survey and assessment data and collected supplemental sediment characteristic data along the cable realignment.

The analyses and data presented above demonstrate that the results of the jet plow trial, evaluation of the sediment dispersion model, mixing zone boundary, water quality monitoring plan, sediment characterization data, bathymetric survey, benthic monitoring, eel grass survey results and supplemental sediment characterization indicate the proposed cable realignment is a minor design change and will have minimal impacts on the water quality and ecology of the Bay.

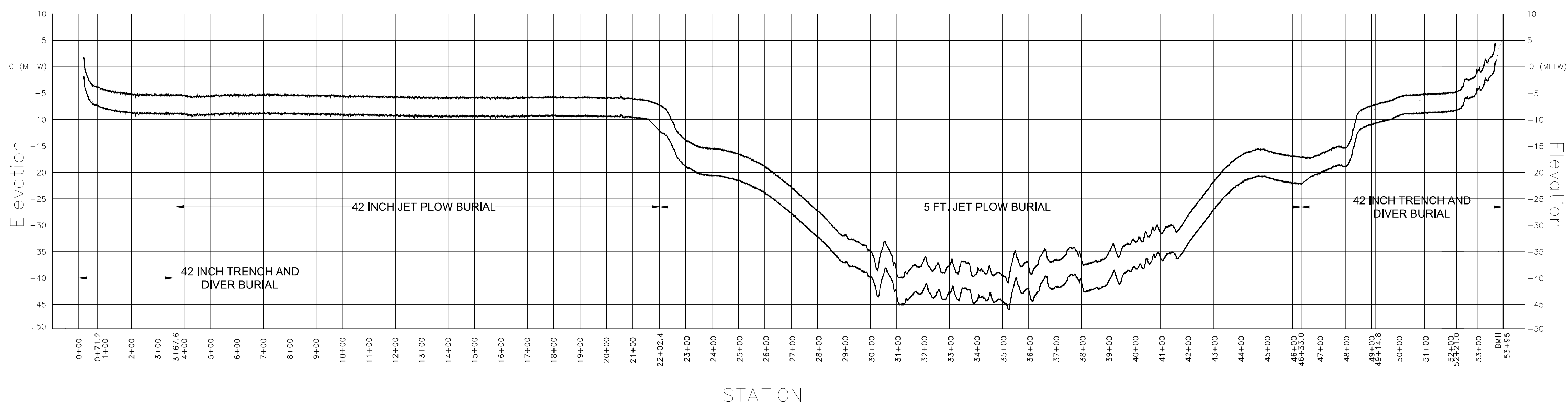
APPENDIX A

Amended Engineering Drawings – Seacoast Reliability Project, Circuit F107, Little Bay Crossing, Newington 115kV Underground Transmission Line

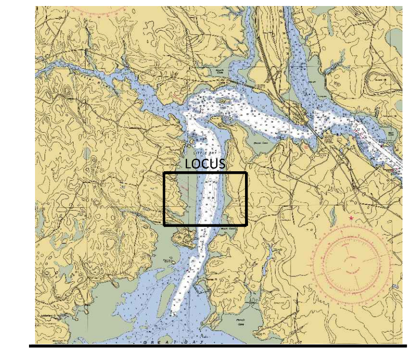
PLAN VIEW



PROFILE VIEW



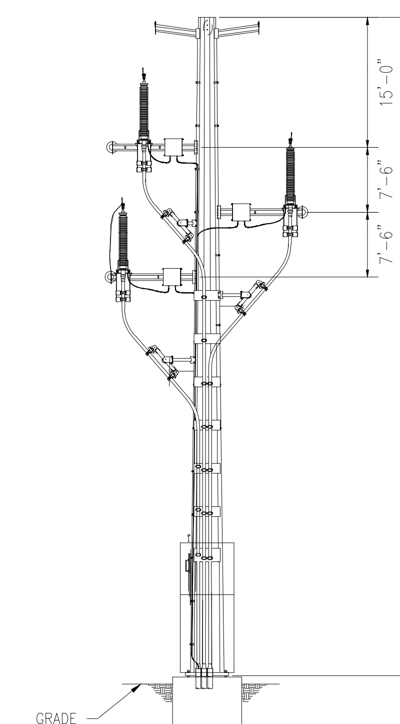
THIS PLAN FOR REFERENCE ONLY. NO REPRESENTATION OR WARRANTY IS MADE AS TO LOCATION OF BOUNDARIES OR OTHER POINTS OF REFERENCE. RIGHT OF WAY LOCATION HAS BEEN SURVEYED AND PROVIDED BY DOUCET SURVEY INC.



Coordinate System

State Plane, NAD 83
2800 – New Hampshire, U.S. Feet

Vertical Datum: MLLW



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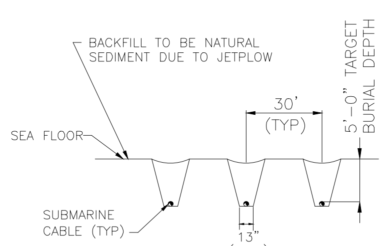
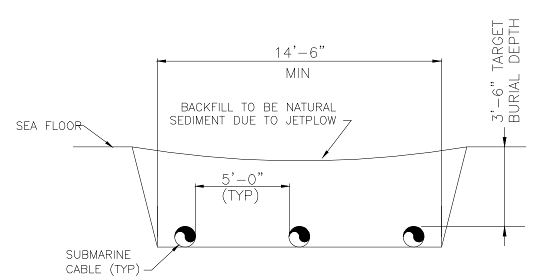
General Notes

PROPOSED RE-ROUTE

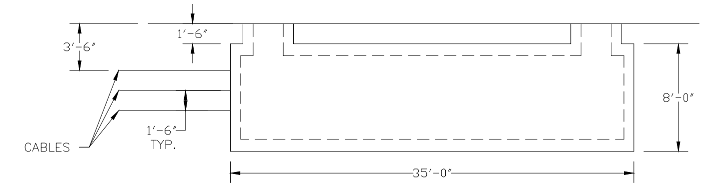
Magnetometer Hit	▲
Route Centerline:	
Trench Burial:	
Diver Burial:	
8'Jet Plow Burial:	
3' Jet Plow Burial:	
OOS Cable:	
OOS Cable To Be Removed:	
Cable Area:	
Easement Area:	
Mean High Water	



TYPICAL SUBMARINE TRENCH SECTION



SHORE LANDING TRENCH SECTION



MANHOLE
EAST SHORE

0 250 500 1000

HORIZONTAL SCALE: 500 FEET
VERTICAL SCALE: 1 INCH = 25 FEET

NO.	REVISION	DATE	DRWN	CHKD	APPR
11	Revised: Jet Plow Alignment for Sand Wave	9/19	–	–	–
10	Revised: Jet Plow Target Depth	8/17	–	–	–

EVERSOURCE ENERGY

TRANSMISSION BUSINESS

11
T

DRAWN	–
ENGINEER	–
CHECKED	–
APPROVED	–

F107 LINE CROSSING LITTLE BAY

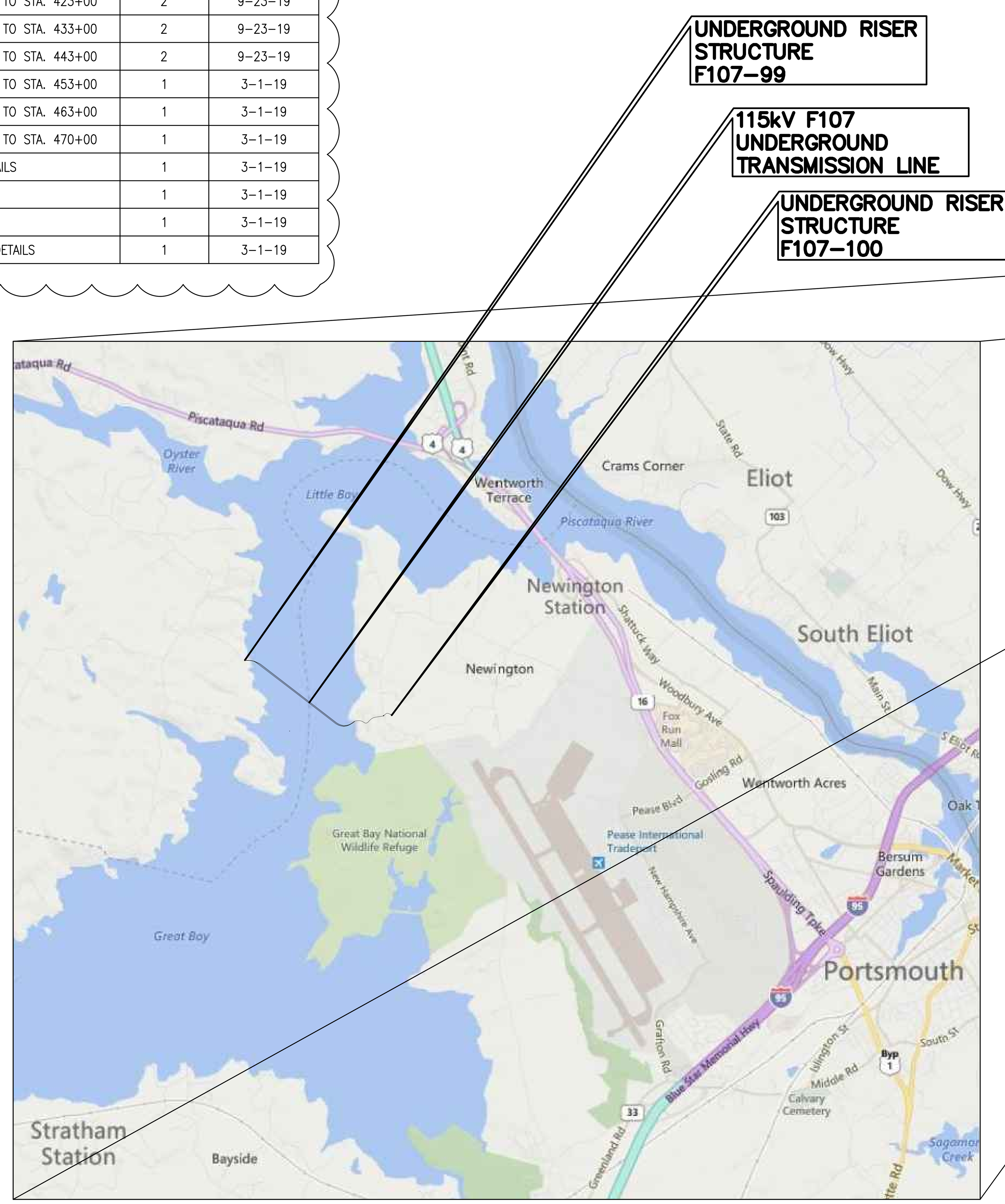
DURHAM AND NEWINGTON, NEW HAMPSHIRE

SCALE	DATE	SHEET	DRAWING NO.
AS NOTED	4/15/15	1 OF 1	F10740905

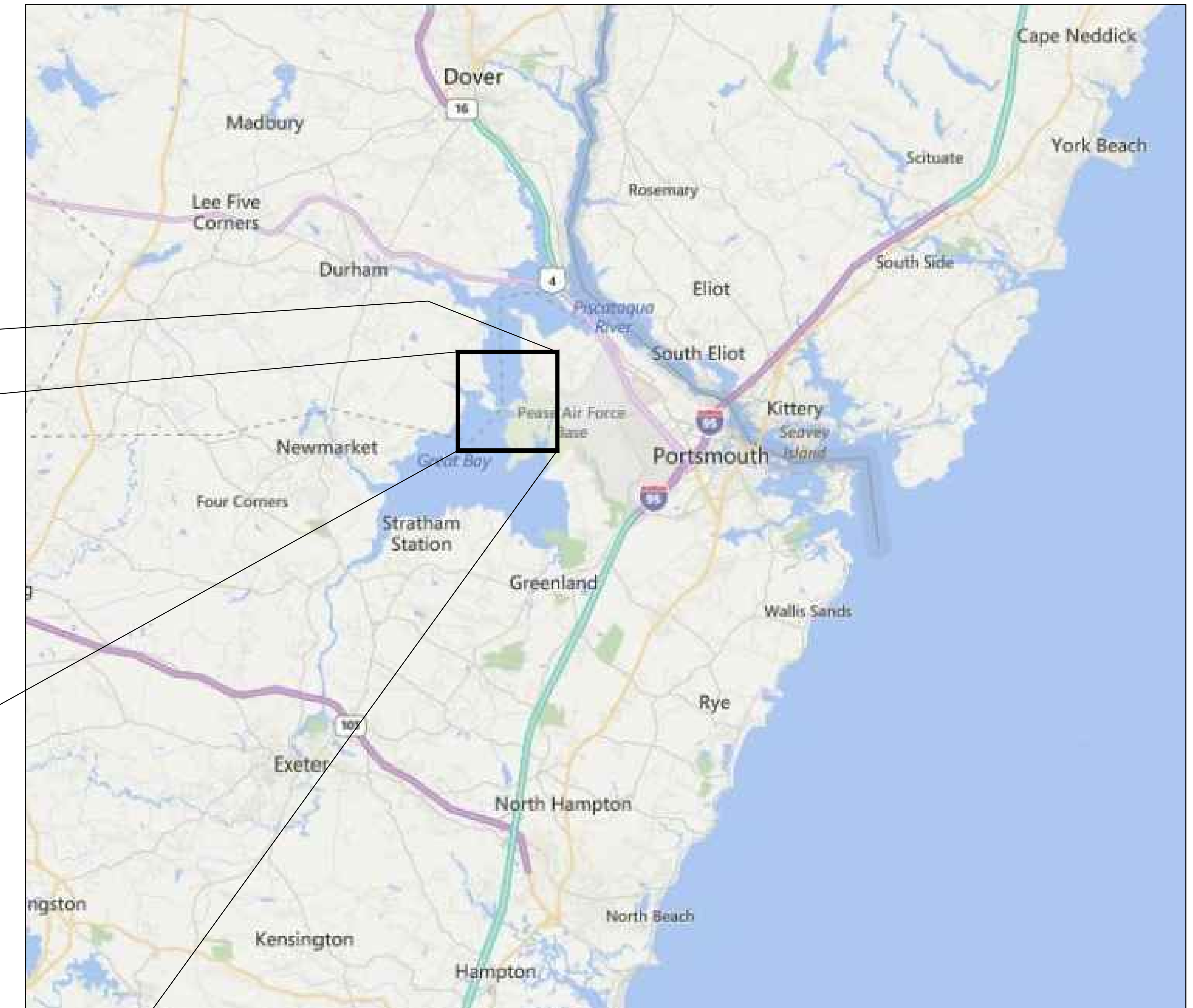
PUBLIC SERVICE COMPANY OF NEW HAMPSHIRE DBA EVERSOURCE ENERGY
SEACOAST RELIABILITY PROJECT, CIRCUIT F107
LITTLE BAY CROSSING, NEWINGTON
115kV UNDERGROUND TRANSMISSION LINE

LEGEND

ELECTRICAL STRUCTURE
LAMP POST
WOODEN POST
IRRIGATION CONTROL VALVE
ELECTRIC BOX
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
STONE WALL



VICINITY MAP
NOT TO SCALE



AREA MAP
NOT TO SCALE

General Notes

1. THE PLANIMETRICS, UTILITIES AND NATURAL FEATURES SHOWN HEREON ARE BASED ON FIELD SURVEYS, AERIAL PHOTOGRAPHY AND RECORD DOCUMENTS. EXISTING CONDITIONS BY SURVEY BY DOUCET. OTHER FACILITIES MAY EXIST NOT DISCOVERED THROUGH THE RECORD CHECK AND OTHER UTILITY LOCATING ACTIVITIES. THE CONTRACTOR SHALL VERIFY THE EXACT LOCATION, BOTH HORIZONTAL AND VERTICAL, OF ALL UTILITIES THROUGH THE APPROPRIATE UTILITY COMPANIES. CALL BEFORE YOU DIG, 811 OR 1-800-344-7233.
2. VERTICAL DATUM IS BASED ON NAVD88, HORIZONTAL DATUM IS BASED ON NEW HAMPSHIRE STATE PLANE IN US FEET, NAD83
3. VERTICAL LOCATION OF SUBSURFACE UTILITY LINES ARE BASED ON ASSUMED DEPTHS USING BEST AVAILABLE INFORMATION AND MAY VARY FROM THE ACTUAL VERTICAL LOCATIONS. BUILDING SERVICE CONNECTIONS (ELECTRIC, GAS, TELEPHONE, WATER AND SANITARY) ARE NOT SHOWN. CONTRACTOR IS TO ASSUME SERVICES ARE PRESENT TO ALL BUILDINGS.
4. DETAIL DESIGN MAY BE OPTIMIZED TO REFLECT ACTUAL CONDITIONS WITH OWNER REVIEW AND ACCEPTANCE.
5. ALL WORK SHALL BE PERFORMED WITHIN THE DESIGNATED PROPERTIES AS NOTED ON THE DRAWINGS.
6. ALL AREAS DISTURBED BY CONSTRUCTION SHALL BE RETURNED TO THEIR ORIGINAL CONDITION OR BETTER AS DETERMINED BY OWNER AND IN ACCORDANCE WITH THE PROJECT SPECIFICATIONS, AND THE APPLICABLE FEDERAL, STATE AND LOCAL REQUIREMENTS.
7. CIVIL CONTRACTOR SHALL HAUL AWAY ALL UNUSED EXCAVATED MATERIAL TO PERMITTED SOIL DISPOSAL SITE PROJECT SPECIFICATIONS, AND THE APPLICABLE FEDERAL, STATE AND LOCAL REQUIREMENTS.
8. CIVIL CONTRACTOR SHALL BE RESPONSIBLE FOR REPAIRING ANY & ALL UTILITIES AND FACILITIES (INCLUDING THOSE NOT SHOWN ON THE DRAWINGS) DAMAGED DURING CONSTRUCTION IN ACCORDANCE WITH THE PROJECT SPECIFICATIONS, APPLICABLE UTILITY SPECIFICATION, FEDERAL, STATE AND LOCAL REQUIREMENTS.
9. ABANDONED UTILITIES SHALL BE CUT AND CAPPED AS NECESSARY WITH UTILITY OWNER REVIEW AND ACCEPTANCE. ABANDONED GAS LINES SHALL NOT BE CUT.
10. CIVIL CONTRACTOR SHALL BE RESPONSIBLE FOR IMPLEMENTING BEST MANAGEMENT PRACTICES FOR CONTROLLING EROSION AND SEDIMENTATION IN ACCORDANCE WITH THE PROJECT SPECIFICATIONS, THE APPLICABLE FEDERAL, STATE AND LOCAL REQUIREMENTS.
11. CIVIL CONTRACTOR SHALL RESTORE GRADE TO PRE-CONSTRUCTION ELEVATIONS UNLESS OTHERWISE NOTED ON THE DRAWINGS.
12. PROPOSED DUCT BANK SHALL MAINTAIN A MINIMUM CLEARANCE OF 2'-6" BETWEEN THE CONCRETE ENCASEMENT AND GRADE, OR AS SHOWN ON THE DRAWINGS.
13. ALL VERTICAL RADII ARE 500' AND ALL HORIZONTAL RADII ARE 500' UNLESS OTHERWISE NOTED ON THE DRAWINGS.
14. PROPOSED DUCT BANK SHALL MAINTAIN MINIMUM HORIZONTAL CLEARANCE OF 24" PER UTRM 077 AND A MINIMUM VERTICAL CLEARANCE OF 24" PER UTRM 077 TO EXISTING UTILITIES, UNLESS OTHERWISE NOTED ON THE DRAWINGS. CONTRACTOR SHALL NOTIFY OWNER OF ALL UNDOCUMENTED UTILITIES DISCOVERED DURING CONSTRUCTION THAT IMPEDE ON THE REQUIRED CLEARANCES TO THE PROPOSED DUCT BANK.
15. PRINTED COPIES ARE NOT DOCUMENT CONTROLLED. CONTRACTOR IS RESPONSIBLE FOR ENSURING PRINTED COPIES ARE THE LATEST REVISION.
16. ALL CONSTRUCTION SHALL BE IN ACCORDANCE WITH PROJECT SPECIFICATIONS AND APPLICABLE EVERSOURCE UTRM REQUIREMENTS.
17. CONSTRUCTION SHALL BE IN ACCORDANCE WITH MEMORANDUM OF UNDERSTANDINGS BETWEEN EVERSOURCE AND TOWN OF DURHAM.
18. SEE DRAWINGS F10743001 AND F10705026 FOR CONNECTION DETAILS BETWEEN THE OVERHEAD AND UNDERGROUND LINES. SEE DRAWING F10713401 FOR PHASING OF F107 LINE.
19. SEE ENVIRONMENTAL CONSTRUCTION MAPS AND DETAILS FOR ENVIRONMENTAL CONTROL AND ACCESS.
20. ALL CONSTRUCTION SHOULD BE IN ACCORDANCE WITH NH EVALUATION COMMITTEE REQUIREMENTS AND CONDITIONS.
21. ALL WORK SHALL BE COMPLETED WITHIN THE EVERSOURCE PERMANENT AND CONSTRUCTION EASEMENT AREAS AS SHOWN ON THE PLANS.
22. SUB BOTTOM PROFILE FOR THE MARINE ROUTE SHOWN IS FROM EXISTING CONDITIONS DONE IN 2014. CONDITIONS WILL VARY DEPENDING ON TIME OF YEAR AND WEATHER CONDITIONS. FOR MOST CURRENT OBSERVED CONDITIONS REFER TO OSI PLAN AND PROFILE, OF LITTLE BAY, DATED 9/20/2019. CONTRACTOR IS RESPONSIBLE TO VERIFY ACTUAL CONDITIONS PRIOR TO CABLE INSTALLATION.

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: T1276A1
EPN-8466

POWER ENGINEERS
PROJECT NUMBER: 133007

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www.powereng.com

PRINT DRAWING TO SCALE ON 22"X34" SHEET

ES VER: 11/2015

9/24/2019 12:57 PM – rolsen – R:\Projects\133007\DD\DWG\08 Const Dwgs\F10743003 REV 2.DWG – COVER

NO.	REVISION	DATE	DRWN	CHKD	APPRV.
2	IFC WO# T1276A1 EPN-8466, ADJUSTED SUBMARINE ALIGNMENT	9-23-19	REO	TSG	TSG
1	ISSUE FOR CONSTRUCTION WO# T1276A1 EPN-8466	3-1-19	REO	TSG	TSG

SEAL

EVERSOURCE ENERGY

T 2

CIRCUIT F107 115kV
UNDERGROUND TRANSMISSION LINE
COVER SHEET

SCALE: N.T.S. DATE: 3/1/2019

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

ES VER: 11/2015

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

STATE OF NEW HAMPSHIRE TODD S. GOYETTE No. 14596 LICENSED PROFESSIONAL ENGINEER

Todd S. Goyette 4/3/19

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EVERSOURCE ENERGY

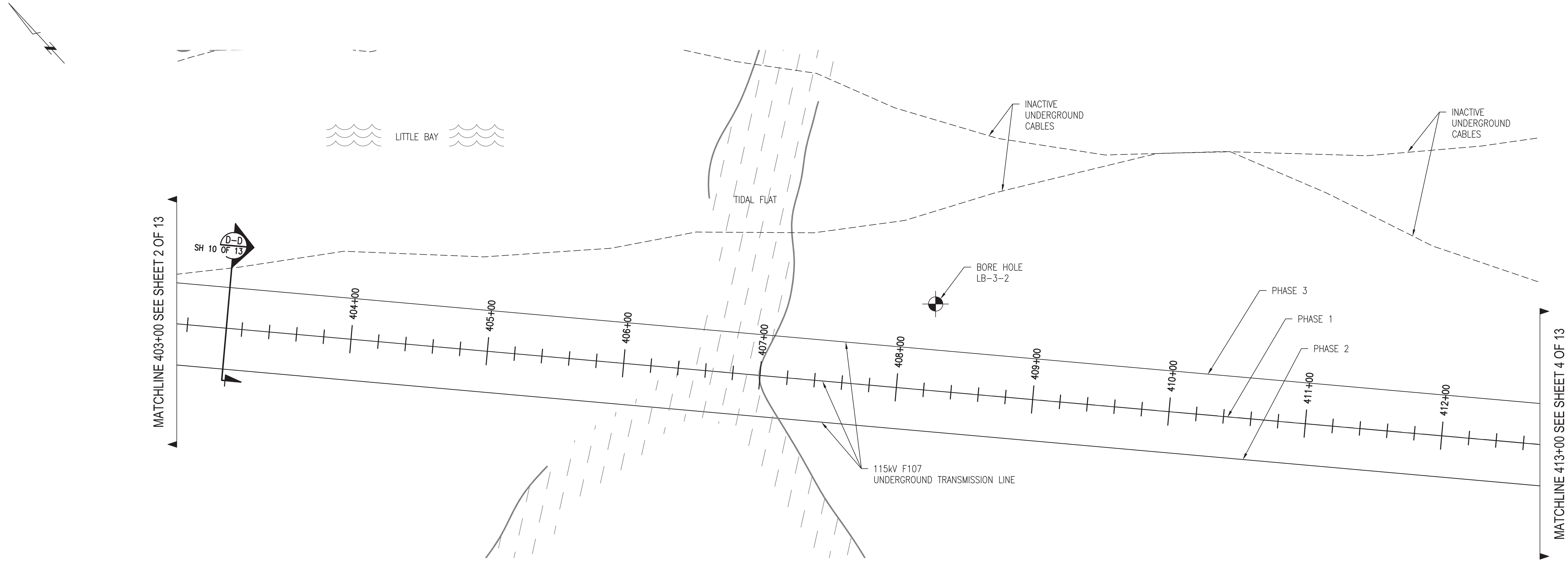
NO.	REVISION	DATE	DRAWN	CHKD	APPRV.
1	ISSUE FOR CONSTRUCTION W/O 1127WA1 EPN-8466	3-1-19	REO	TSG	TSG

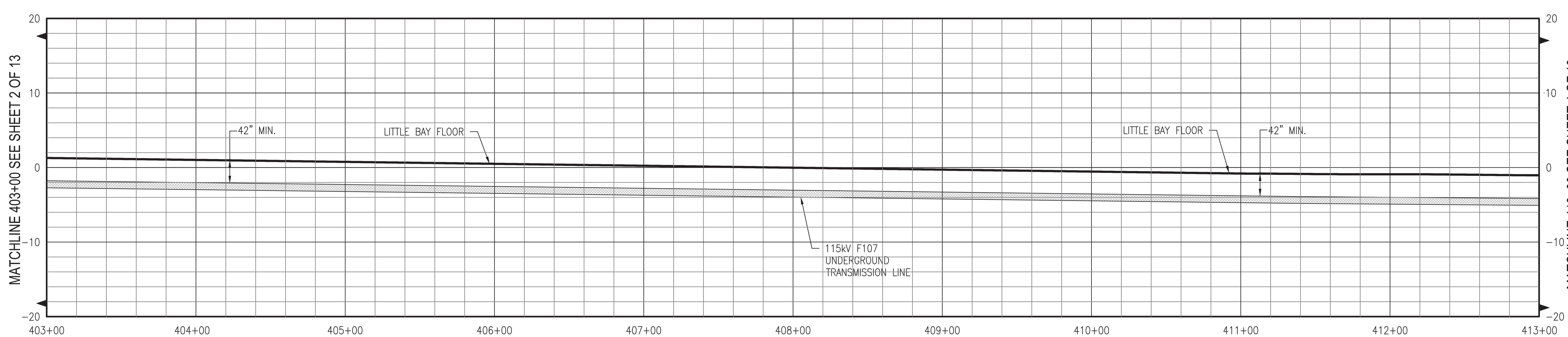
CIRCUIT F107 115kV UNDERGROUND TRANSMISSION LINE PLAN AND PROFILE VIEW

SCALE: H 1"=40', V 1"=8'   DATE: 3/1/2019

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

4/2/2019 5:10 PM – mwallek – R:\Projects\133007\DD\DWG\08 Const Dwgs\F10743003.DWG – 2





STATE OF NEW HAMPSHIRE TODD R. GOYETTE No. 14598 LICENSED PROFESSIONAL ENGINEER

4/3/19

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.
1	ISSUE FOR CONSTRUCTION WO# T1276A1 EPN-8466	3-1-19	REO	TSG	TSG

SEAL

EVERSOURCE ENERGY

T 1

CIRCUIT F107 115kV
UNDERGROUND TRANSMISSION LINE
PLAN AND PROFILE VIEW

SCALE: H 1=40', V 1=8' DATE: 3/1/2019

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

ES VER: 11/2015

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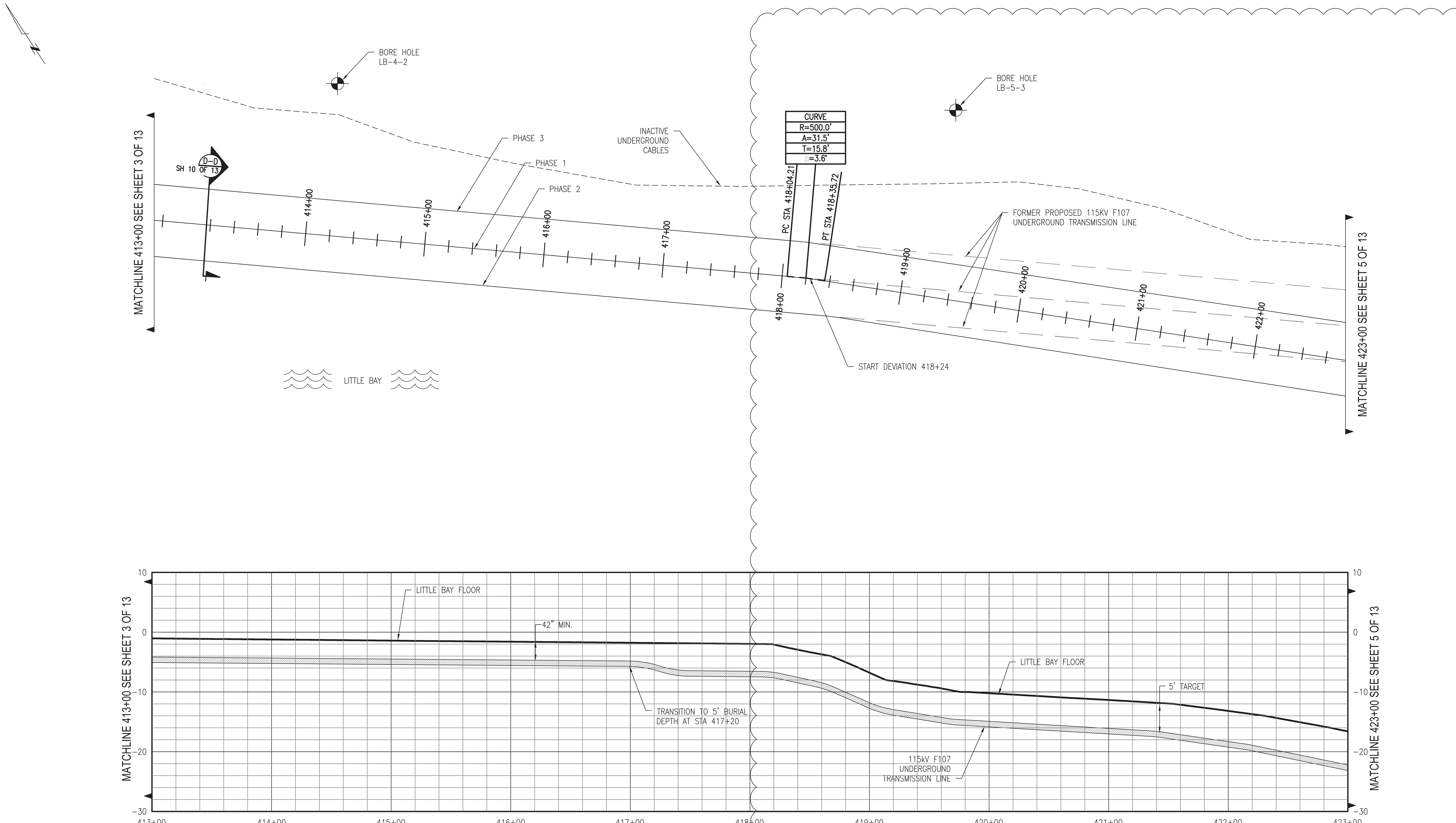

TODD S. GOYETTE No. 14596 LICENSED PROFESSIONAL ENGINEER — STATE OF NEW HAMPSHIRE

9/25/19

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.
2	IFC WO# T1276A1 EPN-8466, ADJUSTED SUBMARINE ALIGNMENT	9-23-19	REO	TSG	TSG
1	ISSUE FOR CONSTRUCTION WO# T1276A1 EPN-8466	3-1-19	REO	TSG	TSG

SEAL

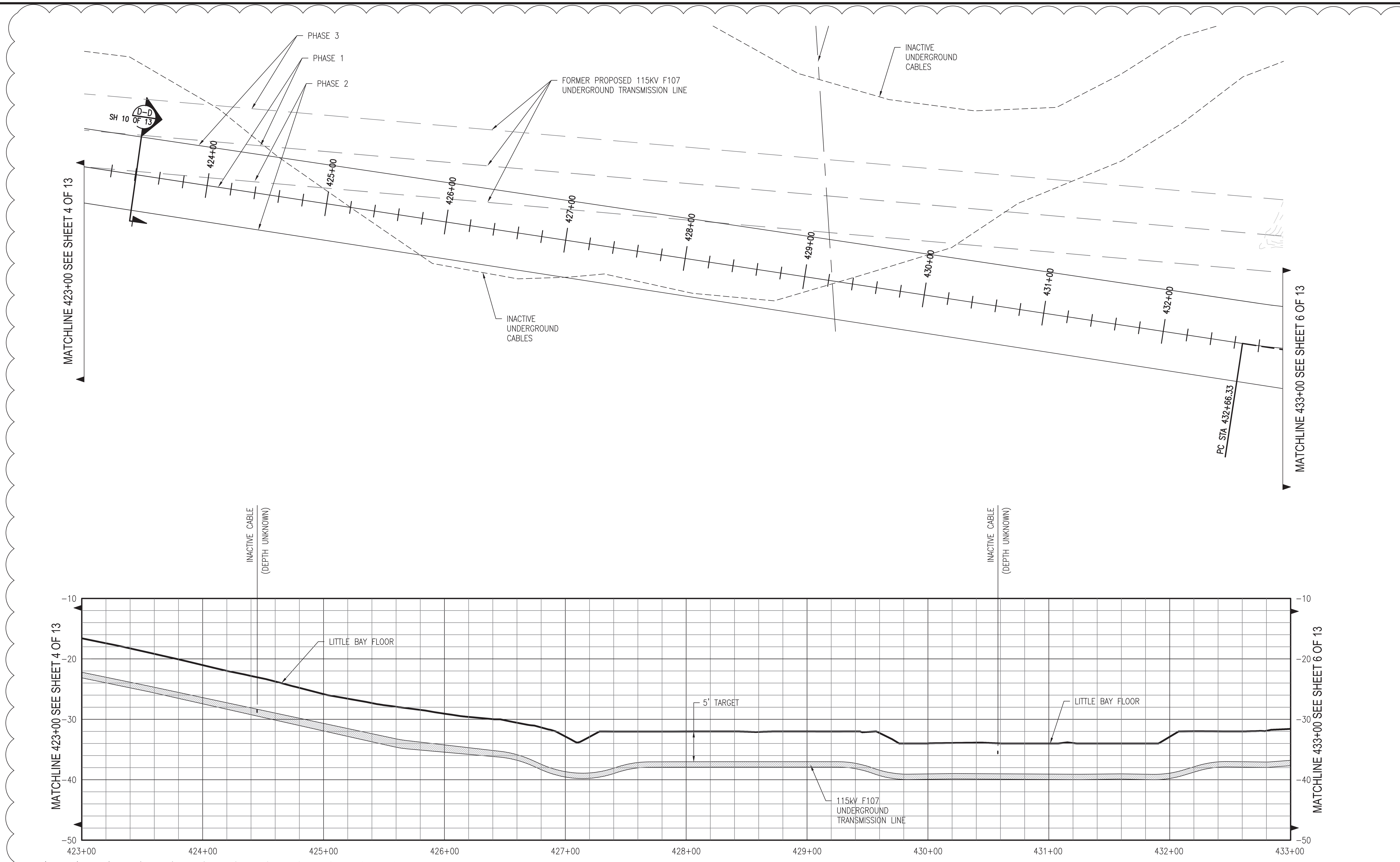
EVERSOURCE ENERGY

T 2

CIRCUIT F107 115kV
UNDERGROUND TRANSMISSION LINE
PLAN AND PROFILE VIEW

SCALE: H 1=40", V 1=8'
DATE: 3/1/2019

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



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STATE OF NEW HAMPSHIRE – TODD S. GOYETTE No. 14996 – LICENSED – PROFESSIONAL ENGINEER

9/25/19

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.
2	IFC WO# T1276A1 EPN-8466, ADJUSTED SUBMARINE ALIGNMENT	9-23-19	REO	TSG	TSG
1	ISSUE FOR CONSTRUCTION WO# T1276A1 EPN-8466	3-1-19	REO	TSG	TSG

SEAL

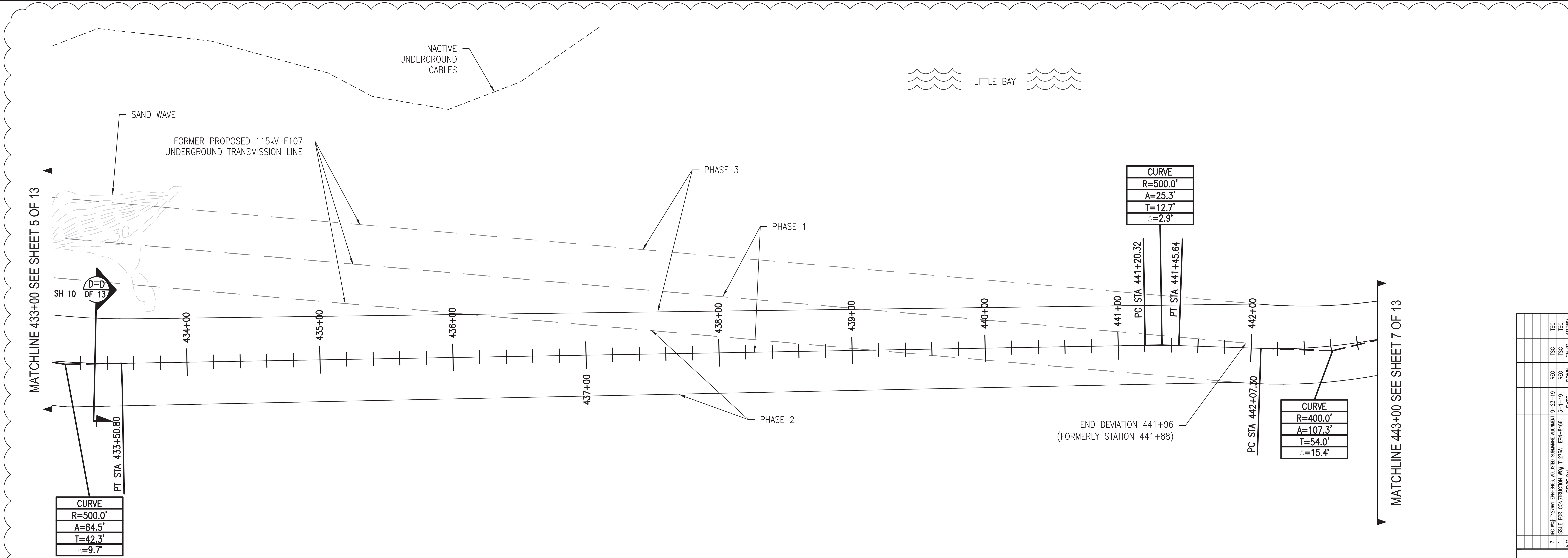
EVERSOURCE ENERGY

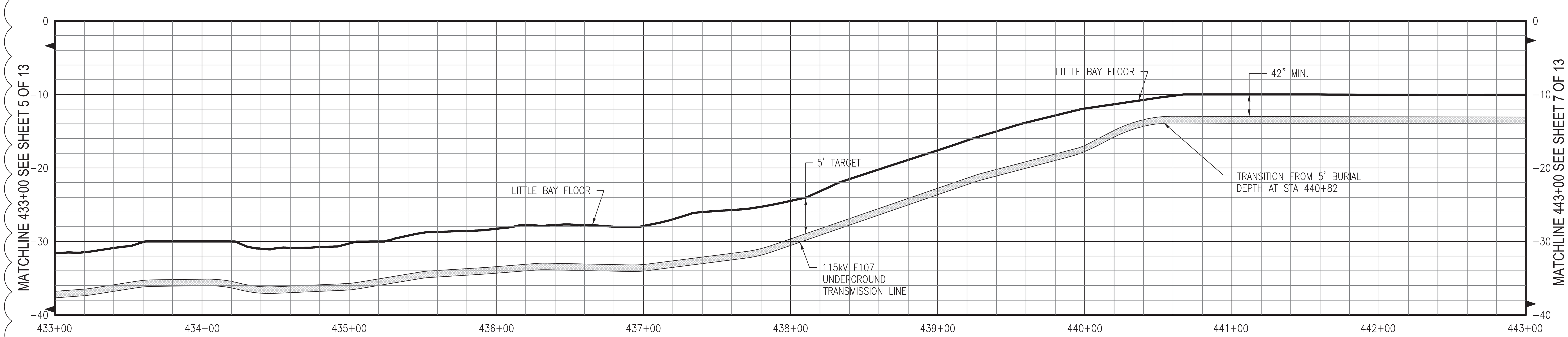
T 2

CIRCUIT F107 115kV
UNDERGROUND TRANSMISSION LINE
PLAN AND PROFILE VIEW

SCALE: H 1=40", V 1=8' DATE: 3/1/2019

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





STATE OF NEW HAMPSHIRE
TODD S. GOYETTE
No. 14596
LICENSED PROFESSIONAL ENGINEER
9/26/19

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.
2	IFC W/# 11276A1 EPN-8468, ADJUSTED SUBMARINE ALIGNMENT	9-23-19	RED	TSG	TSG
1	ISSUE FOR CONSTRUCTION W/# 11276A1 EPN-8468	3-1-19	RED	TSG	TSG

EVERSOURCE ENERGY

T 2

CIRCUIT F107 115kV
UNDERGROUND TRANSMISSION LINE
PLAN AND PROFILE VIEW

SCALE: H 1"=40', V 1"=8'
DATE: 3/1/2019

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

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THREE BUSINESS DAYS BEFORE YOU DIG CALL
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VERTICAL 0 4 8 16 24 FEET 1"= 8'

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

PRINT DRAWING TO SCALE ON 22"X34" SHEET

STATE OF NEW HAMPSHIRE TODD S. GOYETTE No. 14596 LICENSED PROFESSIONAL ENGINEER

4/3/19

NO.	REVISION	DATE	DRWN	CHKD	APPRV
1	ISSUE FOR CONSTRUCTION	3-1-19	RED	TSG	TSG

EVERSOURCE ENERGY

CIRCUIT F107 115kV UNDERGROUND TRANSMISSION LINE PLAN AND PROFILE VIEW

SCALE: H 1"=40', V 1"=8' DATE: 3/1/2019

DES: RED CHK: TSG
DRW: RED APR: TSG
TOWN: NEWINGTON
TRANSMISSION LINE: LINE
MILE NO: 8 & 9
DISCIPLINE/SHT NO.
SHEET 7 OF 13
F10743003

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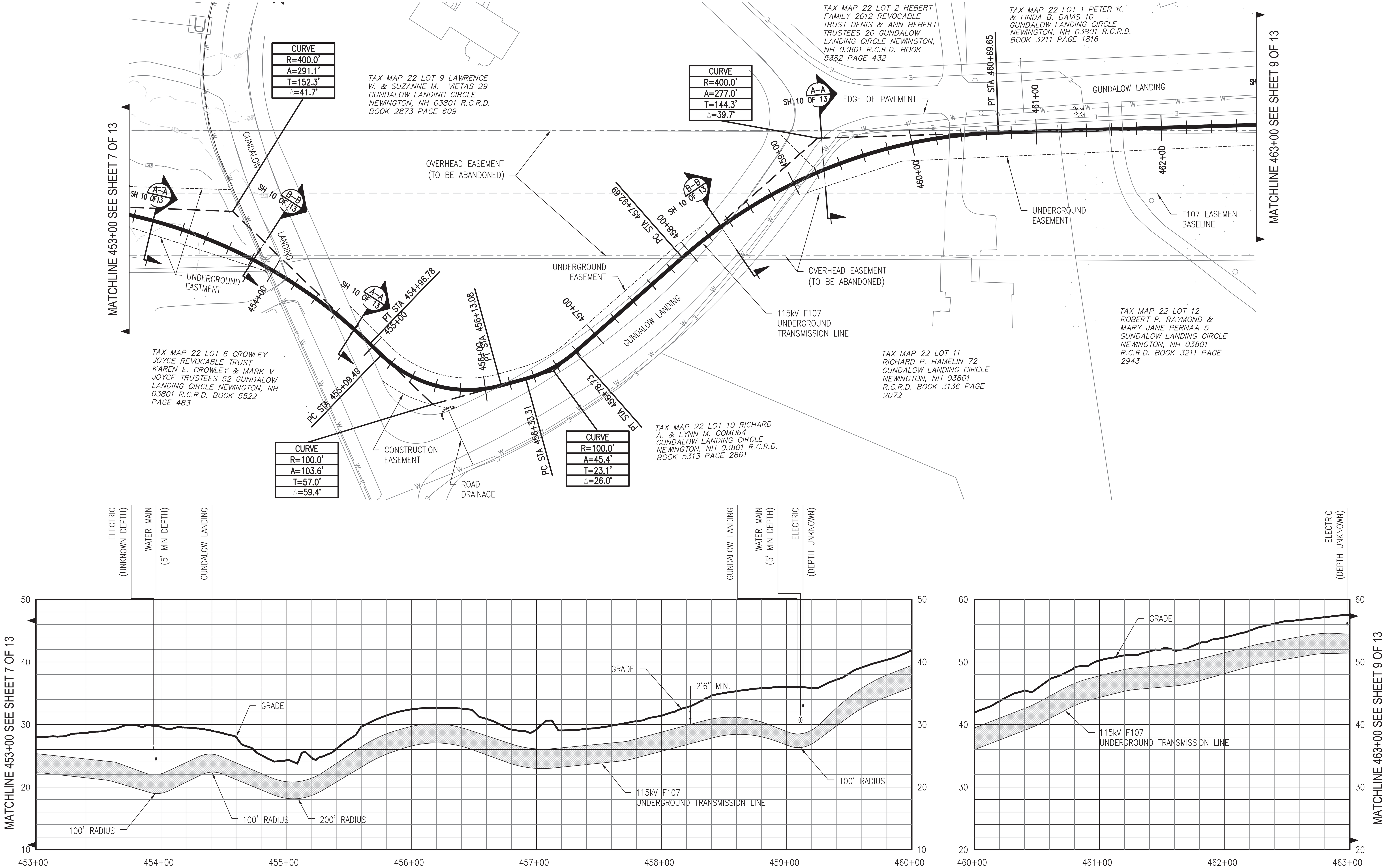

EVERSOURCE ENERGY

NO.	REVISION	DATE	DRAWN	CHKD	APPRV.
1	ISSUE FOR CONSTRUCTION WO# 11276A1 EPN-8466	3-1-19	RED	TSG	TSG

T 1

CIRCUIT F107 115kV
UNDERGROUND TRANSMISSION LINE
PLAN AND PROFILE VIEW

SCALE: H 1"=40', V 1"=8'
DATE: 3/1/2019

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

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TOLL FREE
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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

STATE OF NEW HAMPSHIRE
TODD S. GOYETTE No. 14595
LICENSED PROFESSIONAL ENGINEER
4/3/19

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ES VER: 11/2015

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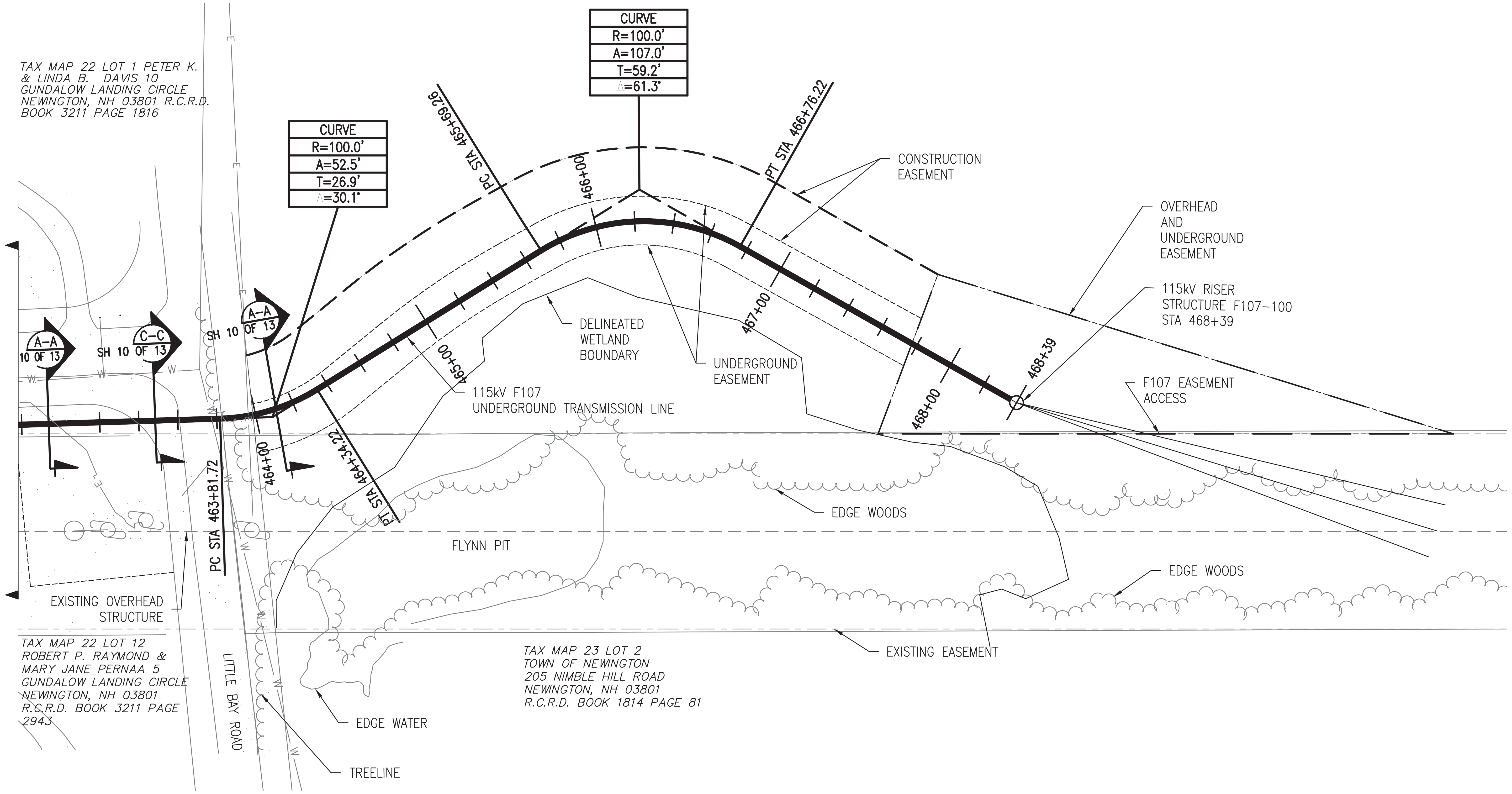

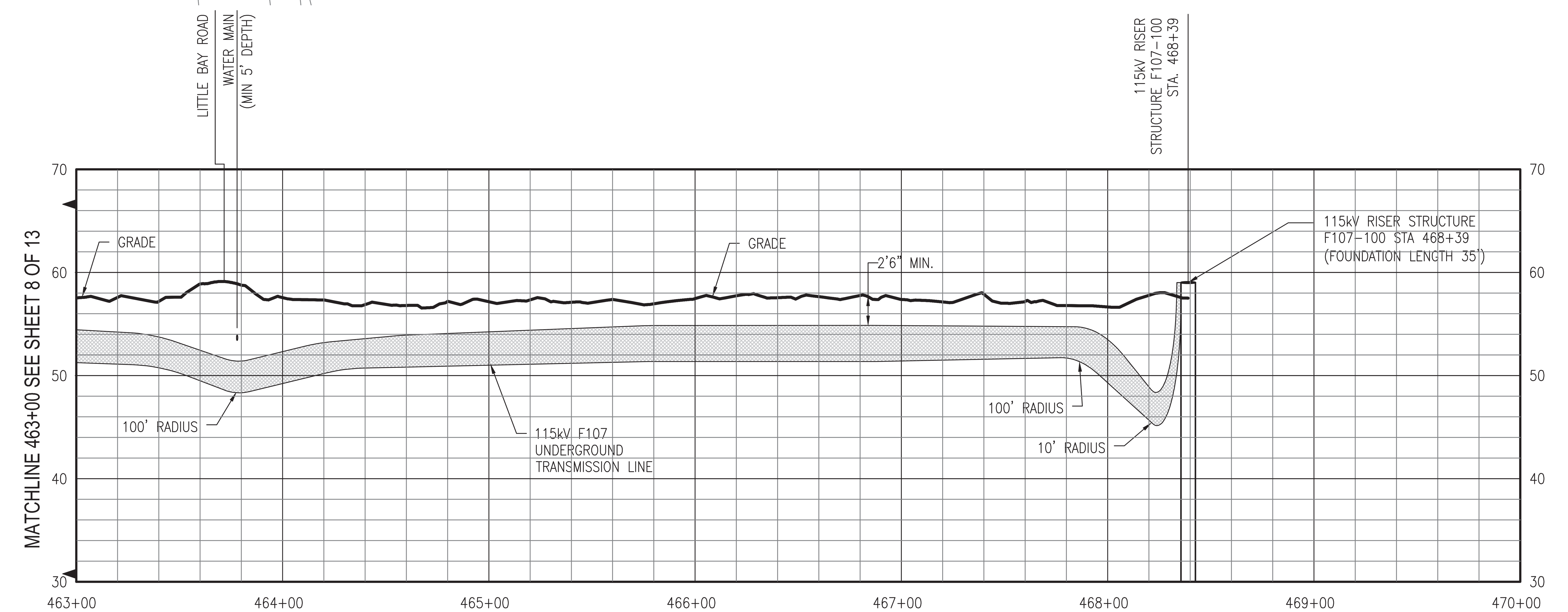

0 4 8 16 24 FEET
VERTICAL 1"= 8'
0 20 40 80 120 FEET
HORIZONTAL 1"= 40'
PRINT DRAWING TO SCALE ON 22"X34" SHEET

STATE OF NEW HAMPSHIRE TODD S. GOYETTE No. 14596 LICENSED PROFESSIONAL ENGINEER
4/3/19

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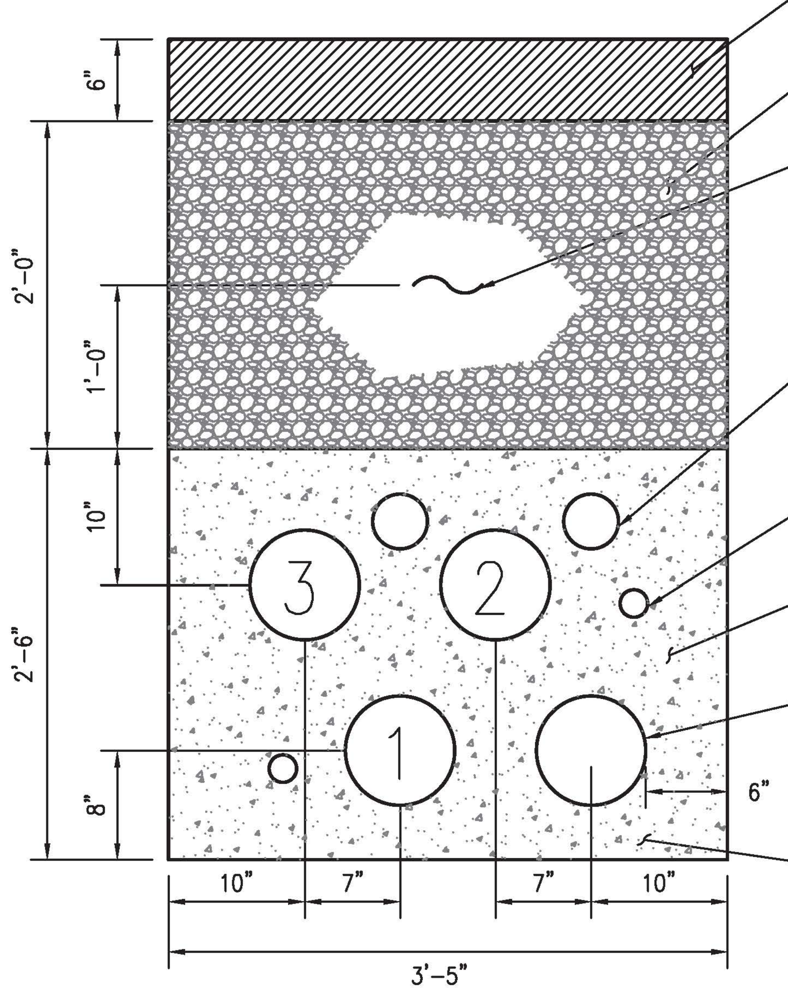
NO.	REVISION	DATE	DRWN	CHKD	APPRV.
1	ISSUE FOR CONSTRUCTION MOD 112784 EPN-8466	3-1-19	RED	TSG	TSG

EVERSOURCE ENERGY

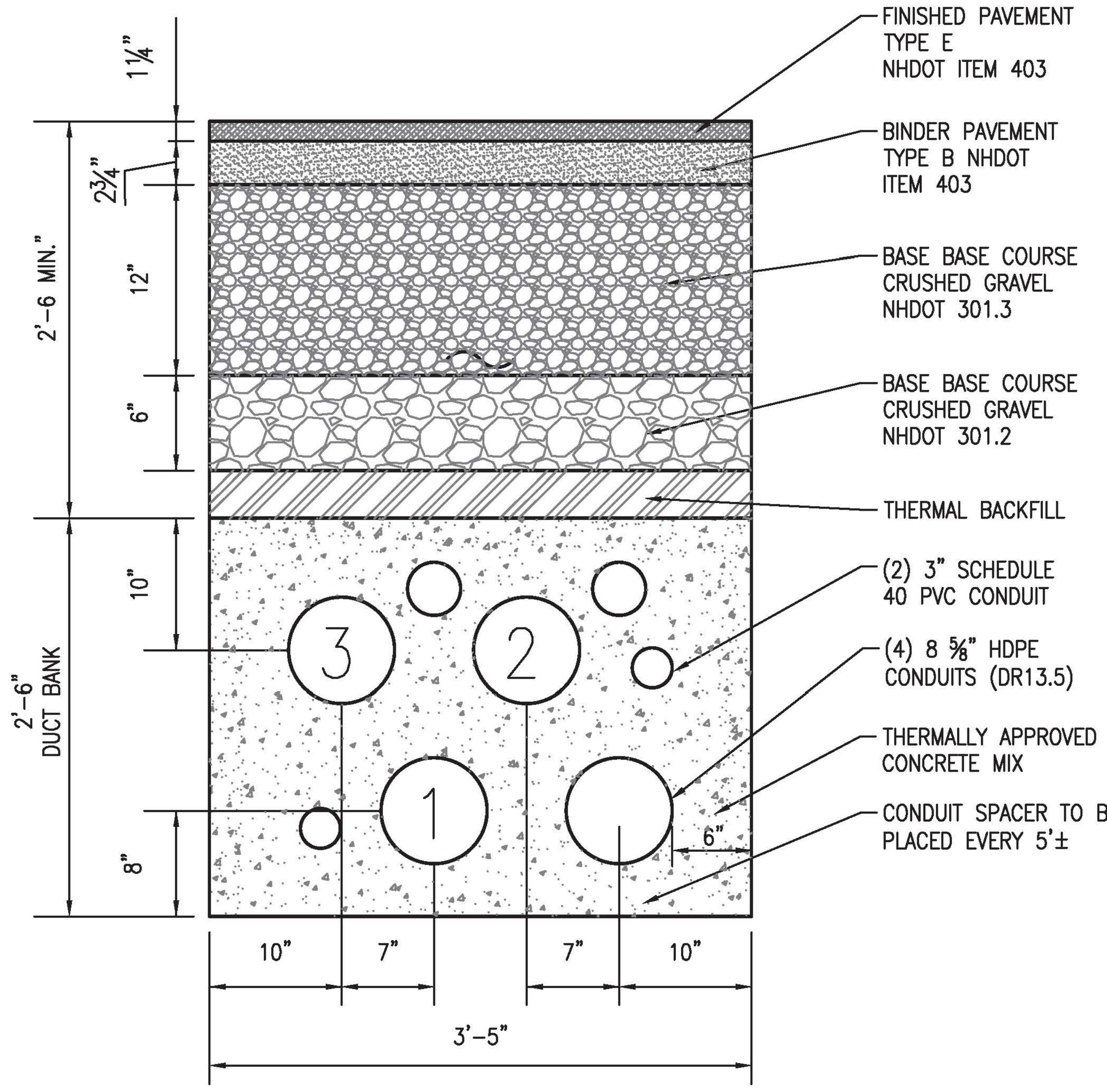
CIRCUIT F107 115kV
UNDERGROUND TRANSMISSION LINE
PLAN AND PROFILE VIEW

SCALE: H 1=40', V 1=8' DATE: 3/1/2019
DES: RED CHK: TSG
DRW: RED APR: TSG
TOWN: NEWINGTON
TRANSMISSION LINE: LINE
MILE NO: 8 & 9
DISCIPLINE/SHT NO.
SHEET 9 OF 13
F10743003

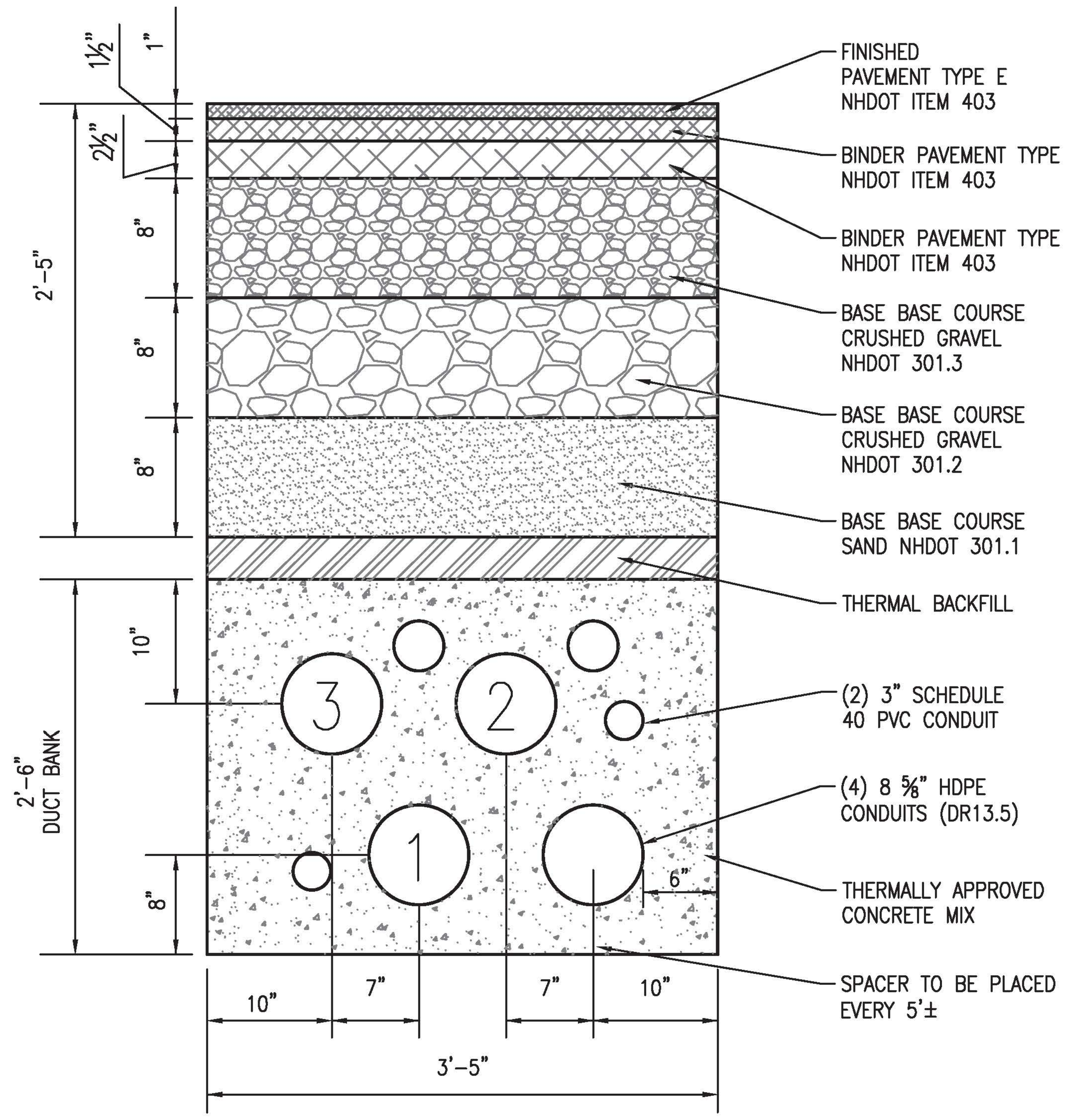
ES VER: 11/2015
4/2/2019 5:10 PM – mwallek – R:\Projects\133007\DD\DWG\08 Const Dwgs\F10743003.DWG – 9



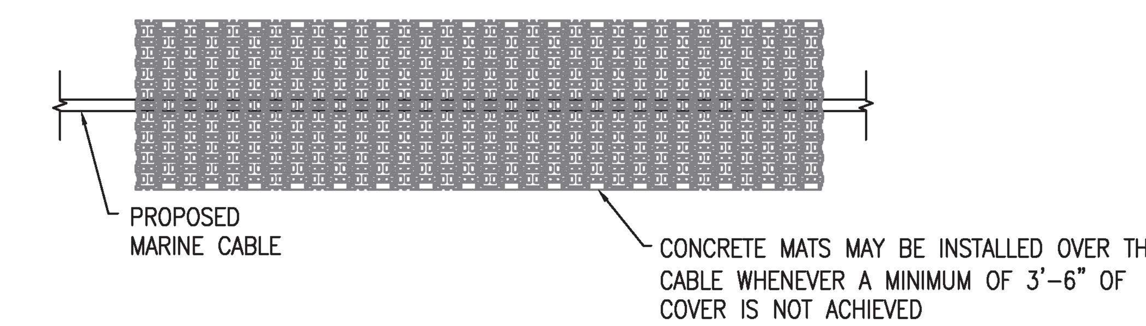
TYP TRENCH DETAIL
SECTION (A-A / SH 10 OF 13)
SCALE N.T.S



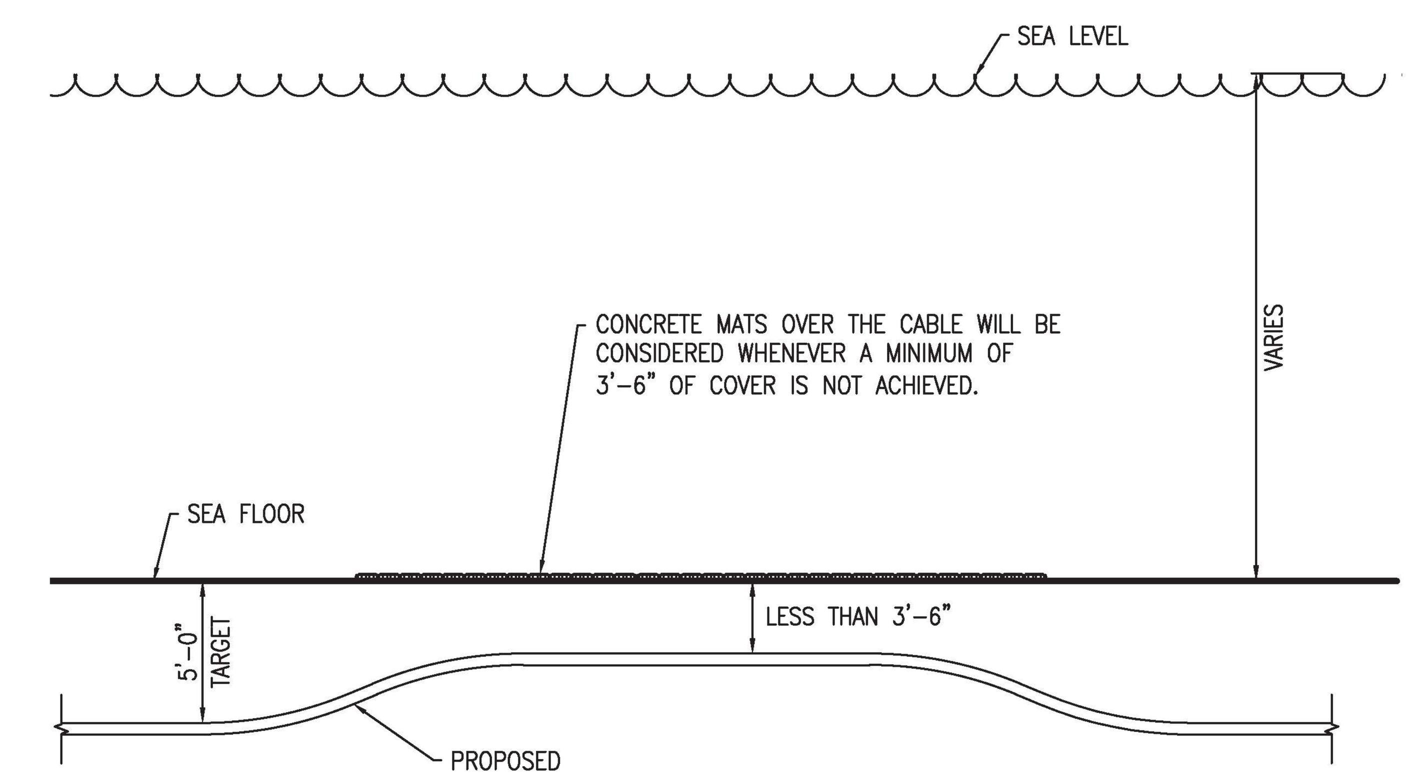
RESIDENTIAL ROAD CROSSING SECTION (GUNDALOW LANDING CIRCLE)
SECTION (B-B / SH 10 OF 13)
SCALE N.T.S



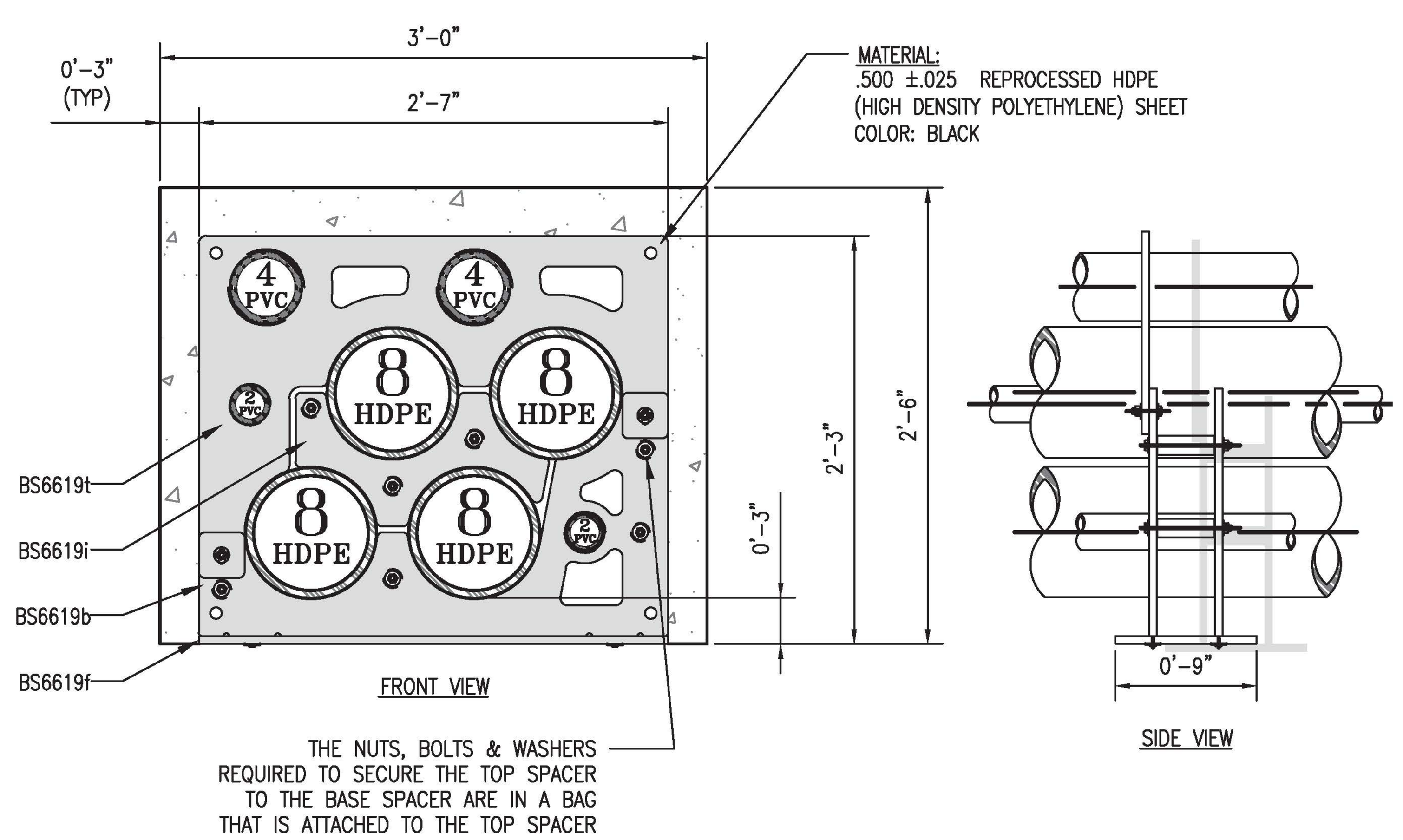
NON RESIDENTIAL ROAD CROSSING SECTION (LITTLE BAY)
SECTION (C-C / SH 10 OF 13)
SCALE N.T.S



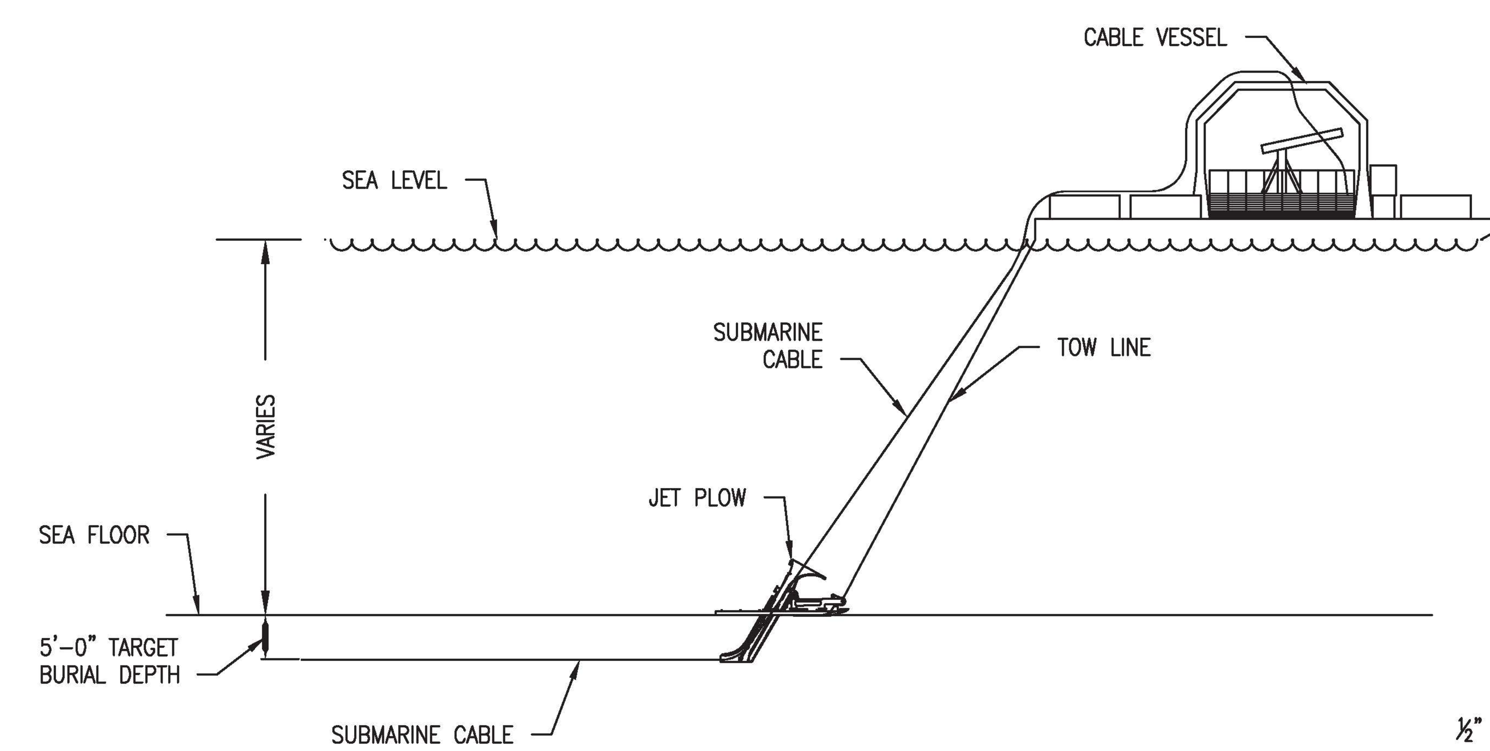
PLAN VIEW



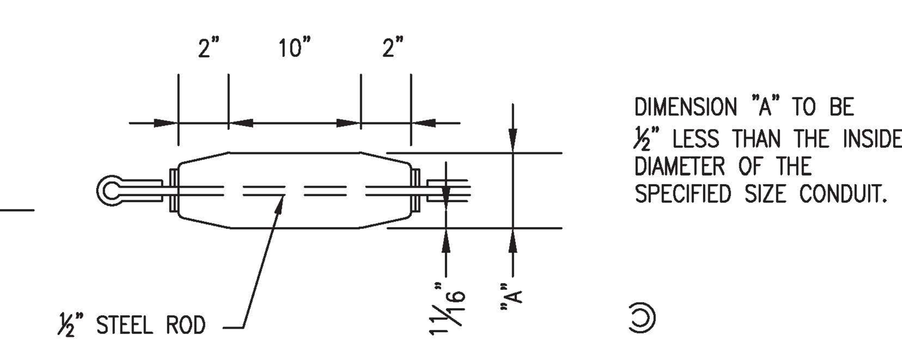
PROFILE VIEW



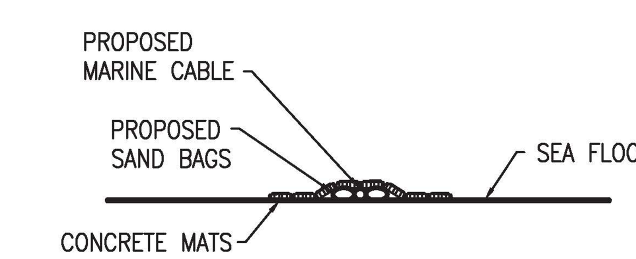
UNDERGROUND DEVICES SAMPLE SPACER ARRANGEMENT
DETAIL (1 / SH 10 OF 13)
SCALE N.T.S.



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



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

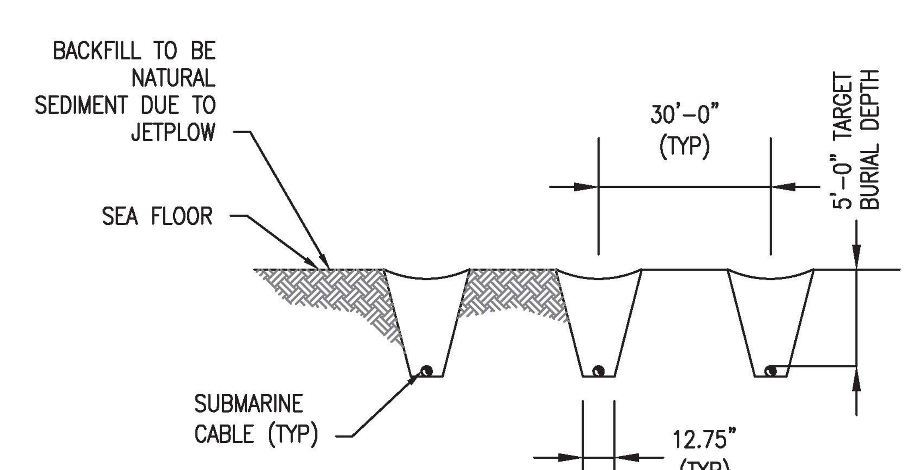


CROSS SECTION

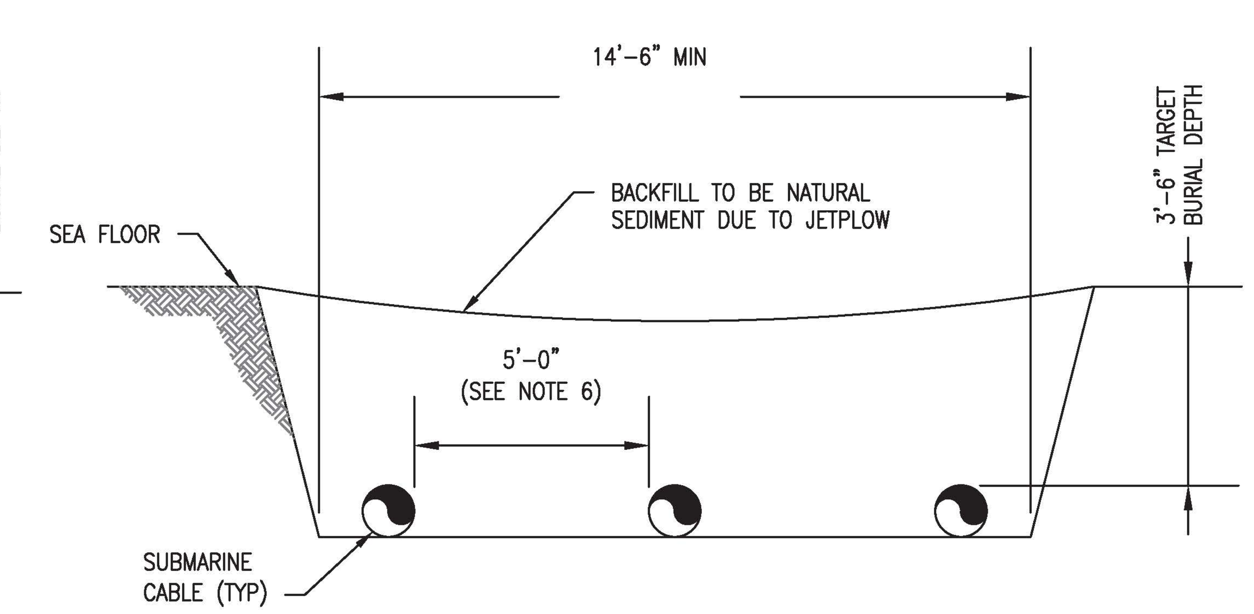
CONCRETE MATTING FOR SHALLOW PENETRATION
DETAIL (4 / SH 10 OF 13)
SCALE N.T.S.

NOTES:

1. SPACER SHOWN IS REPRESENTATIVE. CONTRACTOR TO WORK WITH SELECTED MANUFACTURER FOR PROJECT SPECIFIC SPACER.
2. STAGGER BELL ENDS.
2. AVOID STANDING ON CONDUIT.
3. ALL TRENCH DETAILS AND PHASING SHOWN AS LOOKING AHEAD STATIONS.
4. ALL DUCT SPACERS ARE UNDERGROUND DEVICES SPACERS, OR APPROVED EQUIVALENT.
5. SEPARATION SHOWN IS TYPICAL SPACING IN TRENCH EXCAVATION AREAS. SEE PLAN DETAILS FOR SEPARATION AT OTHER LOCATIONS.



TYP SUBMARINE JET PLOW
SECTION (D-D / SH 10 OF 13)
SCALE N.T.S



TYP SUBMARINE TRENCH
SECTION (E-E / SH 10 OF 13)
SCALE N.T.S

STATE OF NEW HAMPSHIRE
TODD S. GOYETTE
No. 14596
LICENSED
PROFESSIONAL ENGINEER

4/3/19

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PRINT DRAWING TO SCALE ON 22"X34" SHEET

NO.	REVISION	DATE	DRWN	CHKD	APPRV
1	ISSUE FOR CONSTRUCTION W/O T1270M1 EPN-8468	3-1-19	RED	TSG	TSG

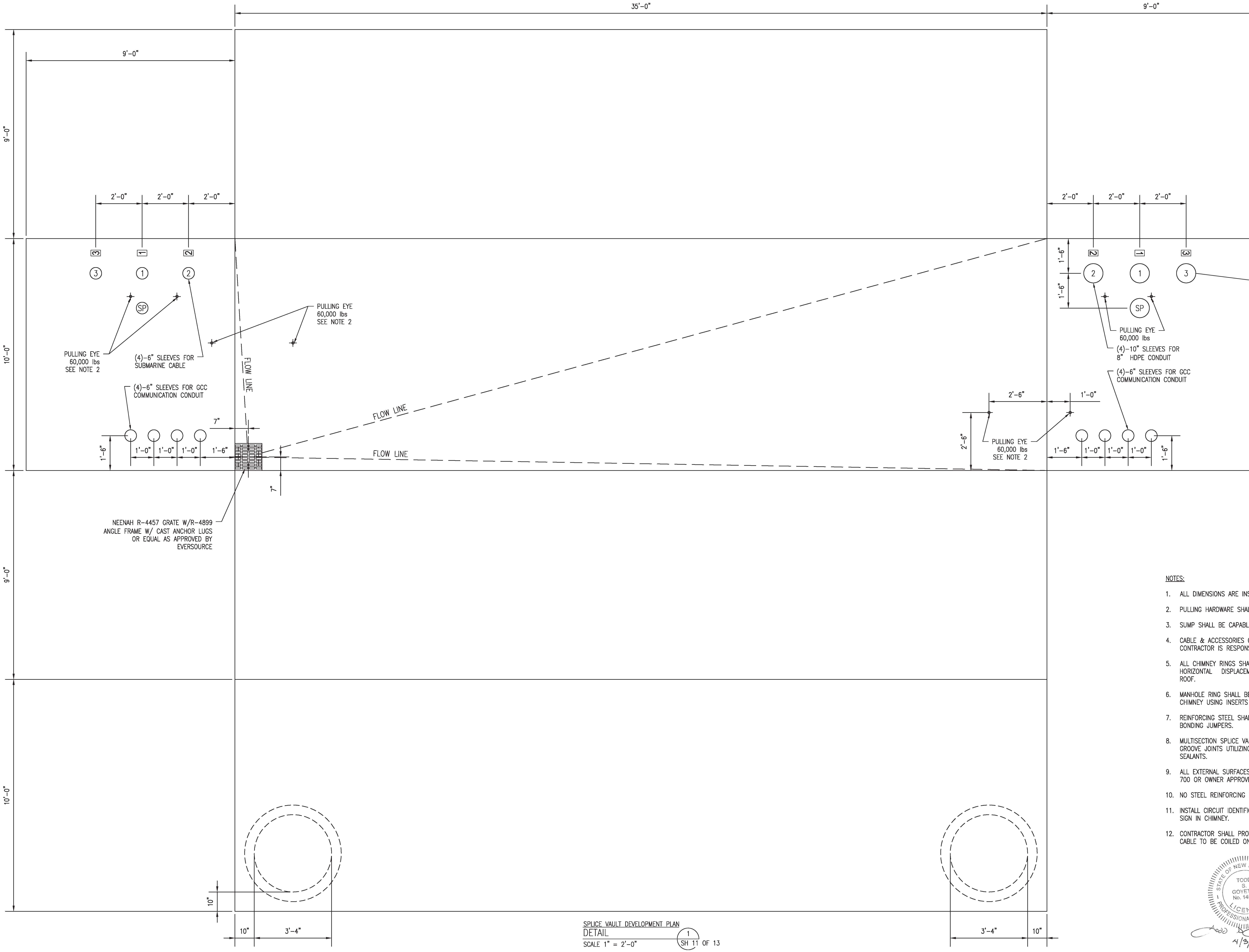
EVERSOURCE ENERGY

T 1

CIRCUIT F107 115kV
UNDERGROUND TRANSMISSION LINE
TRENCH AND JET PLOW DETAILS
SCALE: N.T.S. DATE: 3/1/2019

DES: RED CHK: TSG
DRW: RED APR: TSG
TOWN: DURHAM & NEWINGTON
TRANSMISSION LINE: LINE
MILE NO: 8 & 9
DISCIPLINE/SHT NO.
SHEET 10 OF 13
F10705060

ES VER: 11/2015



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

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. CABLE & ACCESSORIES CONTRACTOR TO FIELD VERIFY ACTUAL SPLICE VAULT DEPTHS. CONTRACTOR IS RESPONSIBLE FOR ALL SAFETY & ENTRY/EXIT REQUIREMENTS.
5. ALL CHIMNEY RINGS SHALL BE MORTARED OR OTHERWISE "KEYED" TO PREVENT HORIZONTAL DISPLACEMENT AND SHALL BE SECURELY MORTARED TO SPLICE VAULT ROOF.
6. MANHOLE RING SHALL BE SECURELY FASTENED TO THE SPLICE VAULT ROOF OR CHIMNEY USING INSERTS AND BOLTS OR OTHER MEANS WITH PRIOR APPROVAL.
7. REINFORCING STEEL SHALL BE BONDED TO 500kcmil SOFT DRAWN BARE COPPER BONDING JUMPERS.
8. MULTISECTION SPLICE VAULTS SHALL INCORPORATE EITHER SHIPLAP OR TONGUE AND GROOVE JOINTS UTILIZING APPROPRIATE SILICONE, POLYMERIC OR ELASTOMERIC SEALANTS.
9. ALL EXTERNAL SURFACES OF VAULT SHALL BE SEALED USING SONNEDORN HYDROCIDE 700 OR OWNER APPROVED EQUIVALENT.
10. NO STEEL REINFORCING BAR MAY ENCAPSULATE ANY INDIVIDUAL CONDUIT.
11. INSTALL CIRCUIT IDENTIFICATION LABELS ON VAULT WALL AND INSTALL DANGER WARNING SIGN IN CHIMNEY.
12. CONTRACTOR SHALL PROVIDE RACKING FOR 50' OF DYNAMIC TEMPERATURE SENSING CABLE TO BE COILED ON THE WALL OPPOSITE THE CABLE SPLICES.

STATE OF NEW HAMPSHIRE
TODD S. GOYETTE
No. 14596
LICENSED
PROFESSIONAL ENGINEER

4/3/19

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NO.	REVISION	DATE	DRWN	CHKD	APPRV.
1	ISSUE FOR CONSTRUCTION W/ 11276A1 EPN-6468	3-1-19	RED	TSG	TSG

EVERSOURCE ENERGY

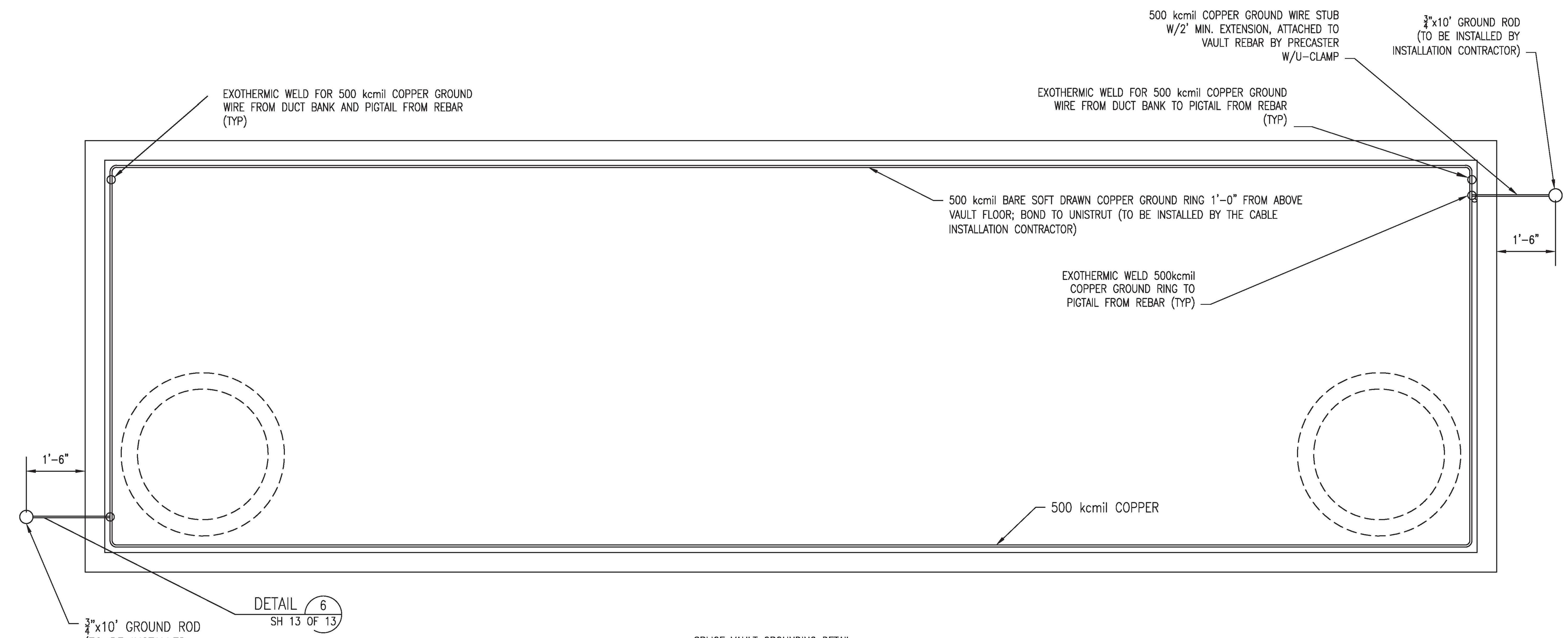
T 1

CIRCUIT F107 115kV
UNDERGROUND TRANSMISSION LINE
SPLICE VAULT DETAIL SHEET
DATE:3/1/2019
SCALE: N.T.S.

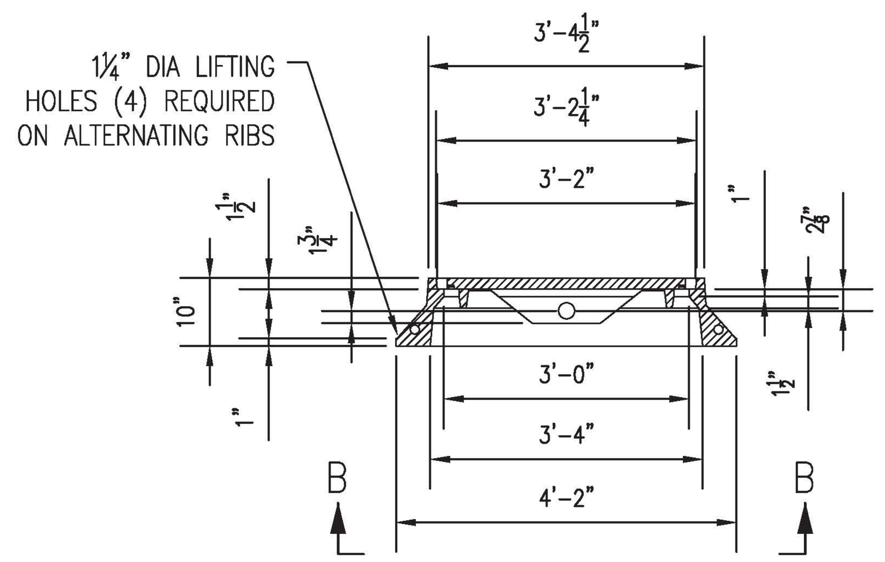
DES: RED CHK: TSG
DRW: RED APR: TSG
TOWN: NEWINGTON
TRANSMISSION LINE: LINE
MILE NO: 8 & 9
DISCIPLINE/SHT NO.
SHEET 11 OF 13
F10705060

4/2/2019 5:18 PM – rwollek – R:\Projects\133007\DD\DWG\08 Const Dwgs\F10705060.dwg – 11

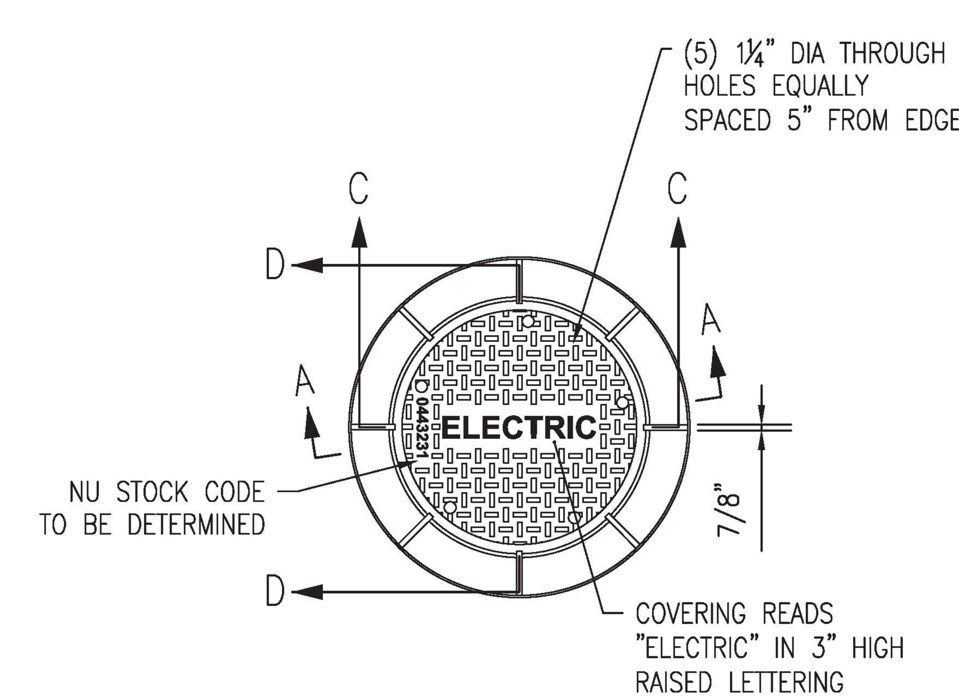
ES VER: 11/2015



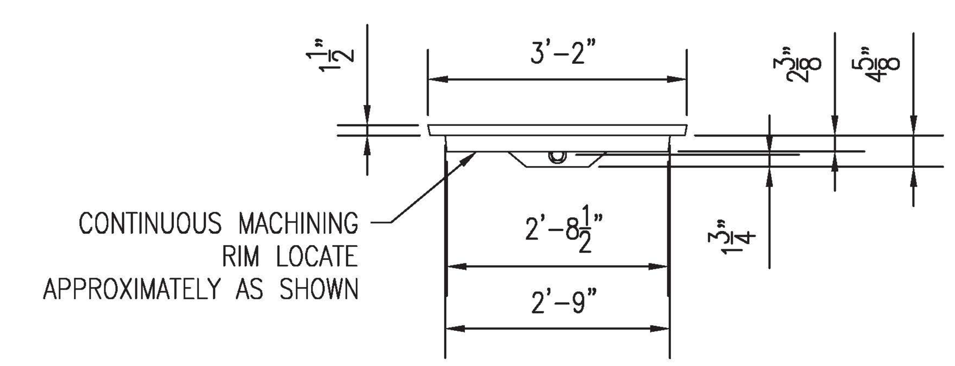
SPLICE VAULT GROUNDING DETAIL
DETAIL 1 SH 12 OF 13
SCALE 1" = 2'-0"



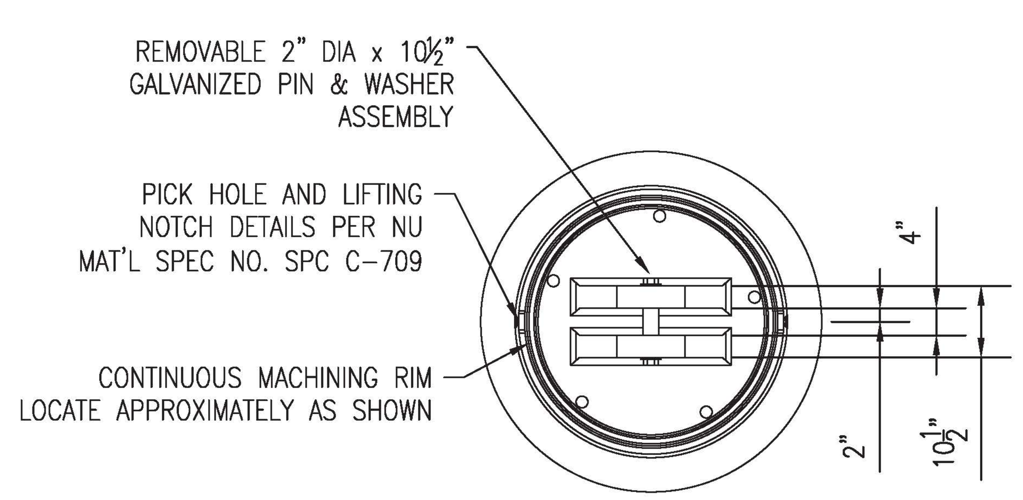
SECTION A-A



TOP VIEW

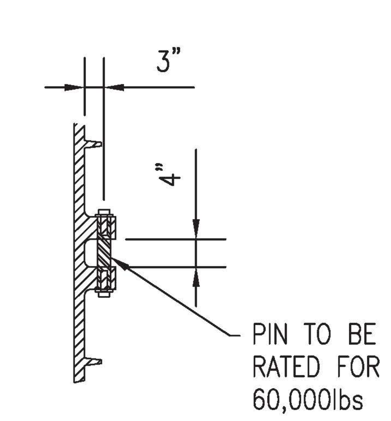


SECTION C-C
AASHTO HS 25 LOAD RATED



SECTION B-B
AASHTO HS 25 LOAD RATED

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



SECTION D-D

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

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. CABLE & ACCESSORIES CONTRACTOR TO FIELD VERIFY ACTUAL SPLICE VAULT DEPTHS. CONTRACTOR IS RESPONSIBLE FOR ALL SAFETY & ENTRY/EXIT REQUIREMENTS.
5. ALL CHIMNEY RINGS SHALL BE MORTARED OR OTHERWISE "KEYED" TO PREVENT HORIZONTAL DISPLACEMENT AND SHALL BE SECURELY MORTARED TO SPLICE VAULT ROOF.
6. MANHOLE RING SHALL BE SECURELY FASTENED TO THE SPLICE VAULT ROOF OR CHIMNEY USING INSERTS AND BOLTS OR OTHER MEANS WITH PRIOR APPROVAL.
7. REINFORCING STEEL SHALL BE BONDED TO 500kcmil SOFT DRAWN BARE COPPER BONDING JUMPERS.
8. MULTISECTION SPLICE VAULTS SHALL INCORPORATE EITHER SHIPLAP OR TONGUE AND GROOVE JOINTS UTILIZING APPROPRIATE SILICONE, POLYMERIC OR ELASTOMERIC SEALANTS.
9. ALL EXTERNAL SURFACES OF VAULT SHALL BE SEALED USING SONNEDORN HYDROCIDE 700 OR OWNER APPROVED EQUIVALENT.
10. NO STEEL REINFORCING BAR MAY ENCAPSULATE ANY INDIVIDUAL CONDUIT.
11. INSTALL CIRCUIT IDENTIFICATION LABELS ON VAULT WALL AND INSTALL DANGER WARNING SIGN IN CHIMNEY.
12. CONTRACTOR SHALL PROVIDE RACKING FOR 50' OF DYNAMIC TEMPERATURE SENSING CABLE TO BE COILED ON THE WALL OPPOSITE THE CABLE SPLICES.

STATE OF NEW HAMPSHIRE
TODD S. GOYETTE No. 14596
LICENSED PROFESSIONAL ENGINEER
4/3/19

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NO.	REVISION	DATE	DRWN	CHKD	APPRV.
1	ISSUE FOR CONSTRUCTION W.O.# 112796A1 EPN-6468	3-1-19	RED	TSG	TSG

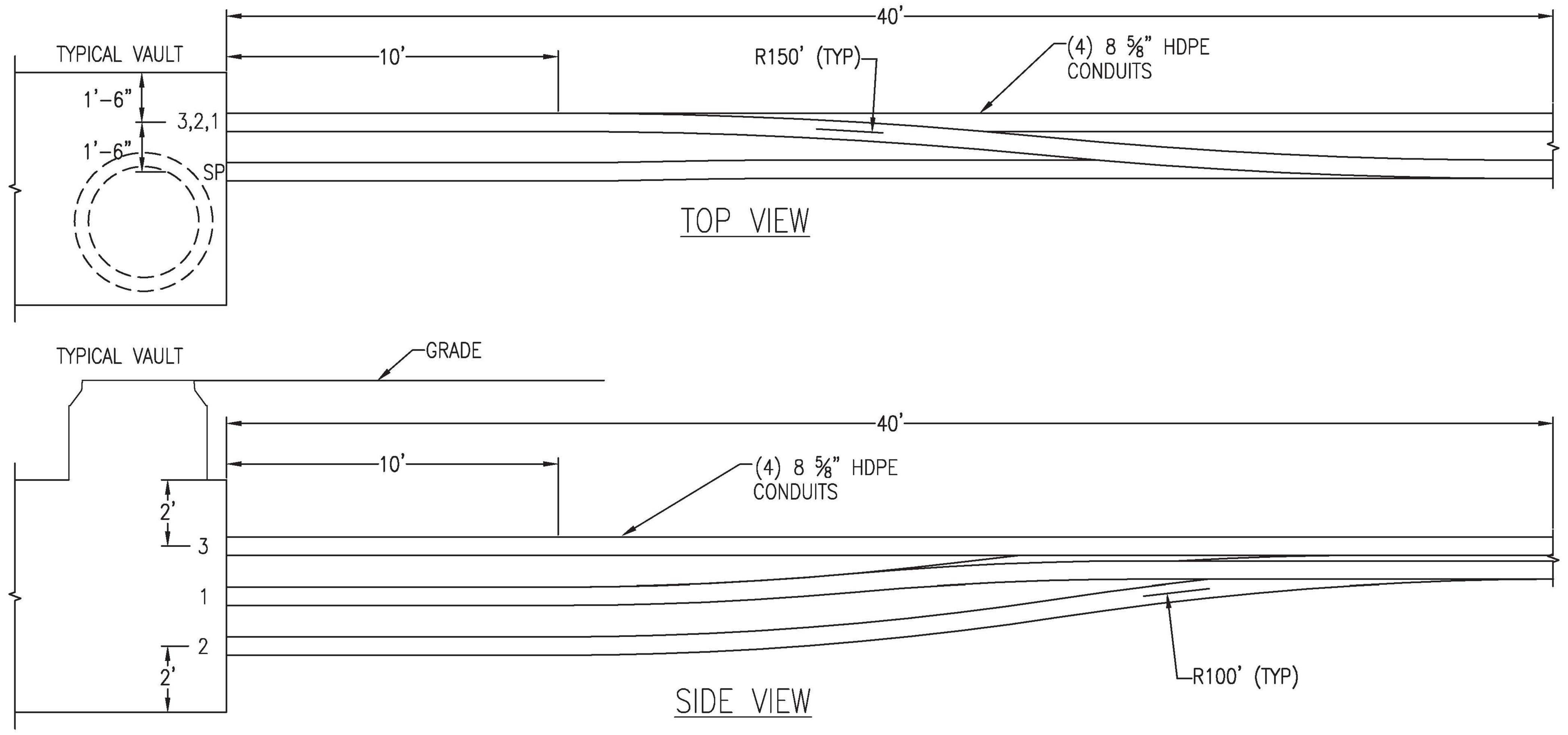
EVERSOURCE ENERGY

T 1

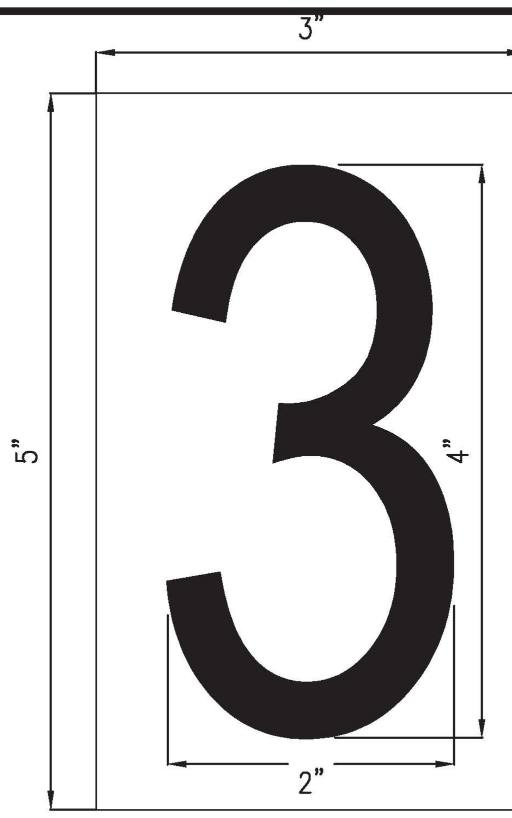
CIRCUIT F107 115kV
UNDERGROUND TRANSMISSION LINE
SPLICE VAULT DETAIL SHEET
SCALE: N.T.S. DATE: 3/1/2019

DES: RED CHK: TSG
DRW: RED APR: TSG
TOWN: NEWINGTON
TRANSMISSION LINE: LINE
MILE NO: 8 & 9
DISCIPLINE/SHT NO.
SHEET 12 OF 13
F10705060

4/2/2019 5:18 PM – mwollek – R:\Projects\133007\DD\DWG\08 Const Dwgs\F10705060.dwg – 12



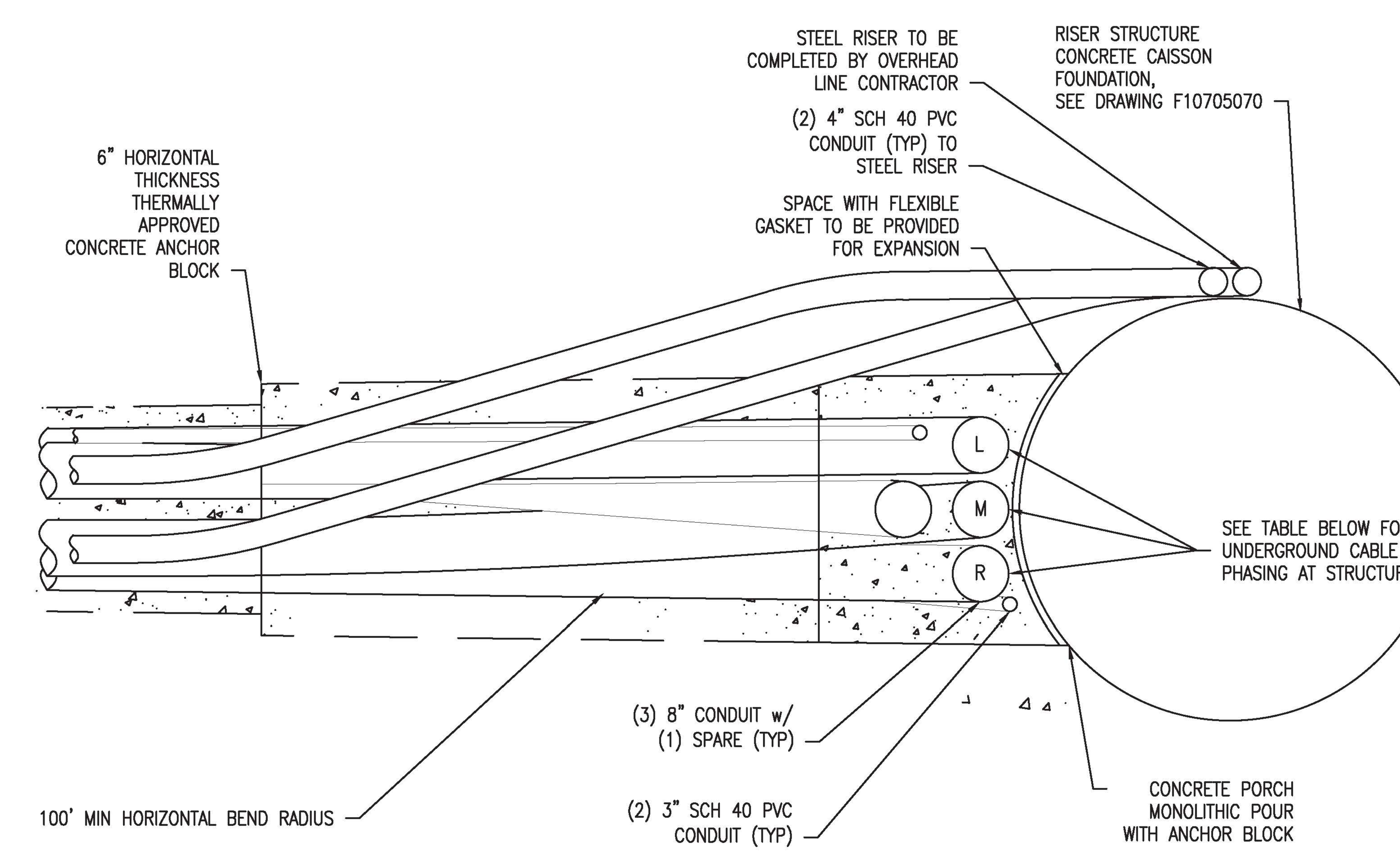
SPLICE VAULT TRANSITION DETAIL
DETAIL 1
NTS
SH 13 OF 13



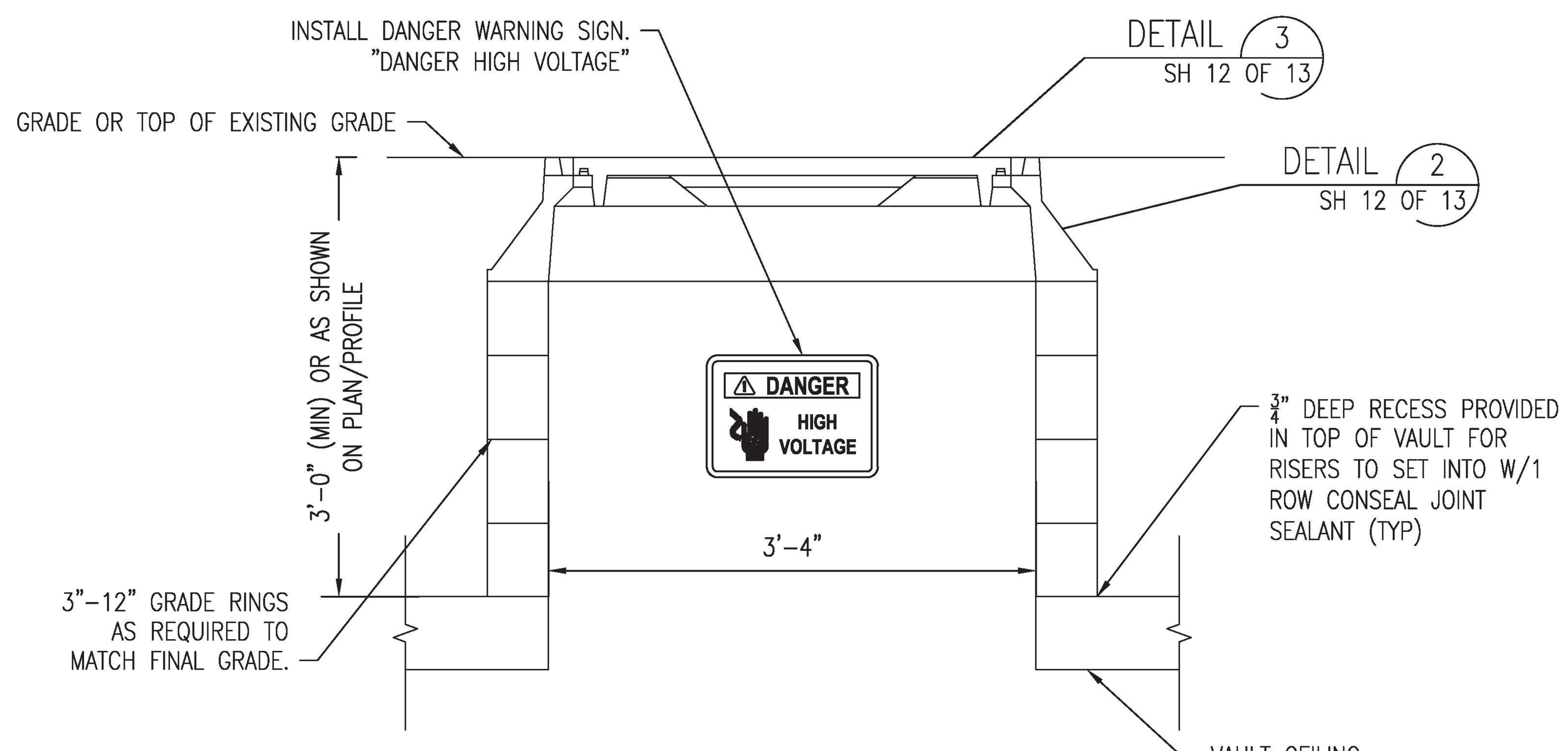
PHASE IDENTIFICATION TAG
DETAIL 2
NTS
SH 13 OF 13

NOTES:

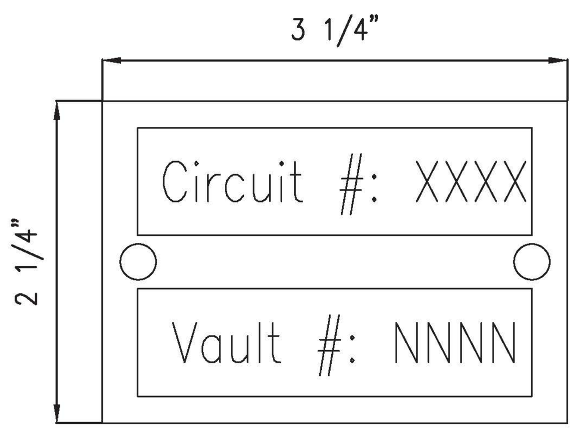
1. CHARACTER SHALL BE 4" HIGH BOLD TYPE.
2. CHARACTER SHALL BE CENTERED ON SIGN.
3. BACKGROUND: WHITE
   LETTERING: BLACK
   CHARACTERS: A, B & C AS SHOWN



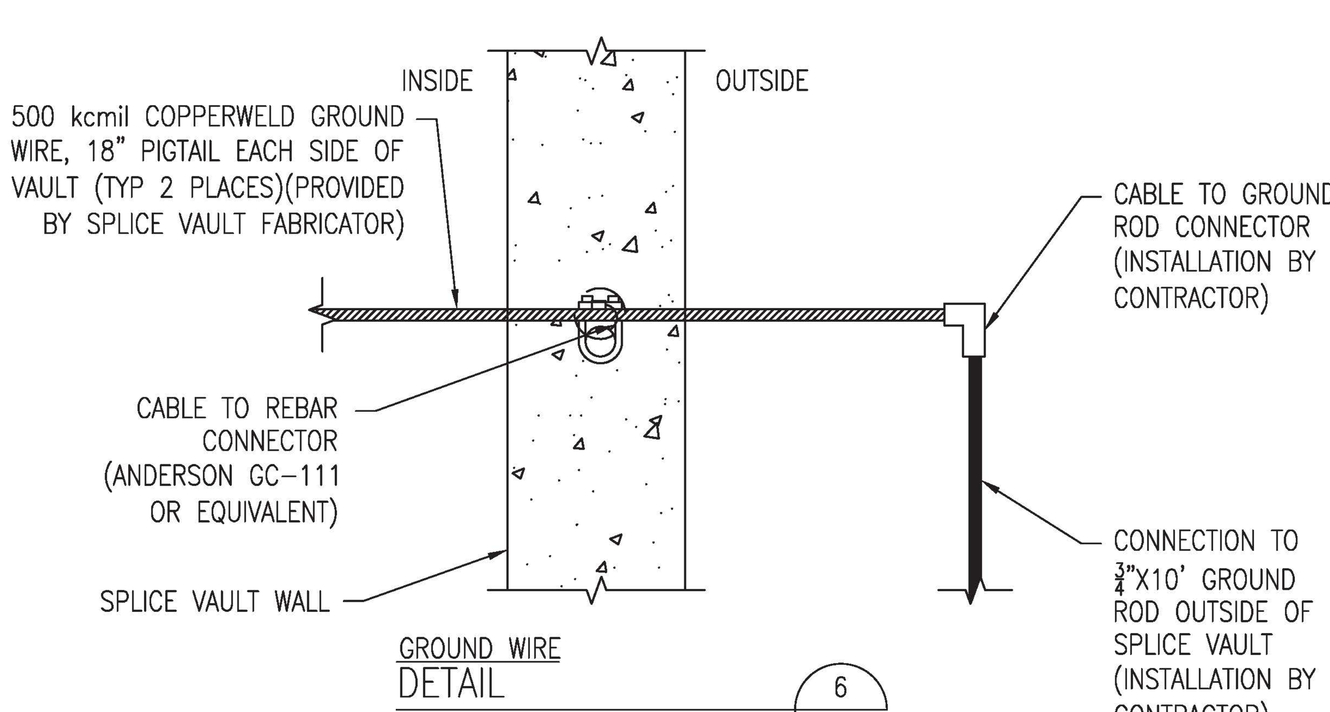
	STR 99	STR 100
L	2	3
M	1	1
R	3	2



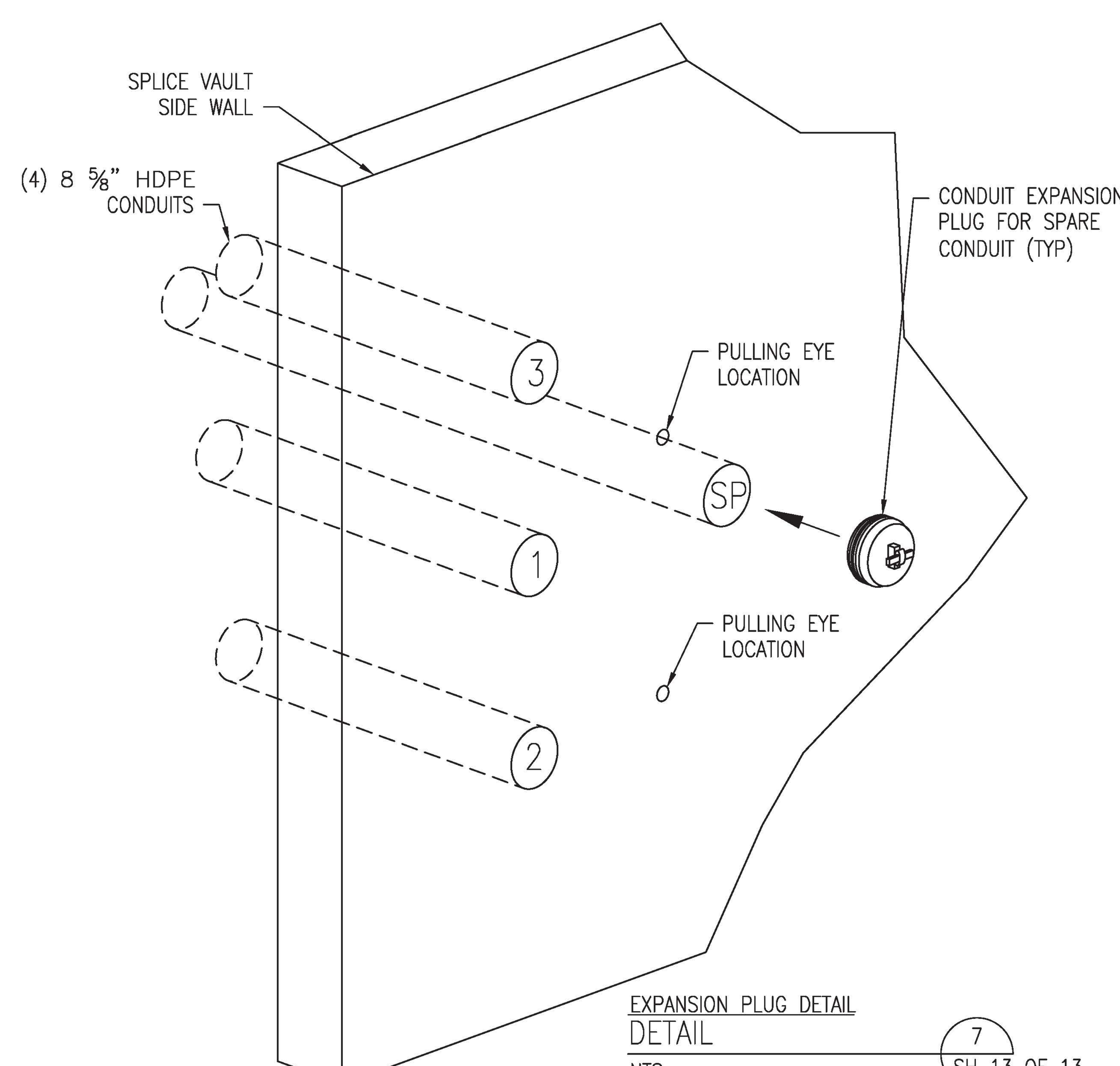
SPLICE VAULT RISER DETAIL
DETAIL 3
NTS
SH 13 OF 13



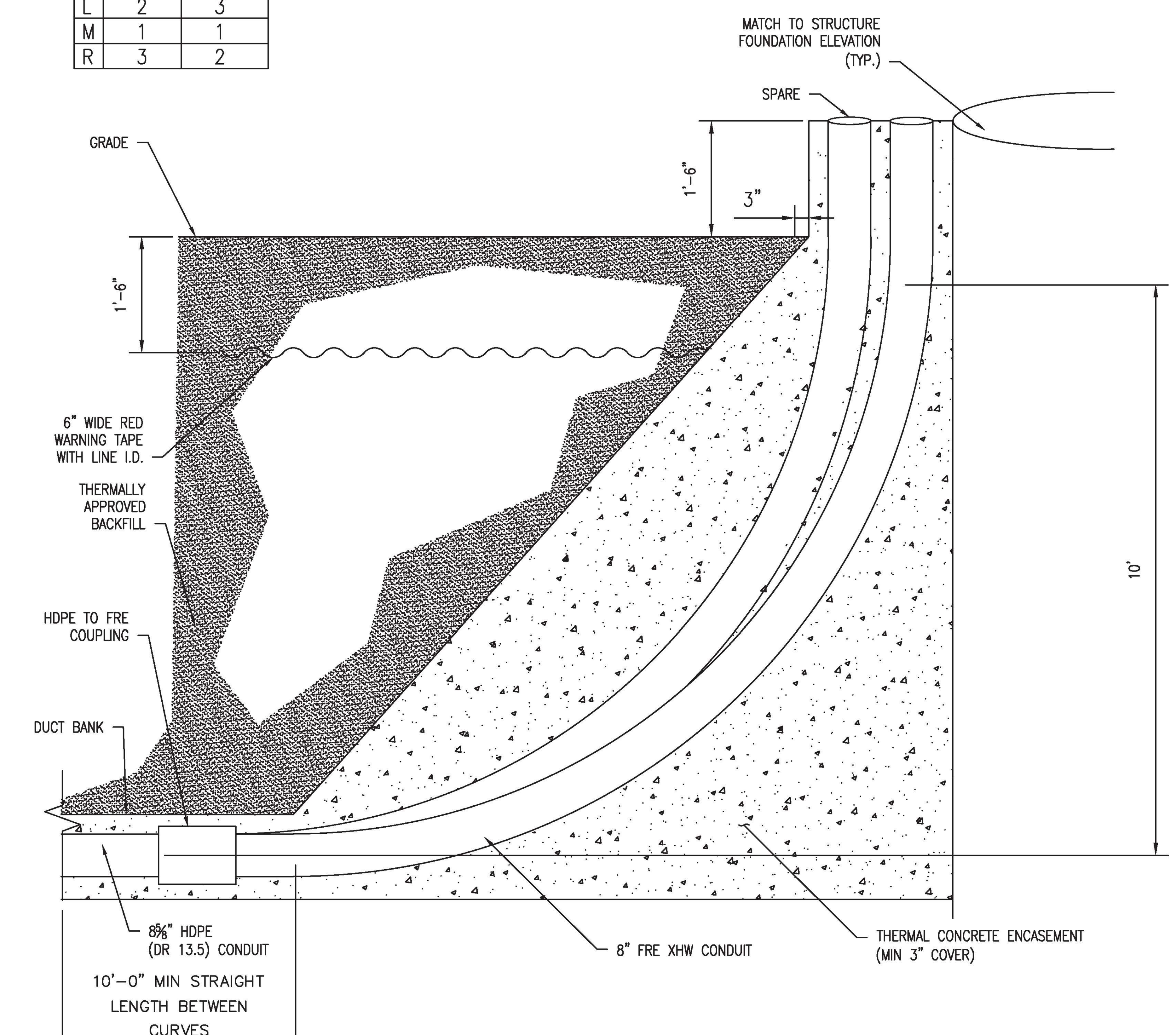
CIRCUIT IDENTIFICATION TAG
DETAIL 4
NTS
SH 13 OF 13



GROUND WIRE
DETAIL 6
NTS
SH 13 OF 13



EXPANSION PLUG DETAIL
DETAIL 7
NTS
SH 13 OF 13



TYP RISER SWEEP
DETAIL 4
SCALE N.T.S.
SHEET 4 OF 5

ES VER: 11/2015

4/3/2019 10:09 AM – mwallek – R:\Projects\133007\DD\DWG\08 Const Dwgs\F10705060.dwg – 13

STATE OF NEW HAMPSHIRE
TODD S. GOYETTE
No. 14596
LICENSED
PROFESSIONAL ENGINEER
4/3/19

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EVERSOURCE ENERGY

NO. | REVISION: ISSUE FOR CONSTRUCTION | DATE | DRWN | CHKD | APPR'D

T 1

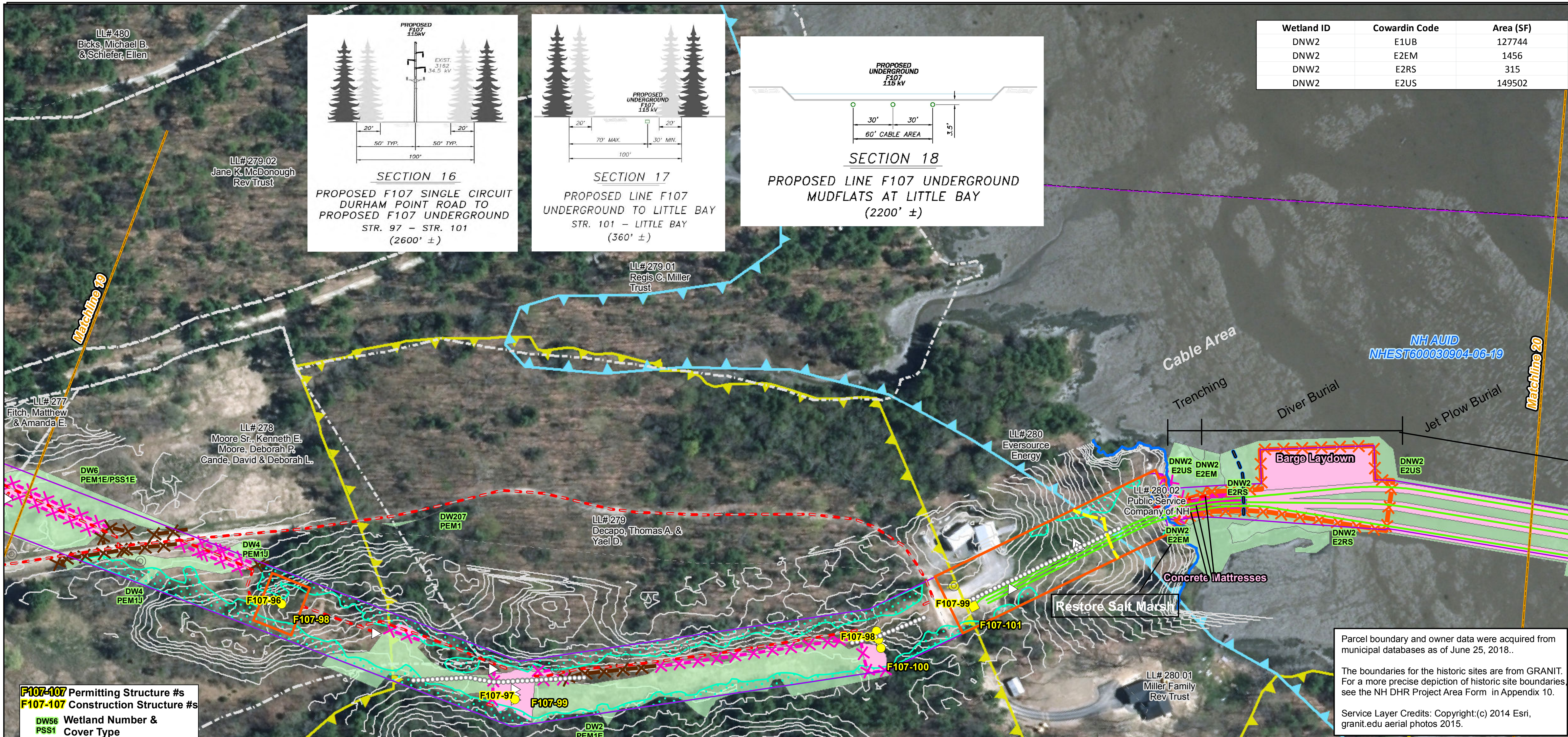
CIRCUIT F107 115kV
UNDERGROUND TRANSMISSION LINE
SPLICE VAULT DETAIL SHEET

SCALE: N.T.S.
DATE: 3/1/2019

DES: RED CHK: TSG
DRW: RED APR: TSG
TOWN: DURHAM & NEWINGTON
TRANSMISSION LINE: LINE
MILE NO: 8 & 9
DISCIPLINE/SHT NO.
SHEET 13 OF 13
F10705060

APPENDIX B

Amended Environmental Maps (Sheets 20, 21, 22)



Wetland ID	Cowardin Code	Area (SF)
DNW2	E1UB	127744
DNW2	E2EM	1456
DNW2	E2RS	315
DNW2	E2US	149502

Parcel boundary and owner data were acquired from municipal databases as of June 25, 2018..

The boundaries for the historic sites are from GRANIT. For a more precise depiction of historic site boundaries, see the NH DHR Project Area Form in Appendix 10.

Service Layer Credits: Copyright:(c) 2014 Esri, granit.edu aerial photos 2015.

Date : 10/1/2019
Drawn By: dpelletier
Project No: 22860.003

Project Corridor
Work Pad
Roads
Local
Not Maintained
Private
State
Access Road Needing Timbermatting
Access Road
Access Rd. Pending Owner Approval
Removed Access Road
Existing Str (Remain)
Existing Str (Removed/Modified)
SRP Underground Cable
Previous UG Cable Route
Erosion Control Removed
Wetland
Prime Wetland
Temporary Impact (TEMP)
Wetland Impact (PERM)
Turbidity Barrier
Silt Fence, Hay Bale, Erosion Control Mix Berm
Silt Sock
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
Railroad
Approximate Parcel Boundary
PSNH Fee Area
Structures
Direct Embed
Drilled Pier
Relocated Distribution
Supplemental BMPs
Removed BMP
Tree Clearing
Stream Buffer
2ft Contour
Tidal Buffer Zone
Highest Observable Tide Line/Reference Line (4ft Contour)
Mean Lower Low Water
Town Boundary

0 75 150 300 Feet
1 inch = 150 feet

MADBURY DOVER Maine DURHAM NEWINGTON NEWMARKET PORTSMOUTH

EVERSOURCE ENERGY

NORMANDEAU ASSOCIATES Environmental Consultants

Seacoast Reliability Project

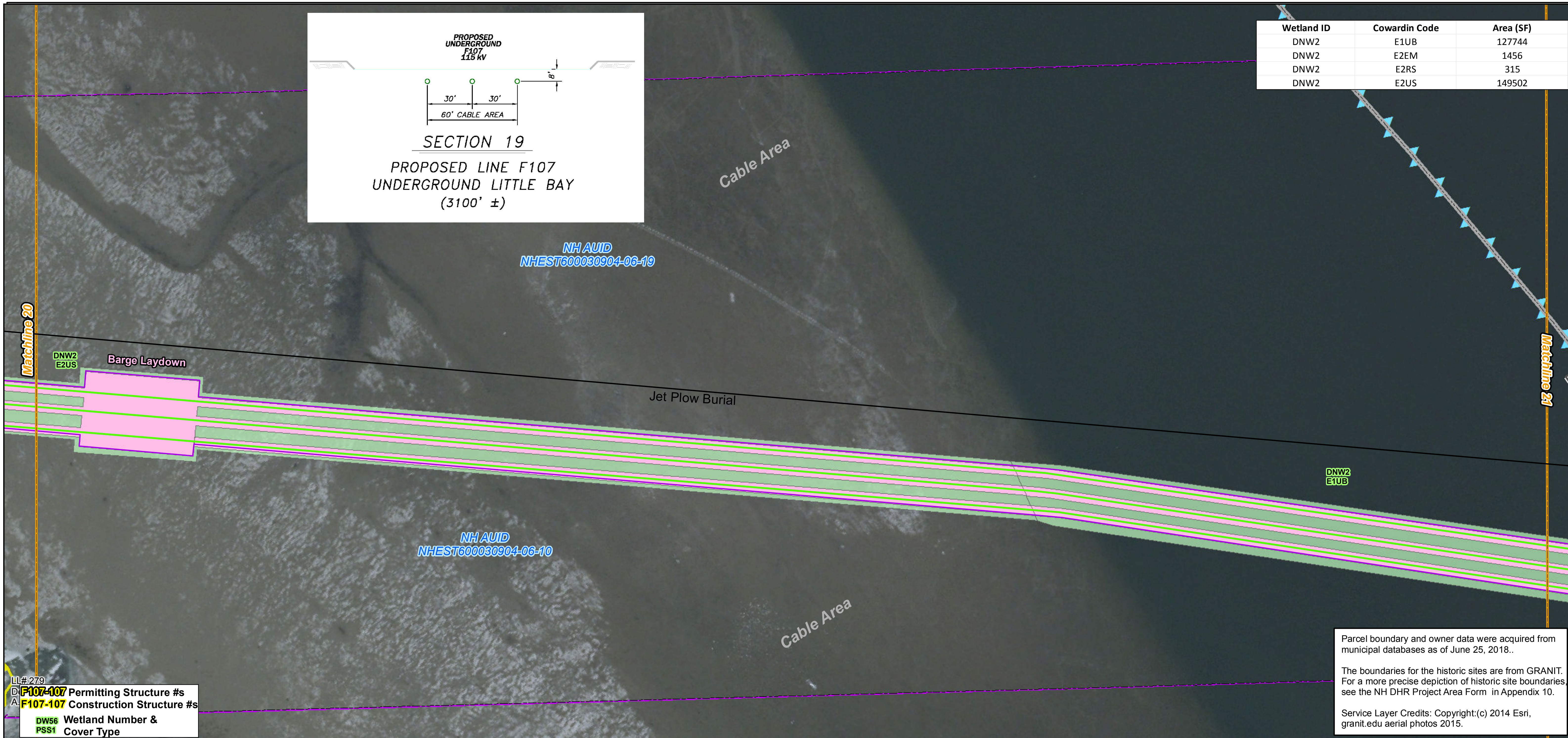
Proposed Re-route Environmental Maps

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

7/16/18

Path: J:\Projects\PSNH_F107\MXD\SRP_Reroute_EnvMap_093019.mxd

Wetland ID	Cowardin Code	Area (SF)
DNW2	E1UB	127744
DNW2	E2EM	1456
DNW2	E2RS	315
DNW2	E2US	149502



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The boundaries for the historic sites are from GRANIT. For a more precise depiction of historic site boundaries, see the NH DHR Project Area Form in Appendix 10.

Service Layer Credits: Copyright:(c) 2014 Esri, granit.edu aerial photos 2015.

Date : 10/1/2019
Drawn By: dpelletier
Project No: 22860.003

Project Corridor
Work Pad
Roads
Local
Not Maintained
Private
State
Access Road Needing Timbermatting
Access Road
Access Rd. Pending Owner Approval
Removed Access Road

Existing Str (Remain)
Existing Str (Removed/Modified)
SRP Underground Cable
Previous UG Cable Route
Erosion Control Removed
Wetland
Prime Wetland
Temporary Impact (TEMP)
Wetland Impact (PERM)
Turbidity Barrier
Silt Fence, Hay Bale, Erosion Control Mix Berm
Silt Sock

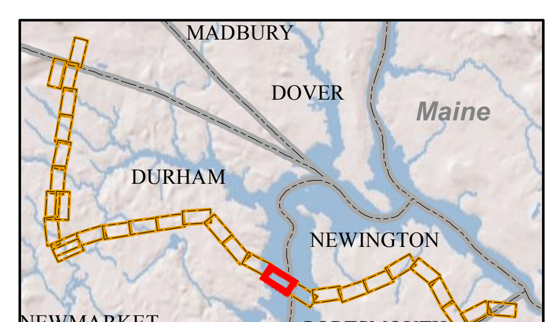
Stream Centerline
Stream Top of Bank
Temporary Culvert
Stonewall alignment
Temporary Mat Bridge
NH DOT Right-of-way
Historical Sites
Designated River Buffer 250'
Conservation Lands
100 Year Floodplain
Railroad
Approximate Parcel Boundary
PSNH Fee Area

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

N E S W

0 75 150 300 Feet

1 inch = 150 feet



EVERSOURCE ENERGY

NORMANDEAU ASSOCIATES
Environmental Consultants

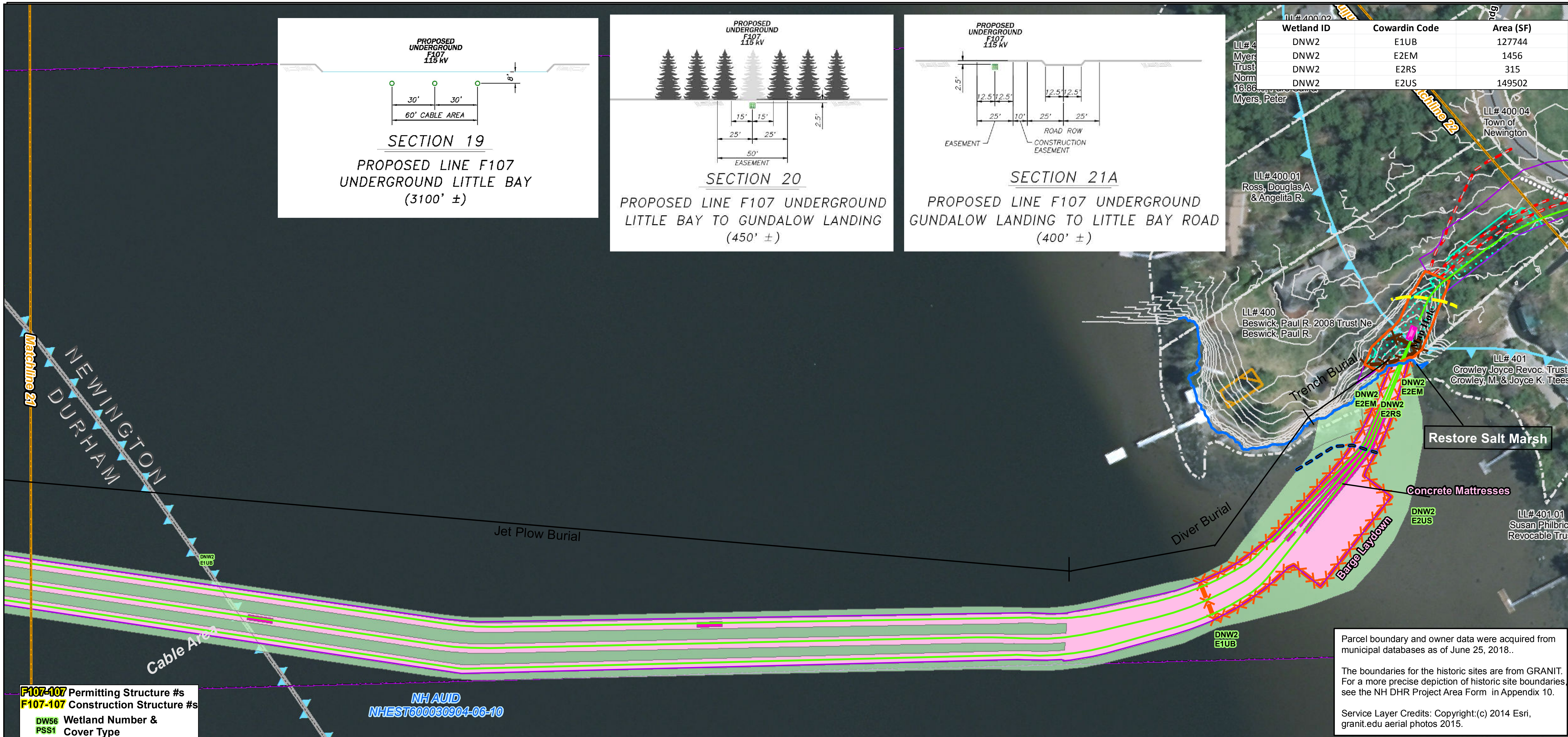
Seacoast Reliability Project

Proposed Re-route Environmental Maps

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

Path: J:\Projects\PSNH_F107\MXD\SRP_Reroute_EnvMap_093019.mxd

7/16/18



Wetland ID	Cowardin Code	Area (SF)
DNW2	E1UB	127744
DNW2	E2EM	1456
DNW2	E2RS	315
DNW2	E2US	149502

F107-107 Permitting Structure #s
F107-107 Construction Structure #s
DW56 PSS1 Wetland Number & Cover Type

Parcel boundary and owner data were acquired from municipal databases as of June 25, 2018..

The boundaries for the historic sites are from GRANIT. For a more precise depiction of historic site boundaries, see the NH DHR Project Area Form in Appendix 10.

Service Layer Credits: Copyright:(c) 2014 Esri, granit.edu aerial photos 2015.

Date : 10/1/2019
Drawn By: dpelletier
Project No: 22860.003

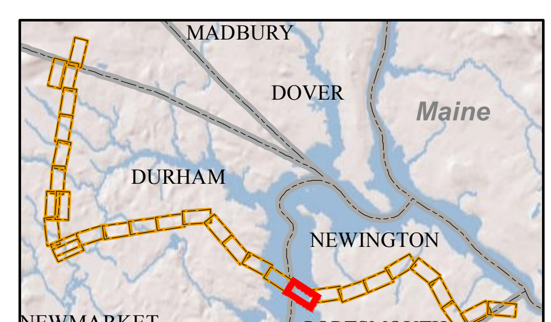
Project Corridor
Work Pad
Roads
Local
Not Maintained
Private
State
Access Road Needing Timbermatting
Access Road
Access Rd. Pending Owner Approval
Removed Access Road

Existing Str (Remain)
Existing Str (Removed/Modified)
SRP Underground Cable
Previous UG Cable Route
Erosion Control Removed
Wetland
Prime Wetland
Temporary Impact (TEMP)
Wetland Impact (PERM)
Turbidity Barrier
Silt Fence, Hay Bale, Erosion Control Mix Berm
Silt Sock

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
Railroad
Approximate Parcel Boundary
PSNH Fee Area

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

0 75 150 300 Feet
1 inch = 150 feet



EVERSOURCE ENERGY

Seacoast Reliability Project

Proposed Re-route Environmental Maps

NORMANDEAU ASSOCIATES
Environmental Consultants

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

7/16/18

Path: J:\Projects\PSNH_F107\MXD\SRP_Reroute_EnvMap_093019.mxd

APPENDIX C

Vibracore Logs and Sediment Laboratory Analytical Reports

NORMANDEAU ASSOCIATES
Environmental Consultants

ATTACHMENT B
rev: 08/16

FIELD DATA SHEET

Project Name: EVERSOURCE -SRP		**Proj. #:** 23840039
Address:		**Task #:** 25
City: PORTSMOUTH	**State:** NH	**Date:** 9-24-19

Field Team Leader(s): MKM
Field Team Safety Coordinator: MKM
Field Crew: ES
Arrival & Departure Times: 0932 - 0948
Station ID #: COR-01
Weather: Clear / Cloudy / Rain / Other ___
Photos: Y / N
Photo Nos.: ___
Wind Conditions (Speed/Direction): 5-10 W

FIELD DATA

Water Depth: 41 ft.
Tide: Ebb / Flood / ~~Low Slack~~ / High Slack / Other ___ / NA
PID: **N/A** Redox Potential: **N/A** pH: **N/A** H^2O Temp.: **N/A** Air Temp.: **NA**

SAMPLE/PUSH #1

Core ID#: COR-1
Coring Time: 0942
Penetration Depth: 66"
Core Recovery: 59"
Sample Method: ~~Ponar~~ / Vibracore / Piston Core / Manual
Coring Material: CAB / Aluminum / SS
Core Diameter (OD): 2" 3" 4"
Vibracore Type: Rossfelder / PVL / Portable Clamp-on / NA
Sampling Equipment Deconned or Replaced: Y N

SAMPLE/PUSH #2

Core ID#: ___
Coring Time: ___
Penetration Depth: ___
Core Recovery: ___
Sample Method: ~~Ponar / Vibracore~~ / Piston Core / Manual
Coring Material: CAB / Aluminum / SS
Core Diameter (OD): 2" 3" 4"
Vibracore Type: Rossfelder / PVL / Portable Clamp-on / NA
Sampling Equipment Deconned or Replaced: Y N

NA

SAMPLE/PUSH #3

Core ID#: ___
Coring Time: ___
Penetration Depth: ___
Core Recovery: ___
Sample Method: Ponar / Vibracore / Piston Core / Manual
Coring Material: CAB / Aluminum / SS
Core Diameter (OD): 2" 3" 4"
Vibracore Type: Rossfelder / PVL / Portable Clamp-on / NA
Sampling Equipment Deconned or Replaced: Y N

DGPS DATA

Operator: MKM
File Name: ~~#2~~ COR-1
Lat / N: 219815.15
Lon / E: 1199300.97
PDOP: ___

Coordinate Units: ~~U.S. Survey~~ Feet
Datum: NAD 83
Proj.: NH
GPS Serial #: GeoXH 6000

COMMENTS / NOTES

Coring Tube Used: 7'
Preparer's Initial: **MKM**

North

NA

NORMANDEAU ASSOCIATES
Environmental Consultants

ATTACHMENT B
rev: 08/16

FIELD DATA SHEET

Project Name: EVERSOURCE - SRP	**Proj. #:** 23840.039
Address:	**Task #:** 25
City: PORTSMOUTH **State:**	**Date:** 9-24-19

Field Team Leader(s): MKM
Field Crew: ES
Station ID #: COR2
Photos: Y N Photo Nos.:
Field Team Safety Coordinator: MKM
Arrival & Departure Times: 0900 - 0923
Weather: Clear Cloudy Rain Other
Wind Conditions (Speed/Direction): 5-10 W

FIELD DATA

Water Depth: 41 ft. Tide: Ebb Flood Low Slack High Slack Other NA
PID: **N/A** Redox Potential: **N/A** pH: **N/A** H^2O Temp.: **N/A** Air Temp.: **NA**

SAMPLE/PUSH #1
Core ID#: COR-2 Coring Time: 0913 Penetration Depth: 24' Core Recovery: 17"
Sample Method: Ponar / Vibracore / Piston Core / Manual Coring Material: CAB / Aluminum / SS Core Diameter (OD): 2" 3" 4"
Vibracore Type: Rossfelder / PVL / Portable Clamp-on / NA Sampling Equipment Deconned or Replaced: Y N

SAMPLE/PUSH #2
Core ID#: Coring Time: Penetration Depth: Core Recovery:
Sample Method: Ponar / Vibracore / Piston Core / Manual Coring Material: CAB / Aluminum / SS Core Diameter (OD): 2" 3" 4"
Vibracore Type: Rossfelder / PVL / Portable Clamp-on / NA Sampling Equipment Deconned or Replaced: Y N

NA

SAMPLE/PUSH #3
Core ID#: Coring Time: Penetration Depth: Core Recovery:
Sample Method: Ponar / Vibracore / Piston Core / Manual Coring Material: CAB / Aluminum / SS Core Diameter (OD): 2" 3" 4"
Vibracore Type: Rossfelder / PVL / Portable Clamp-on / NA Sampling Equipment Deconned or Replaced: Y N

DGPS DATA
Operator: MKM
File Name: COR2
Lat / N: 219694.01
Lon / E: 1199464.02
PDOP:
Coordinate Units: ~~U.S. Survey~~ Feet
Datum: **NAD 83**
Proj.: NH
GPS Serial #: GeoXH 6000

COMMENTS / NOTES

Coring Tube Used: 5'
Preparer's Initial: **MKM**

North

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rev: 08/16

FIELD DATA SHEET

Project Name: EVERSOURCE - SRP	**Proj. #:** 23840.039
Address:	**Task #:** 25
City: PORTSMOUTH **State:** NH	**Date:** 9-24-19

Field Team Leader(s): MKM
Field Team Safety Coordinator: MKM
Field Crew: FS
Arrival & Departure Times: 0956 - 1015
Station ID #: COR-3
Weather: Clear Cloudy Rain Other
Photos: Y N
Photo Nos.:
Wind Conditions (Speed/Direction):

FIELD DATA

Water Depth: 39 ft. Tide: Ebb Flood Low Slack High Slack Other NA

PID: N/A Redox Potential: N/A pH: N/A H^2O Temp.: N/A Air Temp.: NA

SAMPLE/PUSH #1

Core ID#: COR-3 Coring Time: 1000 Penetration Depth: 25" Core Recovery: 23"

Sample Method: Ponar / Vibracore / Piston Core / Manual Coring Material: CAB / Aluminum / SS Core Diameter (OD): 2" 3" 4"

Vibracore Type: Rossfelder / PVL / Portable Clamp-on / NA Sampling Equipment Deconned or Replaced: Y N

SAMPLE/PUSH #2

Core ID#: Coring Time: Penetration Depth: Core Recovery:

Sample Method: ~~Ponar / Vibracore~~ / Piston Core / Manual Coring Material: CAB / Aluminum / SS Core Diameter (OD): 2" 3" 4"

Vibracore Type: Rossfelder / PVL / Portable Clamp-on / NA Sampling Equipment Deconned or Replaced: Y N

NA

SAMPLE/PUSH #3

Core ID#: Coring Time: Penetration Depth: Core Recovery:

Sample Method: Ponar / Vibracore / Piston Core / Manual Coring Material: CAB / Aluminum / SS Core Diameter (OD): 2" 3" 4"

Vibracore Type: Rossfelder / PVL / Portable Clamp-on / NA Sampling Equipment Deconned or Replaced: Y N

DGPS DATA

Operator: MKM
File Name: COR3
Lat / N: 210504.97
Lon / E: 1199642.71
PDOP:

Coordinate Units: ~~U.S. Survey~~ Feet
Datum: NAD 83
Proj.: NH
GPS Serial #: GeoXH 6000

COMMENTS / NOTES

Coring Tube Used: 5'

Preparer's Initial: MKM

North

NA

NORMANDEAU ASSOCIATES
Environmental Consultants

ATTACHMENT B
rev: 08/16

FIELD DATA SHEET

Page 1 of 1

Project Name: EVERSOURCE - SRP	**Proj. #:** 23840039
Address:	**Task #:** 25
City: PORTSMOUTH **State:** NH	**Date:** 9-24-19

Field Team Leader(s): MKM
Field Team Safety Coordinator: MKM
Field Crew: ES
Arrival & Departure Times: 1032 - 1045
Station ID #: COR 4
Weather: Clear Cloudy Rain Other ______
Photos: Y N Photo Nos.: ______
Wind Conditions (Speed/Direction): 10-15 ~ W

FIELD DATA
Water Depth: 35 ft. Tide: Ebb Flood Low Slack High Slack Other ______ NA
PID: **N/A** Redox Potential: **N/A** pH: **N/A** H^2O Temp.: **N/A** Air Temp.: **NA**

SAMPLE/PUSH #1
Core ID#: COR-4 Coring Time: 1041 Penetration Depth: 28" Core Recovery: 23"
Sample Method: Ponar / Vibracore / Piston Core / Manual Coring Material: CAB / Aluminum / SS Core Diameter (OD): 2" 3" 4"
Vibracore Type: Rossfelder / PVL / Portable Clamp-on / NA Sampling Equipment Deconned or Replaced: Y N

SAMPLE/PUSH #2
Core ID#: ______ Coring Time: ______ Penetration Depth: ______ Core Recovery: ______
Sample Method: Ponar / Vibracore / Piston Core / Manual Coring Material: CAB / Aluminum / SS Core Diameter (OD): 2" 3" 4"
Vibracore Type: Rossfelder / PVL / Portable Clamp-on / NA Sampling Equipment Deconned or Replaced: Y N

NA

SAMPLE/PUSH #3
Core ID#: ______ Coring Time: ______ Penetration Depth: ______ Core Recovery: ______
Sample Method: Ponar / Vibracore / Piston Core / Manual Coring Material: CAB / Aluminum / SS Core Diameter (OD): 2" 3" 4"
Vibracore Type: Rossfelder / PVL / Portable Clamp-on / NA Sampling Equipment Deconned or Replaced: Y N

DGPS DATA
Operator: MKM
Coordinate Units: ~~U.S. Survey~~ Feet
File Name: COR4
Datum: **NAD 83**
Lat / N: 219248.30
Proj.: NH
Lon / E: 1200048.32
GPS Serial #: GeoXH 6000
PDOP:

COMMENTS / NOTES

North

NA

Coring Tube Used: 5'
Preparer's Initial: **MKM**

Normandeau Soil Boring Log

PROJECT NUMBER	BORING NUMBER	SHEET 1 OF 1
23840.039 / 25	COR-1	

PROJECT : EVERSOURCE - SRP LOCATION : PORTSMOUTH NH

ELEVATION : NA DRILLING CONTRACTOR : **Normandeau Associates**

DRILLING METHOD AND EQUIPMENT USED : **PVL Vibracore/Ponar® Sediment Grab/Manually-pushed boring**

WATER LEVELS : 4 1 START : 1220 END : 1238 LOGGER : MM

DEPTH BELOW SURFACE (FT)	INTERVAL (FT)	RECOVERY (FT)	#/TYPE	STANDARD PENETRATION TEST RESULTS 6"-6"-6"-6" (N)	CORE DESCRIPTION: SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY.	COMMENTS: DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION.
0"					Homogeneous throughout Soft 1 gley 5/10 y fine to medium grain sands with clay woody debris and shells very wet to wet low plasticity cohesive	1 jar grain size 1 jar archive sample time 12:30
5.9"						

Normandeau Soil Boring Log

PROJECT NUMBER: 23840.039/25
BORING NUMBER: COR-2
SHEET 1 OF 1

PROJECT: EVERSOURCE-SRP
LOCATION: PORTSMOUTH NH
ELEVATION: NA
DRILLING CONTRACTOR: **Normandeau Associates**
DRILLING METHOD AND EQUIPMENT USED: **PVL Vibracore/Ponar® Sediment Grab/Manually-pushed boring**
WATER LEVELS: 41
START: 1240
END: 1248
LOGGER: MM

DEPTH BELOW SURFACE (FT)	INTERVAL (FT)	RECOVERY (FT)	#/TYPE	STANDARD PENETRATION TEST RESULTS 6"-6"-6"-6" (N)	CORE DESCRIPTION: SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY.	COMMENTS: DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION.
0"					Homogeneous throughout soft 1 Gley 5/10Y fine to medium grain sands with clay woody debris and shells very wet to wet low plasticity cohesive	1 Jar grain size 1 Jar archive sample time 1245
17"						

PROJECT NUMBER 23840.039 / 25	BORING NUMBER COR-3	SHEET L OF L

Normandeau Soil Boring Log

PROJECT : EVERSOURCE -SRP LOCATION : PORTSMOUTH NH

ELEVATION : NA DRILLING CONTRACTOR : **Normandeau Associates**

DRILLING METHOD AND EQUIPMENT USED : **PVL/Vibracore/Ponar® Sediment Grab/Manually-pushed boring**

WATER LEVELS : 39 START : 1250 END : 1258 LOGGER : MM

DEPTH BELOW SURFACE (FT)	INTERVAL (FT)	RECOVERY (FT)	#/TYPE	STANDARD PENETRATION TEST RESULTS 6"-6"-6"-6" (N)	CORE DESCRIPTION: SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY.	COMMENTS: DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION.
0"					woody debris	1 Jar grain size 1 Jar archive Sample time 12:55
8"					SOFT 1 Gley 2.5/10Y fine to medium grain sands with minor clay some woody debris wet non-plastic non-cohesive	
23"						

PROJECT NUMBER 23840.039 /25	BORING NUMBER COR-4	SHEET 1 OF 1

Normandeau Soil Boring Log

PROJECT : EVERSOURCE -SRP
LOCATION : PORTSMOUTH
ELEVATION : NA
DRILLING CONTRACTOR : **Normandeau Associates**
DRILLING METHOD AND EQUIPMENT USED : **PVL Vibracore/Ponar® Sediment Grab/Manually-pushed boring**
WATER LEVELS : 35
START : 1300
END : 1310
LOGGER : MKM

DEPTH BELOW SURFACE (FT)	INTERVAL (FT)	RECOVERY (FT)	#/TYPE	STANDARD PENETRATION TEST RESULTS 6"-6"-6"-6" (N)	CORE DESCRIPTION: SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY.	COMMENTS: DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION.
0" – 17"					SOFT 1 Gley 2.5/10Y fine to medium grain sands with minor clay some woody debris wet Non - plastic non - cohesive	1 Jar grain size 1 Jar archive sample time 13:05 COR-4 A
17" – 23"					~~Soft~~ medium 1gley 4/5 G Clay moist high plasticity cohesive	COR-4B

Enthalpy Analytical
1 Lafayette Road
Hampton, NH 03842
603-926-3345

Enthalpy Study Number: 32325

CHAIN OF CUSTODY DOCUMENTATION

Client:	Normandeau Associates, Inc.	Contact:	Mike Mettler	Project Name:	Seacoast Reliability Project
Report to:	Sarah Allen cc: Ann Pembroke	Address:	25 Nashua Rd, Bedford, NH 03110	Project Number:	23840.039
Invoice to:	Normandeau Associates, Inc.	Address:	25 Nashua Rd, Bedford, NH 03110	Project Manager:	Sarah Allen
Voice:	603-637-1158			email:	sallen@normandeau.com
Protocol:					apembroke@normandeau.com

Lab Number (assigned by lab)	Field ID	Date Sampled	Time Sampled	Sampled By	Grab or Composite (G/C)	Container No	Container Size (mL)	Container Type (P/G)	Field Preser-vation	Matrix S=Solid W=Water	Filter N=Not needed F=Done in field L=Lab to do	Analyses Requested
-001/-101	COR-1	9/24/19	1230	mkm	C	2		G	ICE	S	N	Grain Size / Archive
-002/-102	COR-2	↕	1245	↕	↕	↕		↕	↕	↕	↕	↕
-003/-103	COR-3	↕	1255	↕	↕	↕		↕	↕	↕	↕	↕
-004/-104	COR-4A	↕	1305	↕	↕	↕		↕	↕	↕	↕	↕
-005/-105	COR-4B	9/24/19	1320	MKM	C	2		G	ICE	S	N	Grain Size / Archive

Relinquished By:	Date:	Time:	Received By:	Date:	Time:	Temp (C): Meter ID:
Relinquished By: [signature]	Date: 9/24/19	Time: 1515	Received By: [signature]	Date: 09/24/19	Time: 1515	Temp (C): 9.3°C Meter ID: T-292

EA

SAMPLE RECEIPT AND CONDITION DOCUMENTATION

STUDY NO: 32325
SDG No:
Project: Seacoast Reliability Project
Delivered via: Client
Date and Time Received: 09/24/19 1515 | Date and Time Logged into Lab: 09/25/19 0715
Received By: GS | Logged into Lab by: RAM

Air bill / Way bill:	No	Air bill included in folder if received?	NA
Cooler on ice/packs:	Yes	Custody Seals present?	NA
Cooler Blank Temp (C) at arrival:	9.3C	Custody Seals intact?	NA
Number of COC Pages:	1		
COC Serial Number(s):	NA		
COC Complete:	Yes	Does the info on the COC match the samples?	Yes
Sampled Date:	Yes	Were samples received within holding time?	Yes
Field ID complete:	Yes	Were all samples properly labeled?	Yes
Sampled Time:	Yes	Were proper sample containers used?	Yes
Analysis request:	Yes	Were samples received intact? (none broken or leaking)	Yes
COC Signed and dated:	Yes	Were sample volumes sufficient for requested analysis?	Yes
Were all samples received?	Yes	Were VOC vials free of headspace?	NA
Client notification/authorization:	Not required	pH Test strip ID number:	NA

Field ID	Lab ID	Mx	Analysis Requested	Bottle	Req'd Pres'n	Verified Pres'n
COR-1	32325-001	S	Grain Size	16oz G	4C	Yes
COR-2	32325-002	S	Grain Size	16oz G	4C	Yes
COR-3	32325-003	S	Grain Size	16oz G	4C	Yes
COR-4 A	32325-004	S	Grain Size	16oz G	4C	Yes
COR-4 B	32325-005	S	Grain Size	16oz G	4C	Yes
COR-1	32325-101	S	Archive	9oz G	4C	Yes
COR-2	32325-102	S	Archive	9oz G	4C	Yes
COR-3	32325-103	S	Archive	9oz G	4C	Yes
COR-4 A	32325-104	S	Archive	9oz G	4C	Yes
COR-4 B	32325-105	S	Archive	9oz G	4C	Yes

Notes and qualifications:

Chain of custody listed samples on a single line, the aliquot for grain size was assigned a different number from the archival sample. RAM 09/25

Client:	Montrose Environmental Group
Project Name:	32325GZ
Project Location:	---
GTX #:	31679
Test Date:	10/01/19
Tested By:	bfs
Checked By:	emm

Wentworth Classification

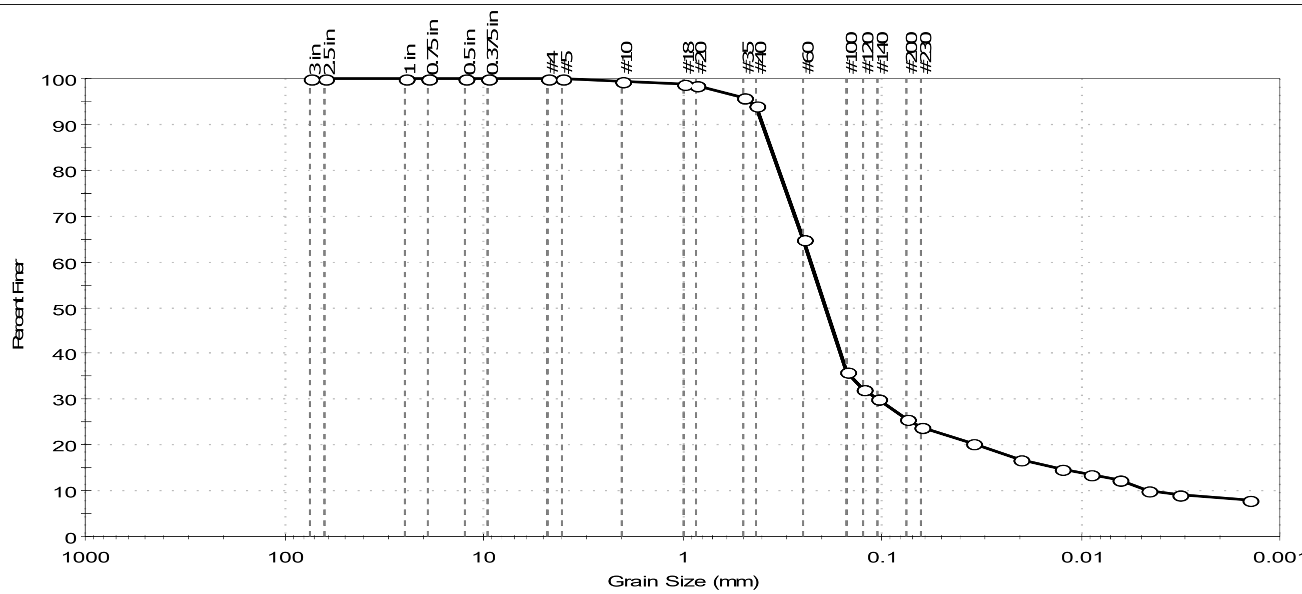
Sample ID	Boulder, % (<-8 ϕ)	Cobble, % (-6 to -8 ϕ)	Gravel, %				Very Fine Gravel, % (-1 to -2 ϕ)	Sand, %					Silt, % (8 to 4 ϕ)	Clay, % (10 to 8 ϕ)
			Very Coarse (-5 to -6 ϕ)	Coarse (-4 to -5 ϕ)	Medium (-3 to -4 ϕ)	Fine (-2 to -3 ϕ)		Very Coarse (0 to -1 ϕ)	Coarse (1 to 0 ϕ)	Medium (2 to 1 ϕ)	Fine (3 to 2 ϕ)	Very Fine (4 to 3 ϕ)		
32325-001	0	0	0	0	0	0	1	0	3	31	33	8	15	9
32325-002	0	0	0	0	0	0	1	4	30	51	7	1	5	1
32325-003	0	0	0	3	4	1	1	2	11	31	17	14	11	5
32325-004	0	0	0	0	1	1	1	6	16	63	7	2	2	1
32325-005	0	0	0	0	0	0	0	1	2	3	1	2	52	39

GeoTesting EXPRESS

Client: Montrose Environmental Group			
Project: 32325GZ			
Location: ---		Project No:	GTX-310679
Boring ID: ---	Sample Type: jar	Tested By:	ckg
Sample ID: 32325-001	Test Date: 09/30/19	Checked By:	bfs
Depth : ---	Test Id: 525227		

Test Comment: ---
Visual Description: Moist, gray silty sand
Sample Comment: ---

Particle Size Analysis - ASTM D422



% Cobble	% Gravel	% Sand	% Silt & Clay Size
—	0.0	74.4	25.6

Sieve Name	Sieve Size, mm	Percent Finer	Spec. Percent	Complies
3 in	75.00	100		
2.5 in	63.00	100		
1 in	25.00	100		
0.75 in	19.00	100		
0.5 in	12.50	100		
0.375 in	9.50	100		
#4	4.75	100		
#5	4.00	100		
#10	2.00	99		
#18	1.00	99		
#20	0.85	99		
#35	0.50	96		
#40	0.42	94		
#60	0.25	65		
#100	0.15	36		
#120	0.12	32		
#140	0.11	30		
#200	0.075	26		
#230	0.063	24		
Hydrometer	Particle Size (mm)	Percent Finer	Spec. Percent	Complies
---	0.0349	20		
---	0.0202	17		
---	0.0125	15		
---	0.0091	14		
---	0.0064	12		
---	0.0046	10		
---	0.0032	9		
---	0.0014	8		

Coefficients

D_{85} =0.3605 mm D_{30} =0.1057 mm
D_{60} =0.2295 mm D_{15} =0.0135 mm
D_{50} =0.1921 mm D_{10} =0.0044 mm
C_u =52.159 C_c =11.064

Classification

ASTM N/A

AASHTO Silty Gravel and Sand (A-2-4 (0))

Sample/Test Description

Sand/Gravel Particle Shape : ---
Sand/Gravel Hardness : ---
Dispersion Device : Apparatus A - Mech Mixer
Dispersion Period : 1 minute
Est. Specific Gravity : 2.65
Separation of Sample: #200 Sieve

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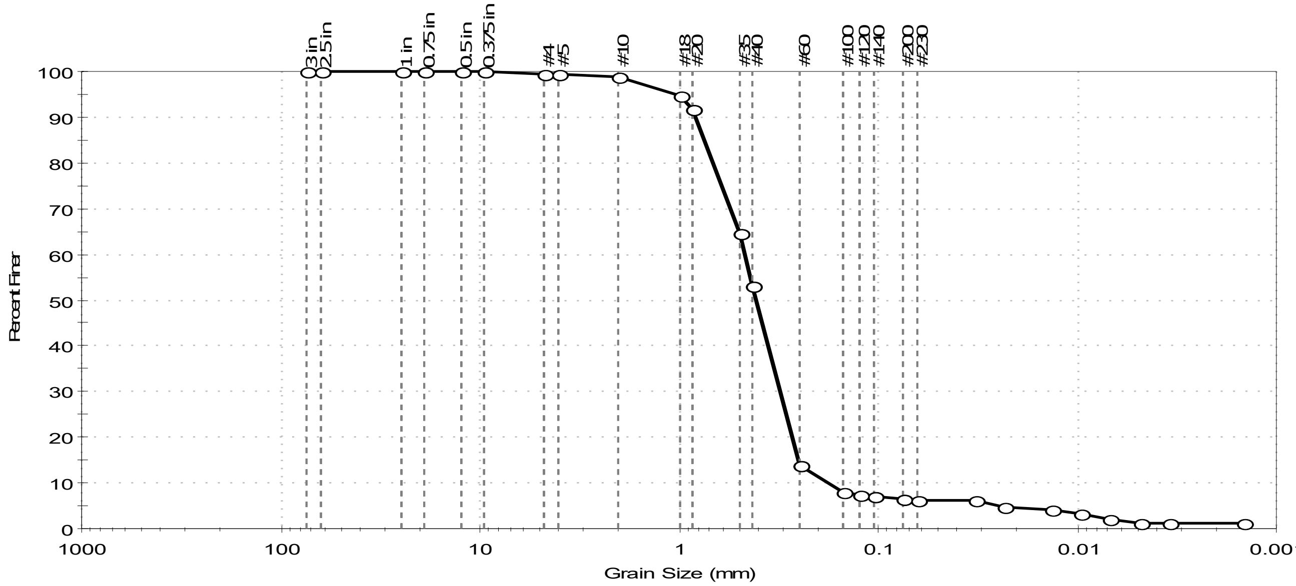
GeoTesting EXPRESS

Client:	Montrose Environmental Group				
Project:	32325GZ				
Location:	---			Project No:	GTX-310679
Boring ID:	---	Sample Type:	jar	Tested By:	ckg
Sample ID:	32325-002	Test Date:	09/30/19	Checked By:	bfs
Depth :	---	Test Id:	525228		
Test Comment:	---				
Visual Description:	Moist, gray sand with silt				
Sample Comment:	---				

Particle Size Analysis - ASTM D422



% Cobble	% Gravel	% Sand	% Silt & Clay Size
0.1	0.4	93.1	6.4

Sieve Name	Sieve Size, mm	Percent Finer	Spec. Percent	Complies
3 in	75.00	100		
2.5 in	63.00	100		
1 in	25.00	100		
0.75 in	19.00	100		
0.5 in	12.50	100		
0.375 in	9.50	100		
#4	4.75	100		
#5	4.00	100		
#10	2.00	99		
#18	1.00	95		
#20	0.85	92		
#35	0.50	65		
#40	0.42	53		
#60	0.25	14		
#100	0.15	8		
#120	0.12	7		
#140	0.11	7		
#200	0.075	6.4		
#230	0.063	6		
Hydrometer	Particle Size (mm)	Percent Finer	Spec. Percent	Complies
---	0.0324	6		
---	0.0233	5		
---	0.0135	4		
---	0.0096	3		
---	0.0068	2		
---	0.0048	1		
---	0.0034	1		
---	0.0015	1		

Coefficients

D_{85} =0.7451 mm
D_{30} =0.3113 mm
D_{60} =0.4685 mm
D_{15} =0.2540 mm
D_{50} =0.4083 mm
D_{10} =0.1791 mm
C_u =2.616
C_c =1.155

Classification

ASTM N/A

AASHTO Fine Sand (A-3 (1))

Sample/Test Description

Sand/Gravel Particle Shape : ---

Sand/Gravel Hardness : ---

Dispersion Device : Apparatus A - Mech Mixer

Dispersion Period : 1 minute

Est. Specific Gravity : 2.65

Separation of Sample: #200 Sieve

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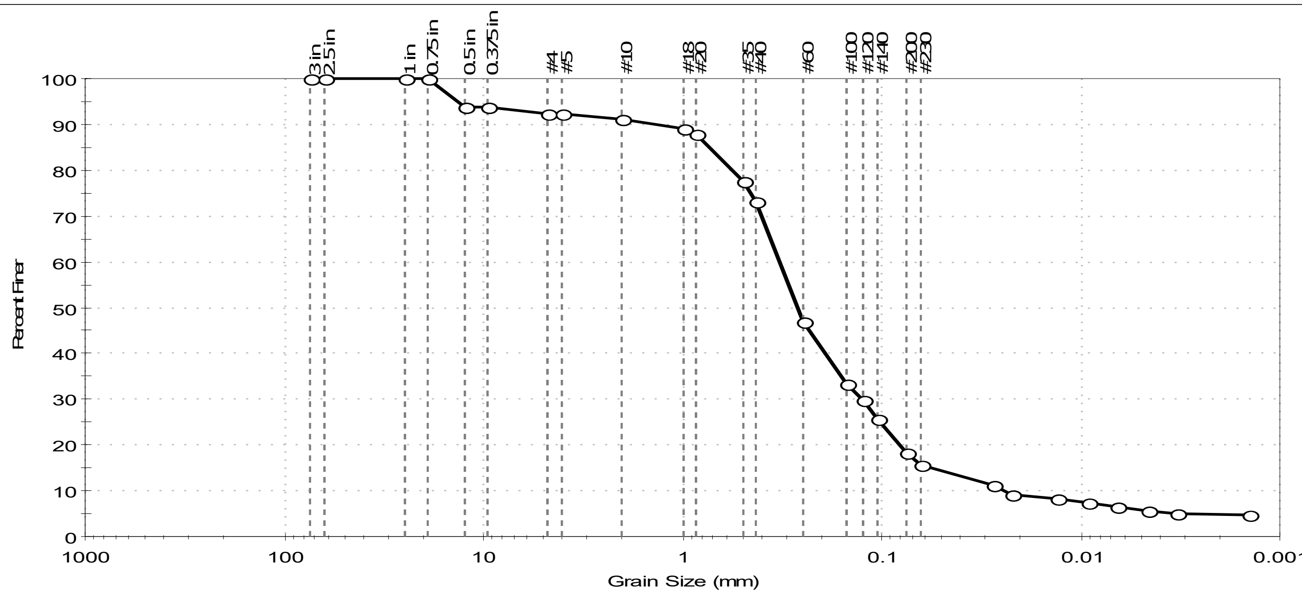
Client:	Montrose Environmental Group
Project:	32325GZ
Location:	---
Project No:	GTX-310679
Boring ID:	---
Sample Type:	jar
Tested By:	ckg
Sample ID:	32325-003
Test Date:	09/30/19
Checked By:	bfs
Depth :	---
Test Id:	525229
Test Comment:	---
Visual Description:	Moist, gray silty sand
Sample Comment:	---

Particle Size Analysis - ASTM D422



% Cobble	% Gravel	% Sand	% Silt & Clay Size
—	7.7	74.0	18.3

Sieve Name	Sieve Size, mm	Percent Finer	Spec. Percent	Complies
3 in	75.00	100		
2.5 in	63.00	100		
1 in	25.00	100		
0.75 in	19.00	100		
0.5 in	12.50	94		
0.375 in	9.50	94		
#4	4.75	92		
#5	4.00	92		
#10	2.00	91		
#18	1.00	89		
#20	0.85	88		
#35	0.50	78		
#40	0.42	73		
#60	0.25	47		
#100	0.15	33		
#120	0.12	30		
#140	0.11	26		
#200	0.075	18		
#230	0.063	16		
Hydrometer	Particle Size (mm)	Percent Finer	Spec. Percent	Complies
---	0.0273	11		
---	0.0223	9		
---	0.0131	8		
---	0.0093	7		
---	0.0066	6		
---	0.0046	6		
---	0.0033	5		
---	0.0014	5		

Coefficients

D_{85} =0.7364 mm | D_{30} =0.1259 mm

D_{60} =0.3260 mm | D_{15} =0.0558 mm

D_{50} =0.2666 mm | D_{10} =0.0242 mm

C_u =13.471 | C_c =2.009

Classification

ASTM N/A

AASHTO Silty Gravel and Sand (A-2-4 (0))

Sample/Test Description

Sand/Gravel Particle Shape : ANGULAR

Sand/Gravel Hardness : HARD

Dispersion Device : Apparatus A - Mech Mixer

Dispersion Period : 1 minute

Est. Specific Gravity : 2.65

Separation of Sample: #200 Sieve

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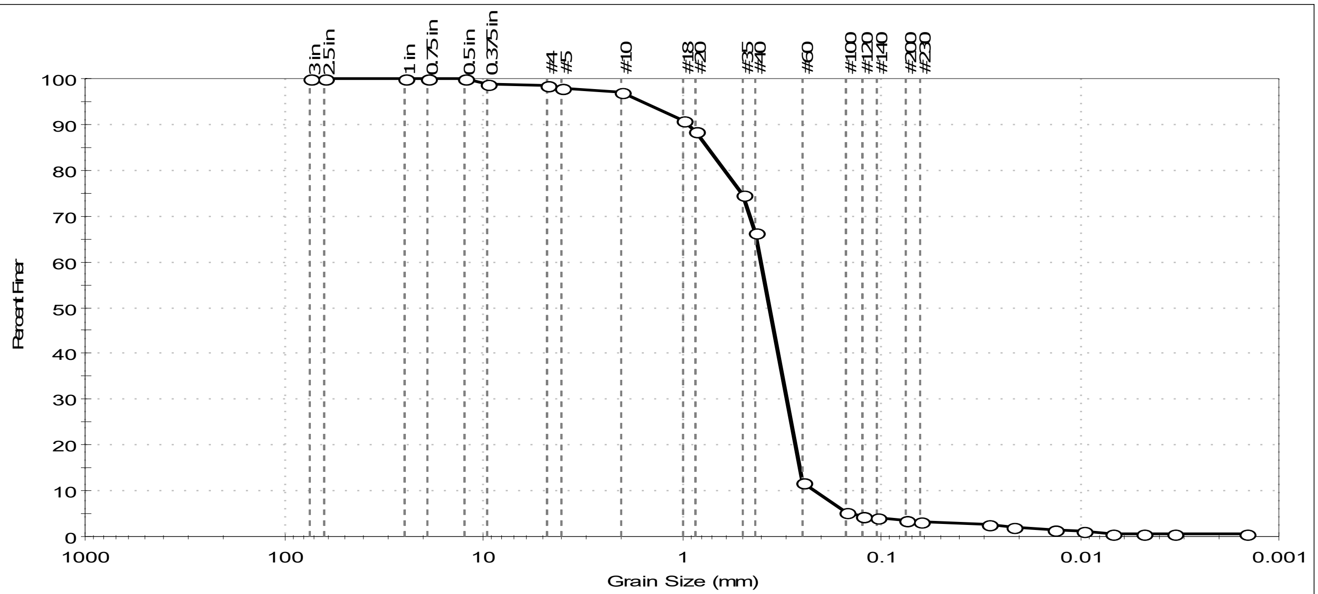
Client:	Montrose Environmental Group		
Project:	32325GZ		
Location:	---	Project No:	GTX-310679
Boring ID:	---	Sample Type: jar	Tested By: ckg
Sample ID:	32325-004	Test Date: 10/01/19	Checked By: bfs
Depth :	---	Test Id: 525230	
Test Comment:	---		
Visual Description:	Moist, gray sand		
Sample Comment:	---		

Particle Size Analysis - ASTM D422



% Cobble	% Gravel	% Sand	% Silt & Clay Size
—	1.6	95.0	3.4

Sieve Name	Sieve Size, mm	Percent Finer	Spec. Percent	Complies
3 in	75.00	100		
2.5 in	63.00	100		
1 in	25.00	100		
0.75 in	19.00	100		
0.5 in	12.50	100		
0.375 in	9.50	99		
#4	4.75	98		
#5	4.00	98		
#10	2.00	97		
#18	1.00	91		
#20	0.85	88		
#35	0.50	75		
#40	0.42	66		
#60	0.25	12		
#100	0.15	5		
#120	0.12	5		
#140	0.11	4		
#200	0.075	3.4		
#230	0.063	3		
Hydrometer	Particle Size (mm)	Percent Finer	Spec. Percent	Complies
---	0.0290	3		
---	0.0216	2		
---	0.0136	2		
---	0.0097	1		
---	0.0069	1		
---	0.0048	1		
---	0.0034	1		
---	0.0015	1		

Coefficients

D_{85} =0.7436 mm D_{30} =0.2984 mm

D_{60} =0.3993 mm D_{15} =0.2580 mm

D_{50} =0.3623 mm D_{10} =0.2179 mm

C_u =1.832 C_c =1.023

Classification

ASTM Poorly graded SAND (SP)

AASHTO Fine Sand (A-3 (1))

Sample/Test Description

Sand/Gravel Particle Shape : ---

Sand/Gravel Hardness : ---

Dispersion Device : Apparatus A - Mech Mixer

Dispersion Period : 1 minute

Est. Specific Gravity : 2.65

Separation of Sample: #200 Sieve

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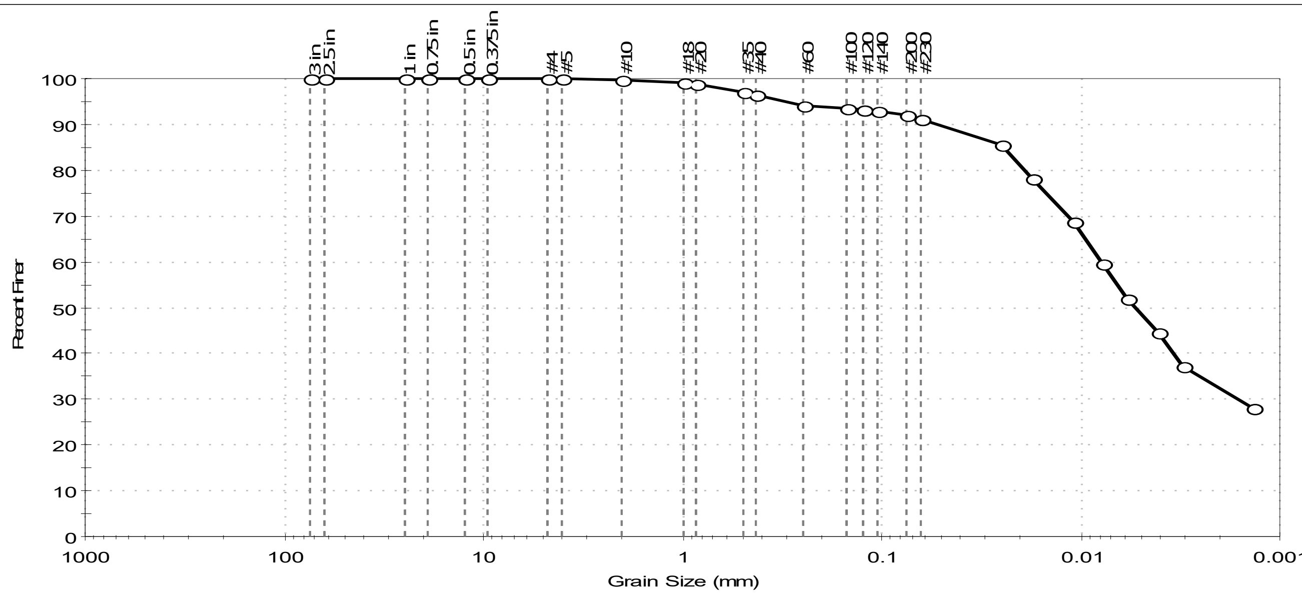
Client: Montrose Environmental Group			
Project: 32325GZ			
Location: ---		Project No:	GTX-310679
Boring ID: ---	Sample Type: jar	Tested By:	ckg
Sample ID: 32325-005	Test Date: 09/30/19	Checked By:	bfs
Depth : ---	Test Id: 525231		
Test Comment: ---			
Visual Description: Moist, gray sand			
Sample Comment: ---			

Particle Size Analysis - ASTM D422



% Cobble	% Gravel	% Sand	% Silt & Clay Size
0.1	0.0	7.8	92.1

Sieve Name	Sieve Size, mm	Percent Finer	Spec. Percent	Complies
3 in	75.00	100		
2.5 in	63.00	100		
1 in	25.00	100		
0.75 in	19.00	100		
0.5 in	12.50	100		
0.375 in	9.50	100		
#4	4.75	100		
#5	4.00	100		
#10	2.00	100		
#18	1.00	99		
#20	0.85	99		
#35	0.50	97		
#40	0.42	96		
#60	0.25	94		
#100	0.15	93		
#120	0.12	93		
#140	0.11	93		
#200	0.075	92		
#230	0.063	91		
Hydrometer	Particle Size (mm)	Percent Finer	Spec. Percent	Complies
---	0.0253	86		
---	0.0176	78		
---	0.0108	69		
---	0.0079	59		
---	0.0058	52		
---	0.0041	45		
---	0.0031	37		
---	0.0014	28		

Coefficients

D_{85} =0.0247 mm	D_{30} =0.0016 mm
D_{60} =0.0080 mm	D_{15} =N/A
D_{50} =0.0053 mm	D_{10} =N/A
C_u =N/A	C_c =N/A

Classification

ASTM N/A

AASHTO Silty Soils (A-4 (0))

Sample/Test Description

Sand/Gravel Particle Shape : ---

Sand/Gravel Hardness : ---

Dispersion Device : Apparatus A - Mech Mixer

Dispersion Period : 1 minute

Est. Specific Gravity : 2.65

Separation of Sample: #200 Sieve

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APPENDIX D

RPS Memorandum on Sediment Dispersion Model and Mixing Zone

MEMO

Date:	October 2, 2019
To:	Sarah Allen (Normandeau Associates Inc.)
From:	Deborah Crowley (RPS) and Craig Swanson (Swanson Environmental)
Pages:	12 including this page
Regarding	*Seacoast Reliability Project – Sediment Plume*

55 Village Square Drive
South Kingstown RI 02879
T +1 401 789 6224

1. Introduction

RPS and Swanson Environmental have been supporting Normandeau Associates Inc (Normandeau) in their work conducting the environmental assessment and permitting of cable burial operations associated with the Seacoast Reliability Project which is being pursued by Public Service of New Hampshire d/b/a Eversource Energy. The project includes the construction of an electrical cable system to increase the reliability of the electrical transmission grid in southern New Hampshire. This cable would cross the Little Bay portion of the Great Bay Estuarine System. The crossing would entail burial of three separate but parallel cable bundles by jet plowing and diver assisted methods across a tidal flat and channel.

RPS has previously completed two separate modeling studies evaluating the sediment effects as characterized by the plume of total suspended solids (TSS) above ambient levels and subsequent seabed deposition. These studies listed below are referred to as 'Original' and 'Revised' herein. The revised study reflected new data and new project details and included sensitivity studies.

- Original- *Modeling Sediment Dispersion from Cable Burial for Seacoast Reliability Project, Little Bay, New Hampshire* (Issued 14 December 2015).
- Revised – *Revised Modeling Sediment Dispersion from Cable Burial for Seacoast Reliability Project, Upper Little Bay, New Hampshire* (Issued 27 June 2017).

Subsequent to these reports the project was granted a permit with a condition of performing a jet plow trial. The jet plow trial includes operating the jet plow (without cable) along a portion of the planned route so the installer can better understand the site and to gauge the effects on water quality. The permit included a mixing zone which was proposed by Normandeau and Eversource based on modeling results from the original study and the base case of the revised study. The mixing zone was defined as the area within which these two model runs had predicted maximum excess TSS less than 20 mg/L. The permit required that monitoring be performed at stations within and at the mixing zone boundary. The jet plow trial took place September 9, 2019 along with water quality monitoring. Normandeau issued a report describing the installation activity and observed water quality conditions. Part of the water quality observations included examining the relationship between turbidity (NTU; the regulated water quality parameter) and TSS, sampling of background conditions, sampling of conditions during the jet plow trial and sampling of conditions after the plow operation ceased.

Also subsequent to these reports and the original permit conditions it was found that a portion of the route in the channel included sand waves on the bottom. The sand waves pose potential operating restrictions to the plow due to localized seabed slope. It is now proposed that a portion of the route deviate slightly to avoid the seabed slope issues local to the sand waves.

MEMO

Date: October 2, 2019
Regarding: SRP - TSS

RPS has prepared this memo to comment on the mixing zone relative to the modeling and jet plow trial as well as to provide comment on the route adjustment local to the sand waves.

2. Comment on Mixing Zone Relative to Jet Plow Trial and Modeling

A mixing zone developed as part of the permit was intended to delineate the area where maximum excess concentrations of TSS may exceed 20 mg/L. This mixing zone was delineated based on the union of the 20 mg/L contour from the modeling of the original base case and the revised base case. Both cases had assumed continuous jet plow operations and both reflected a start of the jet plow at the western shore at high tide such that initial plowing will be synchronous with an ebbing current (transporting sediments north). The original case had slower installation (5.47 ft/min [1.67 m/min]) such that the plowing experienced more stages of the tidal currents subsequent to the initial ebb current after high tide to slack at low tide, then flood after low tide, to slack at high tide, then ebb again, whereas the revised modeling had faster installation (~10 ft/min [~3 m/min]) such that the ebb current is experienced along most of the route with it turning to a period of flood currents after slack at low tide near the eastern end of the route.

The jet plow trial installation speeds varied only slightly (5.77 ft/min – 10.38 ft/min [1.76 m/min – 3.16 m/min]) from approximately the installation rate from the original base case modeling to that of the revised base case modeling. However, the installer has indicated that burial operations would have multiple stoppages to relocate the cable pulling barges; therefore operations could occur during any stage of the tidal current. As a result of this change in operation, it was necessary to reevaluate the suitability of the mixing zone area delineation. RPS performed an assessment of the modeling results comparing the original and revised modeling as well as results from an additional scenario carried out specifically to assess the effect of tidal stage and to reflect the currently understood operational scenario. This new scenario was modeled assuming the slow advance rate (5 ft/min [1.52 m/min]) across the mud flats followed by a 3 hour stoppage (time required for anchor changes) and finally resuming installation across the channel at the base advance rate (10 ft/min [3.04 m/min]); the stoppage is such that the resumed activities take place during a flood current. A summary of the model runs (original, revised and new) with their associated key model input values is presented in Table 1.

Maps delineating the 20 mg/L contour from the previously documented original and revised modeling (including sensitivity runs) are presented in Figure 1 and the revised base along with the new start/stop/restart scenario is presented in Figure 2. Reviewing Figure 1 it can be seen that the 20 mg/L footprints from the original and revised modeling primarily remain within the mixing zone except for small areas with the more conservative runs (higher loss rate and faster advance rate). Results from the jet plow trial indicate that neither the higher loss rate nor the faster advance rate scenarios are likely to occur. The 20 mg/L contour from the new run (Figure 2) remains primarily within the mixing zone however with some deviation since this new run captured operations with flood currents in a different manner (starting immediately after the mud flat, rather than partway across the channel, and during close to peak flood current) than the slow advance base case.

The model results were also post-processed to determine the duration that excess TSS concentrations exceeded the 20 mg/L threshold; figures of this metric are presented for the original and the revised base case in Figure 3 and Figure 4, respectively and in Figure 5 for the new case. Reviewing the durations over the 20 mg/L threshold, it is evident that in most locations close to the mixing zone boundary, concentrations of 20 mg/L persist for less than an hour. In fact for the revised base and new (starting, stopping, and resuming) modeling scenarios shown in Figure 4 and Figure 5, this is true even for most locations well within the mixing zone. The durations were greater for the original modeling due to the much more conservative nature of that modeling, as noted in the bullets below:

- Modeled sediments had a higher assumed fraction of fine material
- The modeled trench was deeper in the deep waters
- The modeled trench was assumed 100 percent solid (no account for moisture content since it was not available)

The maximum excess TSS concentrations from model results at the location of the jet plow trial monitoring stations were then extracted and compared to the observed TSS concentrations from the jet plow trial report (Normandeau, 2019). Note that the jet plow trial only took place over a fraction of the route whereas the modeling reflects the entire route. A summary of the observed maximum TSS concentrations and model-predicted maximum excess TSS concentrations at the jet plow trial observation station locations is presented in Table 2. Reviewing Table 2, it is evident that, during the jet plow trial, the observations were primarily much lower than the model predicted excess concentrations. The observed concentrations are total suspended sediment concentration (ambient plus plume) whereas the model concentrations are excess suspended sediment concentrations (plume only); therefore the observations of the plume concentrations due to jet plowing operations are of an even lower magnitude than what was observed since the observed contains the plume plus ambient (represented by the reference station values in Table 2) contributions.

Table 1: Summary of Model Runs.

Original, Revised, or New Model Results	Run Descriptor	Report Date	Jet Duration (hours)	Advance Rate (ft/min)	Loss Rate (%)	Tide	Old/New Sediment	Start Time	Currents As Operations from West to East Occur
Original	Original	Dec-15	13	5.47	25	Mean	Old	High Slack	Ebb-Flood-Ebb
Revised	Revised - Base	Jul-17	7.1	10.00	25	Spring	New	High Slack	Ebb -Flood
Revised	Revised - Slow	Jul-17	14.2	5.00	25	Spring	New	High Slack	Ebb-Flood-Ebb
Revised	Revised - Fast	Jul-17	4.7	15.00	25	Spring	New	High Slack	Ebb
Revised	Revised - High Loss	Jul-17	7.1	10.00	35	Spring	New	High Slack	Ebb -Flood
Revised	Revised - Low Loss	Jul-17	7.1	10.00	10	Spring	New	High Slack	Ebb -Flood
Revised	Revised - Neap	Jul-17	7.1	10.00	25	Neap	New	High Slack	Ebb -Flood
New	Start/Stop/Restart	Oct-19	10.5	5.00 & 10.00	25	Spring	New	High Slack	Ebb -Flood-Ebb

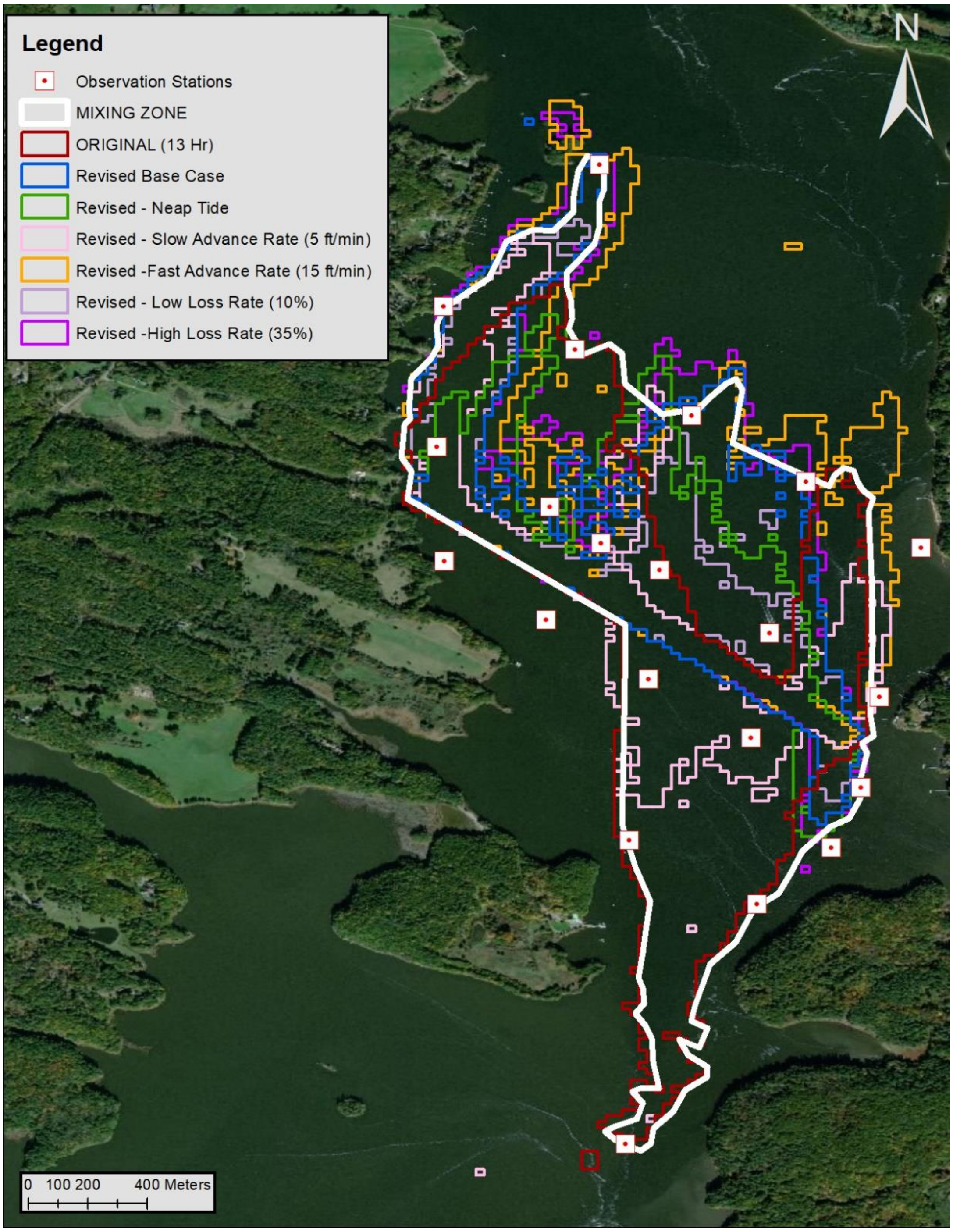

Figure 1 Delineation of the 20 mg/L contour from previously reported model runs.

MEMO

Date: October 2, 2019
Regarding: SRP - TSS

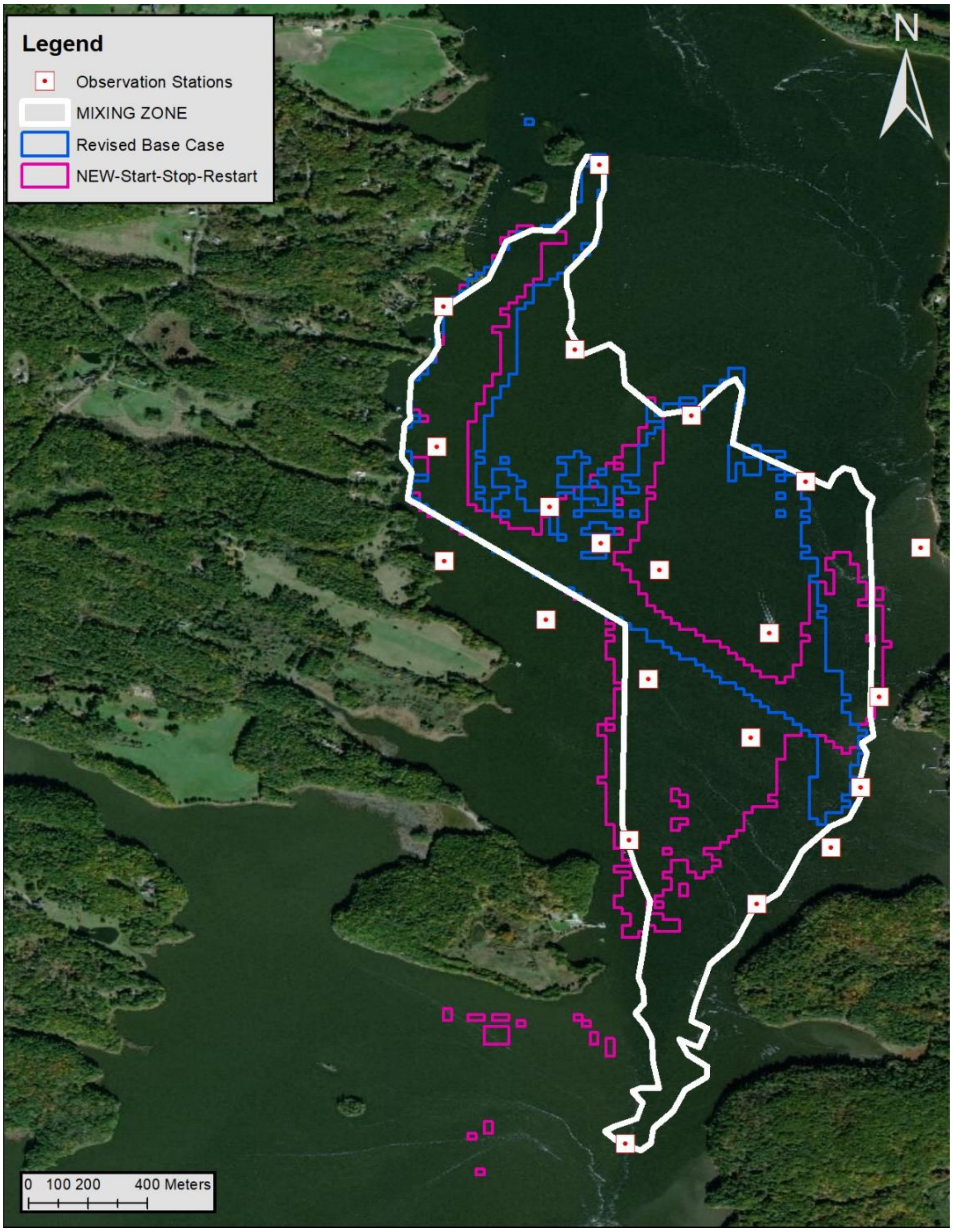

Figure 2 Delineation of the 20 mg/L contour from the updated base case from the revised modeling and that same case with a new case that reflected starting slow (5 ft/min [1.52 m/min]) across the mud flats, stopping for 3 hours and then restarting at the base advance rate (10 ft/min [3.04 m/min]).

MEMO

Date: October 2, 2019
Regarding: SRP - TSS

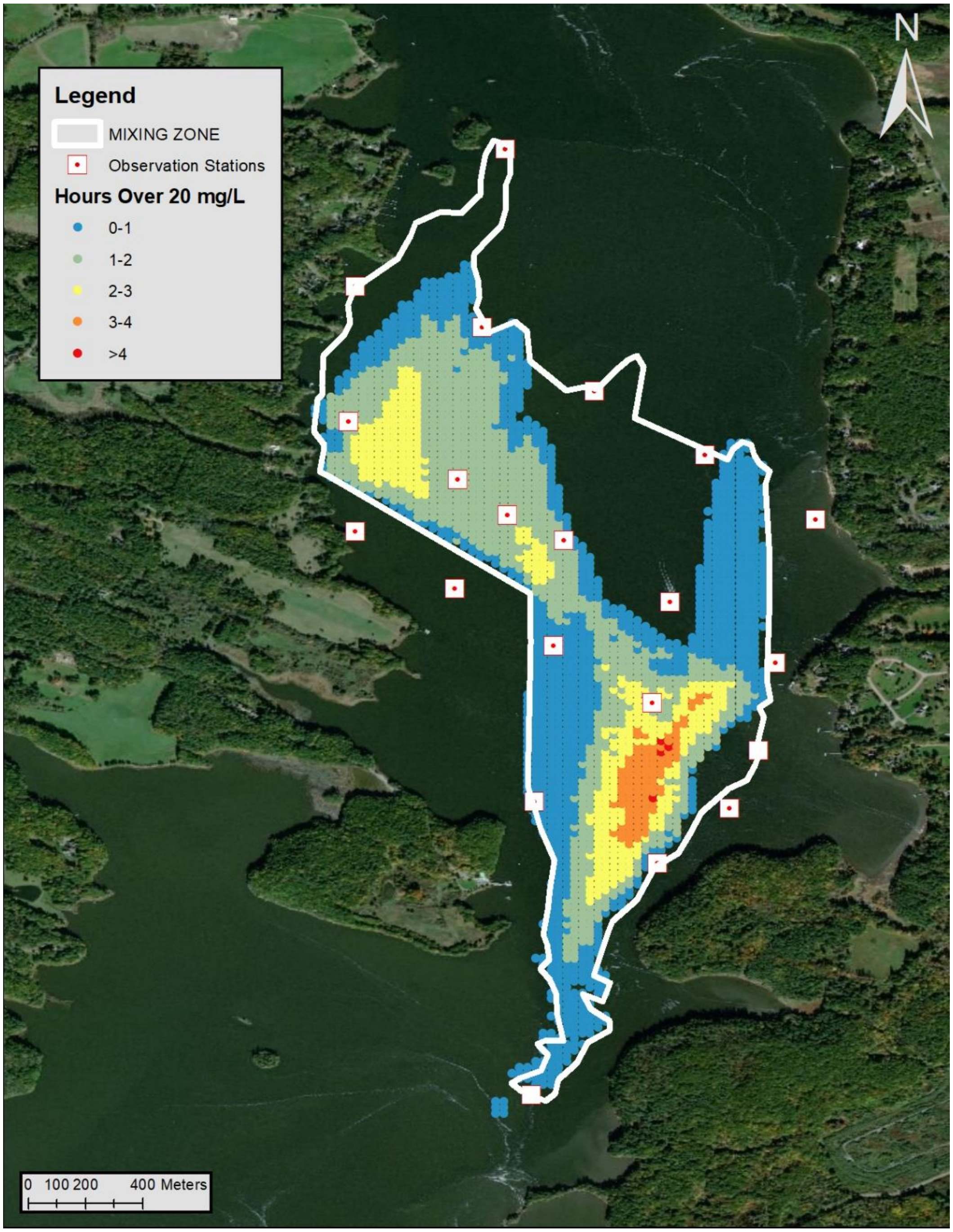

Figure 3 Hours over 20 mg/L for the original base case.

MEMO

Date: October 2, 2019
Regarding: SRP - TSS

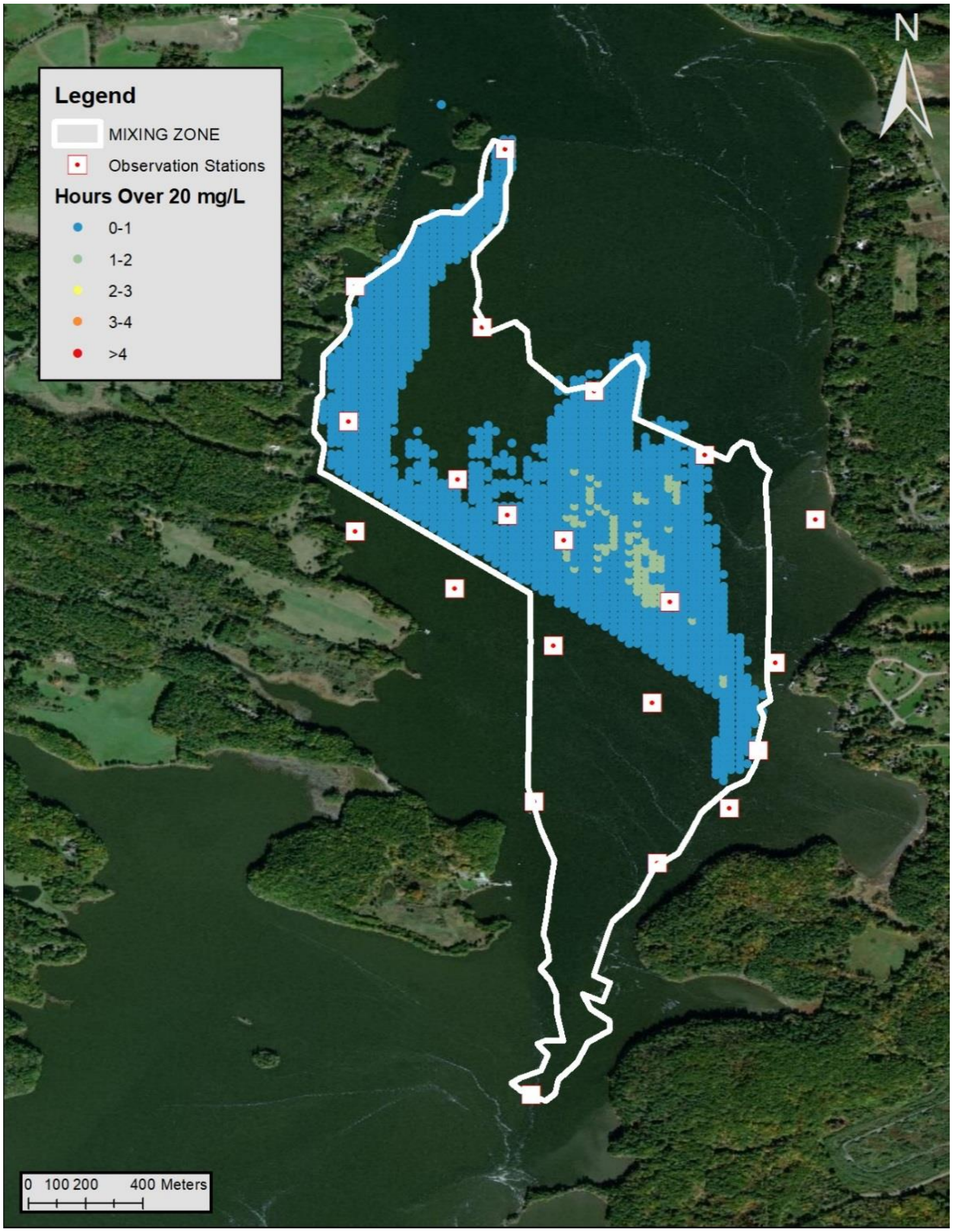

Figure 4 Hours over 20 mg/L for the revised base case.

Date: October 2, 2019
Regarding: SRP - TSS

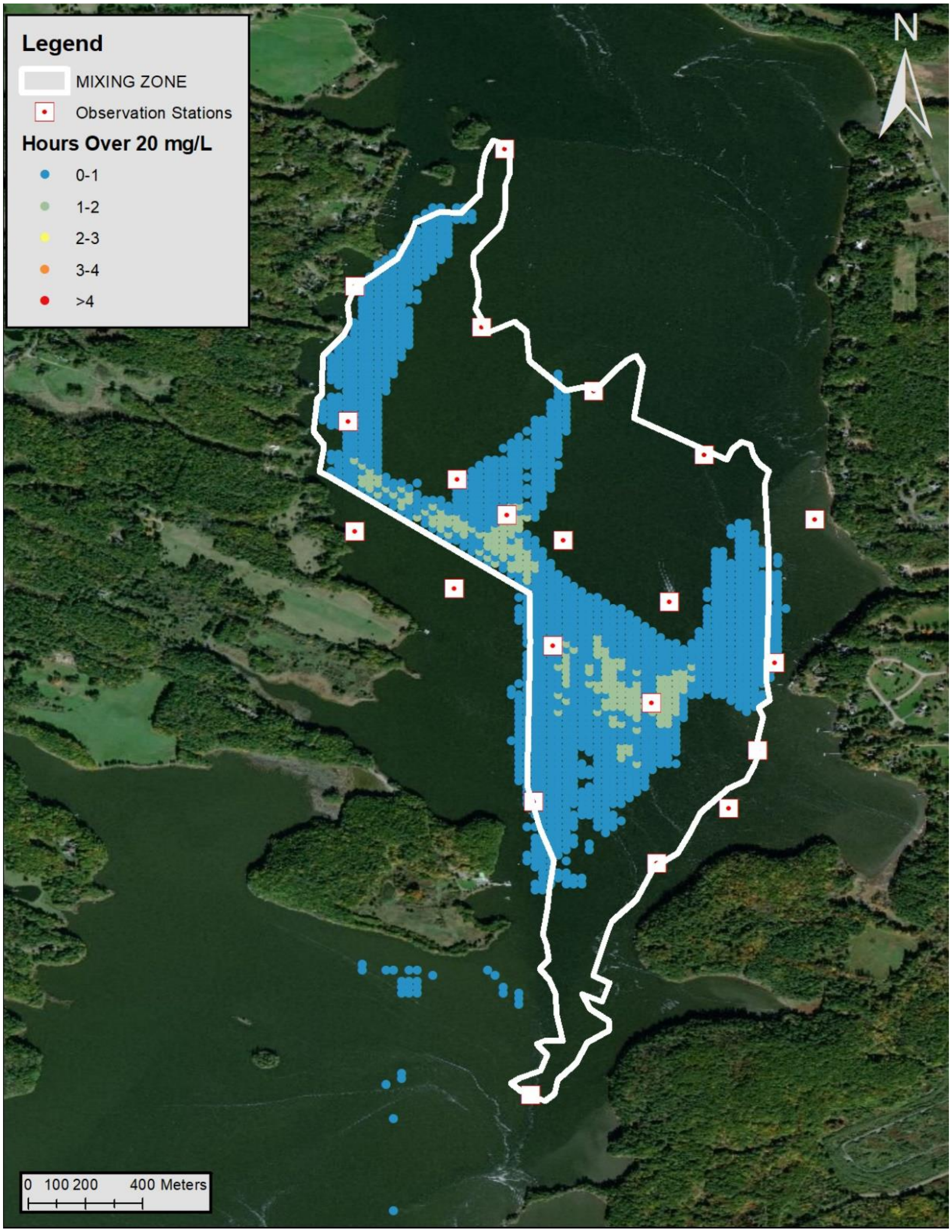

Figure 5 Hours over 20 mg/L for the new case of starting, stopping, and resuming operations.

Table 2: Summary of maximum value from model runs at observations stations.

OBSERVATIONS								Model Predictions								
NAI -Jet Plow Trial Summary Report September 18, 2019 Table 3								**Study**	Original	Revised	Revised	Revised	Revised	Revised	Revised	New
								Run Descriptor	Original	Base	Slow	Fast	High Loss	Low Loss	Neap	Start/Stop
Location	**Station**	**Total Suspended Solids (mg/L)[a]**						**Report Date**	Dec-15	Jun-17	Jun-17	Jun-17	Jun-17	Jun-17	Jun-17	Oct-19
		Before Trial			**During and After Trial**			**Jet Duration (hours)**	13	7.1	14.2	4.7	7.1	7.1	7.1	10.5
								Advance Rate (ft/min)	5.47	10.00	5.00	15.00	10.00	10.00	10.00	10.00
								Loss Rate (%)	25	25	25	25	35	10	25	25
								Tide	Mean	Spring	Spring	Spring	Spring	Spring	Neap	Spring
								Original/New Sediment	Original	New	New	New	New	New	New	New
		S	**M**	**B**	**S**	**M**	**B**		**Maximum Time Integrated Excess TSS Concentration (mg/L)**							
Nearfield North	11	4.8	--	6.4	13	--	7.9-23		95.9	19.0	19.7	19.4	29.1	8.5	22.7	22.7
	11a	9.5	--	8	13	--	6.3-15		56.5	33.6	154.8	38.4	31.7	17.7	417.7	136.2
	12	16	8.2	7.1	5.8-21	5.6-23	6.4-19		51.9	185.7	0.0	159.6	186.6	116.9	170.2	1.8
	13	7.9	8.2	5.9	7.4-24	7-23	6.7-12		6.7	65.6	2.5	101.4	95.1	27.3	85.6	5.9
Nearfield South	16	7.8	--	6.4	10	--	5.1-9.5		2.6	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	17	6.6	7.5	5	5.2-13	5.6-44	7.8-26		134.0	0.0	113.6	0.0	0.0	0.0	1.3	90.3
	18	--	--	--	9.7-13	5.2-8.8	5.9-25		233.9	2.6	26.7	0.0	5.0	1.3	5.4	103.9
Boundary North	22	6.7	12	8.1	5.2-13	5.4-9.6	7.7-10		6.5	20.2	5.4	48.2	27.2	11.1	3.5	12.0
	23	4.3	--	11-13	5.9	--	4.5-16		18.5	9.0	2.8	14.8	14.7	4.0	7.8	3.6
	24	4.4	8.1	7.3	5.5-40	6.1-21	7.2-26		2.6	25.0	3.2	31.0	37.7	14.6	7.1	3.3
	25	4.6	7.6	11	7.6-13	6.6-24	5.2-8.6		16.0	17.3	2.9	42.1	30.2	7.6	2.8	6.6
Boundary South	27	--	--	--	8.1-12	5.2-11	8.8-14		14.7	6.4	2.7	0.0	6.8	2.9	6.0	1.8
	28	--	--	--	8.6-25	6.8-15	11-18		17.6	0.0	2.7	0.0	1.2	0.0	0.0	4.1
	29	--	--	--	6.3-13	9.5-13	12-15		24.3	0.0	13.1	0.0	0.0	0.0	1.3	24.1
Reference	41	6.6	6.8	10	7.1	7.5	10									
	42	7.1	--	7.1	--	--	5									
	43	4.6	8.4	4.7	13	9.7	6.9									
Field Blanks	n/a	<1														

3. Comment on Route Adjustment

The cable burial route is proposed to be slightly adjusted to avoid a sand wave area where steeper bottom slopes exist. The adjustment is an offset from the original route for a short distance with a maximum offset of ~100 ft (~33 m) (see Figure 6).

The slight route offset will not affect the modeling results due to the small distance change from the original route. The resolution of the sediment transport modeling grid (where the excess sediment concentration and deposition is calculated) is 20 m (66 ft) in the plan view and 0.2 m (8 in) in the vertical. Thus the adjusted route would result in the sediment source (the jet plow) being located only 1-2 grid cells from the original modeled location. Although there will be a shift in the location of the maximum concentrations (>> 20 mg/L) right at and locally surrounding the jet plow, this is not anticipated to have an effect on the modeling results at large, particularly at distances where the 20 mg/L mixing zone area is delineated.

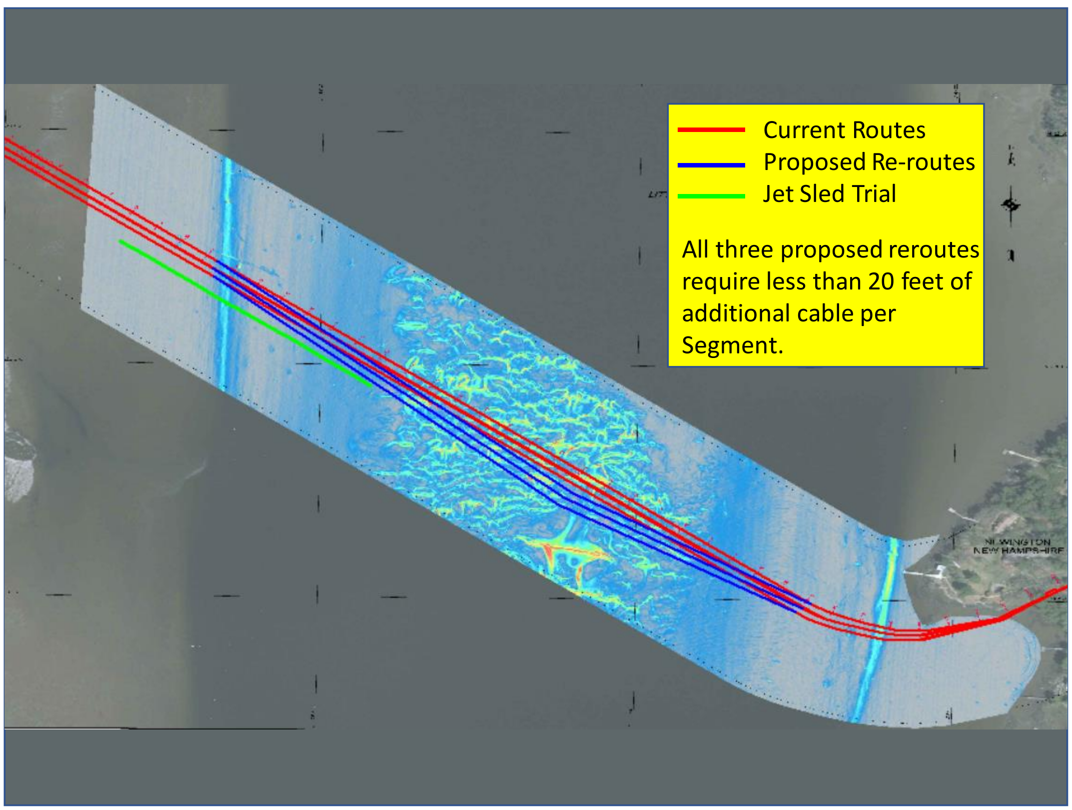

Figure 6 Illustration of adjusted route relative to the modeled route (Source: Normandeau).

Date: October 2, 2019
Regarding: SRP - TSS

4. Conclusions

Based on the combination of modeling results from various scenarios, it is suggested that the permitted mixing zone is suitable for delineating the area where expected excess concentrations would exceed 20 mg/L from jet plow operations regardless of the tide stage at the time of crossing the channel and of the minor deviation from the original route within the channel. While there are some model predicted deviations of the 20 mg/L contour outside this mixing zone, they are at the further extents close to where the concentrations drop and are based on conservative assumptions which may have resulted in an overestimate of the plume. The assumptions have been observed to be conservative based on comparison of the maximum observed TSS during the jet plow trial which were all considerably lower than the model predicted maximum at these locations.

Further it is suggested that the route adjustment will not significantly change the model predictions, and therefore the previously completed modeling is deemed a useful proxy for the adjusted route.

5. References

Normandeau Associates. *Eversource Energy Seacoast Reliability Project Jet Plow Trial Summary Report* (Issued 18 September 2019).

Swanson, J.C, T. Isaji and C. Gallagan. *Modeling Sediment Dispersion from Cable Burial for Seacoast Reliability Project, Little Bay, New Hampshire* (Issued 14 December 2015).

Swanson, J.C, D. Crowley, D. Mendelsohn, and N. Vinhateiro. *Modeling Sediment Dispersion from Cable Burial for Seacoast Reliability Project, Little Bay, New Hampshire* (Issued 27 June 2017).