Geotechnical Engineering Report

Preston Bridge 02931: Route 2A (Poquetanuck Road) over Poquetanuck Cove

Preston, Connecticut

125 Nagog Park
Acton, MA 01720

Geocomp Project Number: 220693

March 25, 2019

Submitted to:
Mr. Donald Wurst, P.E.
CME Associates, Inc.
East Hartford, CT

Submitted by:
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Geocomp

March 25, 2019

Mr. Donald Wurst, P.E.
CME Associates, Inc.
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RE: Geotechnical Engineering Report
Route 2A (Poquetanuck Road) over Poquetanuck Cove
Bridge No. 02931
Preston, Connecticut

Dear Mr. Wurst:

In accordance with the notice to proceed dated September 8, 2016, Geocomp Consulting, Inc. is pleased to submit this draft geotechnical engineering report for the replacement of the Route 2A (Poquetanuck Road) Bridge (ConnDOT Bridge No. 02931) over Poquetanuck Cove in Preston, Connecticut. This report presents a summary of site subsurface conditions based on recent site-specific borings, laboratory test results from the recent investigation, and geologic maps of the surrounding area. This report contains geotechnical recommendations for the proposed bridge replacement.

We wish to thank you for the opportunity to work with CME and your project team on this project. Please do not hesitate to contact us if you wish to discuss the contents of this report.

Sincerely yours,
GEOCOMP CONSULTING, INC.

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1.0 BACKGROUND INFORMATION

Our understanding of the project and existing conditions is based on:

- Recent borings and test pits performed at the project site;
- Laboratory testing of samples recovered from the recent borings;
- Aerial photographs, available geologic maps and publications;
- Rehabilitation Study Report (RSR) for Bridge No. 02931 in Preston, CT prepared by CME for the State of Connecticut Department of Transportation (ConnDOT), dated July 2015;
- Update to the Rehabilitation Study Report (RSR) for Bridge No. 02931 in Preston, CT prepared by CME for the State of Connecticut Department of Transportation (ConnDOT), dated July 2015 revised June 2016;
- 90% Submission Design Drawings for Rehabilitation of Bridge No. 02931, Route 2A over Poquetanuck Cove, ConnDOT, dated February 2019;
- Discussions and correspondence with CME.
- Meeting with ConnDOT, CME, Eversource, and Fuss & O'Neill on January 25, 2019

1.1 Site Location and Existing Conditions

Bridge No. 02931 was constructed in 1928 and carries Route 2A (Poquetanuck Road) over Poquetanuck Cove in Preston, Connecticut. The current span length between abutments is approximately 14 feet. Available plans for the existing bridge site are included in Appendix A and the bridge location is shown on Figure 1.

The bridge was originally constructed in 1928 with no record of major rehabilitation. The existing bridge superstructure consists of a 16-inch reinforced concrete slab with a bituminous concrete overlay and no waterproofing membrane. No expansion joints were observed at the bridge.

The existing abutments are reinforced concrete abutments with flared wingwalls. The abutments are embedded in embankments that slope downwards towards Poquentanuck Cove at slopes ranging from approximately 1.1H:1V to 2.3H:1V. The existing abutments are supported on shallow foundations.

All elevations in this report are in feet and are referenced to the National Geodetic Vertical Datum of 1988 (NGVD88).

1.2 Proposed Construction

We understand that the proposed construction will include replacement of the existing bridge deck and abutment seat and that the existing bridge abutments and wingwalls will be reused. The face of the existing abutments and wing walls and part of the subsurface face within the channel are to be repaired and resurfaced. The project also includes the installation of open pedestrian rails along each fascia, installing R-B Mash Metal Beam Rails away from the bridge transitioning into S3-TL4 Open Bridge Rails at the bridge, and regrading and armoring the existing embankment slopes with rip rap. A 4-foot diameter temporary bypass pipe is proposed to be installed beneath the existing bridge within the work zone to provide a water bypass during construction of the new bridge deck. New barrier walls will be installed on both the north and south sides of the roadway embankment for a distance extending approximately 130 feet and 25 feet to the west and east of the existing bridge, respectively. It is our understanding that changes in grade along the existing roadway embankment and adjacent to the new bridge will not exceed approximately six inches.

The proposed construction sequence shall be accomplished by utilizing staged construction with one-way alternating traffic. We understand that the suggested construction sequence is anticipated to consist of stages. The first stage will be to relocate and provide temporary support for the existing utilities around the bridge. Overhead utilities will be relocated with new pole locations. The existing HPFF electric line on the northern side of the bridge will be supported by the northern wingwalls during both construction and in the permanent condition. The existing gas line on the southern side of the bridge will be temporarily supported on drilled-in steel piles.

The second stage will set up one-way alternating traffic in the northern lane, install the temporary cofferdam and bypass pipe, and start and finish construction on the southern half of the bridge.

The third stage will redirect the one-way alternating traffic from the northern lane to the newly constructed southern lane, start and finish construction on the northern half of the bridge, and removal of the temporary cofferdam and bypass pipe. Superstructure replacement of the existing bridge will consist of removing the existing bridge deck and the top part of the existing abutment. A new abutment seat will be constructed over the removed portions of the existing abutment. After the new abutment seat is installed, the face of the existing abutment will be repaired and resurfaced. The drawings indicate that the repairing and resurfacing will continue to approximately 12 inches below the mudline. Following the repairing and resurfacing, the new bridge deck will be installed. The final stage will provide the final layer of pavement over the bridge.

The proposed construction sequence is shown on the Structure Drawing Set of the 90% Submission Design Drawings for new bridge, included in Appendix B. The proposed embankment slopes are shown on the Highway Drawing Set of the 90% Submission Design Drawings.

2.0 SUBSURFACE CONDITIONS AND EXPLORATIONS

2.1 Regional Geology

The surficial geology is described in a publication entitled “Surficial Geology of the Uncasville Quadrangle, Connecticut” by Richard Goldsmith, published by the United States Geological Survey (USGS), 1960. This document indicates that surficial materials in the vicinity of the bridge area consist of the following from the ground surface downwards:

- marsh deposits consisting of partly decomposed organic material, primarily salt marsh grass, mixed with sand, silt, and clay;
- alluvium deposits, consisting of silt, sand, and gravel in flood plains;
- terrace deposits consisting of sand, gravel, and cobbles;
- older terrace deposits consisting of sand and gravel stream terraces, both cut and depositional terraces;
- ground moraine deposits consisting of a glacial till varying from sandy-gravelly till to a compact, gray, fissile till containing more silt and clay.

The bedrock geology is described in a publication entitled "Bedrock Geological Map of the Uncasville Quadrangle, New London County, Connecticut" by Richard Goldsmith, published by the USGS in 1967 and "Bedrock Geologic Map of Connecticut" by John Rodgers, published by the USGS in 1985. The bedrock in the vicinity of the bridge site is part of the Tatnic Hill Formation and generally consists of gray to dark-gray gneiss and schist. Bedrock is described as a medium-grained, biotite schist and gneiss containing sillimanite and garnet. Bedrock outcrops were observed near the bridge.

Based on the results of recent borings, described below, subsurface conditions were generally consistent with available geologic information relative to the type and thickness of overburden materials and bedrock encountered.

2.2 Recent Subsurface Explorations

Three subsurface exploration programs consisting of borings and test pits were performed at the bridge site. Geocomp personnel coordinated, observed, and monitored the recent subsurface investigations. The boring and test pits locations are shown in Figure 2 and were estimated based on tape measurements from existing site features. Boring and test pit logs are included in Appendix B. Details of the recent subsurface exploration programs are provided below.

2.2.1 December 2018 Subsurface Exploration Program

New England Boring Company (NEBC) performed a subsurface exploration program consisting of three borings drilled through the existing abutments and foundations between December 12, 2018 and December 14, 2018 using a Mobile B-52 truck-mounted drill rig. The intent of the boring program was to determine the elevations of the bottom of the existing abutment foundations and to determine the abutment foundation bearing material.

Two borings (Borings B-2-7 and B-2-7A) were performed through the western abutment in the westbound lane. Boring B-2-7 was relocated on the western abutment due to the presence of rebar encountered during concrete coring through the abutment. One boring (Boring B-2-6) was performed through the eastern abutment in the westbound lane.

These borings ranged in depth from approximately 15.5 to 24 feet. Standard Penetration Tests (SPT) and split-spoon sampling were performed in each boring using drive and wash or solid stem auger techniques in accordance with ASTM D1586. Concrete and rock coring were performed in each boring in accordance with ASTM D2113. The sample spacing was continuous for SPT, split-spoon, and coring operations once the abutment or footing was found. The boring was advanced to as deep as the open hole would permit.

The boring elevations were estimated from topographic information provided in an electronic file named "SV_D2_170_3250F_PRESTON_CT 2A OVER POQUETANUCK COVE BR 02931 AND DICKERMANS BROOK BR02932_GRN.dgn" and dated February 16, 2016.

2.2.2 October 2018 Subsurface Exploration Program

Laydon Industries (Laydon) performed four test pits on and behind the bridge deck between October 3, 2018 and October 5, 2018. The test pits were performed with a 430F2 backhoe excavator and a Cusco

Hydro Trencher vacuum truck. The intent of the test pit program was to locate the back of the abutments and determine the slope of the back of the abutments

One test pit (Test Pit T-2-1) was performed on the northwestern corner of the bridge, on top of and behind the existing bridge deck. One test pit (Test Pit T-2-2) was performed on the northeastern corner of the bridge, on top of and behind the existing bridge deck. One test pit (Test Pit T-2-3) was performed on the southwestern corner of the bridge, on top of and behind the existing bridge deck. One test pit (Test Pit T-2-4) was performed on the southeastern corner of the bridge, on top of and behind the existing bridge deck.

2.2.3 April/May 2017 Subsurface Exploration Program

Allstate Drilling Company (Allstate) performed ten borings adjacent to the existing abutments between April 24, 2017 and May 17, 2017. The borings were drilled using an Acker 2 truck-mounted drill rig. The intent of the boring program was to provide sufficient subsurface information for design and construction of the new bridge. The boring program as initially proposed consisted of four borings, with one boring adjacent to each corner of the existing bridge. Each boring was proposed to be performed to a depth of 50 feet or to top of rock, whichever was shallower. However, due to difficult drilling conditions and frequent auger and casing refusal at depths significantly less than 50 feet, the borings had to be relocated several times to provide sufficient information on subsurface conditions at the bridge site.

Four borings (Borings B-2-1, B-2-2A, B-2-2B, and B-2-2C) were performed on the westbound shoulder and within the eastbound lane of US Route 2A behind the existing western bridge abutment. Five borings (Borings B-2-3, B-2-4A, B-2-4B, B-2-4C, and B-2-4D) were performed on the westbound shoulder and within the eastbound lane of US Route 2A behind the existing eastern bridge abutment. Boring B-2-2 and B-2-4 were relocated several times due to casing refusal during driving and auger refusal. One boring (B-2-5) was also performed near the centerline of the westbound lane of US Route 2A through the existing bridge deck approximately 2.5-feet east of the face of the existing western bridge abutment. Boring B-2-5 was performed to confirm the presence of soft organic silts within the footprint of the proposed bridge culvert.

The performed borings ranged in depth from approximately 18 to 52.3 feet. Standard Penetration Tests (SPT) and split-spoon samples were performed in each boring using rotary cased methods in accordance with ASTM D1586. The sample spacing ranged from continuous to a maximum of five-foot intervals. Each boring was advanced to rotary bit and split-spoon refusal (i.e. at least 50 blows of a 140-pound hammer for less than or equal to 6 inches of penetration with a split spoon, or at least 100 blows of a 140-pound hammer for less than or equal to 12 inches of penetration). An undisturbed soil sample was also collected from Boring B-2-3. To supplement the borings, a field vane shear test was performed by Geocomp personnel using a GEONOR H-70 Heavy Inspection Vane Borer to a maximum depth of five feet below the ground surface in the vicinity of the proposed box culvert. The field vane shear was pushed by hand and the in-situ and remolded strengths of the soft organic silts were obtained at various depths. The boring logs are included in Appendix B and the boring locations are shown in Figure 2.

All borings were performed either on or near the existing bridge. It is not known if the materials encountered near the bridge are representative of subsurface conditions beneath the roadway embankment beyond the bridge.

2.3 Laboratory Testing

Laboratory tests were performed on selected soil and bedrock samples collected during the 2016 subsurface exploration program. The laboratory program for the test borings included performing eight sieve gradation tests on soil samples, one Atterberg limits test, one organic content test, and one suite of corrosion potential tests (pH, soil resistivity, sulfate content, chloride content, and oxidation-reduction potential). The gradation tests were used to complete visual field classifications and evaluate engineering properties of the soil. All laboratory testing followed ASTM guidelines described in the 2005 ConnDOT Geotechnical Engineering Manual. The results of the laboratory tests are included in Appendix C.

2.4 Subsurface Conditions

Based on the recent subsurface investigations, subsurface conditions at the bridge site generally consisted of fill over organic silt deposits, underlain by native granular terrace deposits and glacial till over bedrock. Alluvial deposits were also encountered within the stream channel under the bridge deck. A subsurface profile based on the recent boring and test pit programs is included as Figure 3.

A general description of the subsurface conditions encountered in the borings is summarized below. Refer to the logs in Appendix B for specific conditions encountered at the boring and test pit locations.

Asphalt and Road Base – Approximately 9- to 18-inches of asphalt was encountered at the ground surface in each boring. The asphalt is underlain by approximately 6-inches of road base material (coarse to fine sand and some fine gravel). At boring B-2-5, approximately 18-inches of concrete was encountered under the asphalt within the bridge deck. The asphalt and road base material generally overlays the fill materials.

Fill – Fill material was found at each boring and test pit behind the abutments. This material generally consisted of a brown to dark brown fine to coarse sand with varying amounts of gravel and silt. The thickness of the fill ranged from approximately 13 to 17 feet. The density of the fill ranged from very loose to medium dense with SPT N-values measured in the fill ranged from 3 to 27 with an average of approximately 13. Split spoon refusal was encountered once in this soil. The fill material generally overlays the organic silt or terrace deposit materials.

Alluvial Deposits – Alluvial deposits were encountered at the river bed in boring B-2-5. The alluvial deposit consisted of black fine to coarse sand with varying amounts of gravel and silt. The thickness of the alluvial deposit was approximately 2 feet. The alluvial deposit was medium dense with an SPT N-value of 15. The alluvial deposits generally overlay the organic silt materials.

Boulders – Boulders were encountered beneath the western abutment in boring B-2-7A and B-2-5. The boulders consisted of gray and black granite. The thickness of the boulder layer is approximately 4 feet. The RQD of the boulders from boring B-2-7A is approximately 63%. Based on boring B-2-7A and B-2-5, the boulders appear to be directly beneath the existing footing and tailing off to the side. The boulders generally overlay the terrace deposit materials. It is unknown whether these boulders were placed during bridge construction for abutment foundation support or whether they were naturally deposited. Boulders were not encountered beneath the eastern abutment.

Organic Silt – Organic silt was encountered in nine of the thirteen borings. The organic silt consisted primarily of dark gray to black silt with varying amounts of fine to coarse sand, organics, and gravel. The thickness of the organic silt ranged from approximately 6.5 to 8 feet across the site. The organic silt ranged from very soft to stiff with SPT N-values ranging from weight of rod (WOR) to 14, with an average of approximately 6. Split spoon refusal was encountered four times in this soil, three of which were at the interface between the organic silt and the underlying terrace deposit, most likely due to the cobbles and possible boulders encountered at the interface between the organic silt and terrace deposit in each boring. Corrected undrained shear strengths measured from the field vane shear tests varied from approximately 130 psf at a depth of three feet to 190 psf at a depth of five feet, with undrained shear strength increasing with depth at a rate of approximately 20 psf/ft. Laboratory testing indicated the organic silt has a Liquid Limit of 158, Plasticity Index of 88, Liquidity Index of 0.5, and a moisture content of 117%. Table 1 presents the thickness and depths of the encountered organic silt. The organic silt generally overlays the terrace deposit materials. The organic silt layer was not encountered in Borings B-2-3 and B-2-6, which were performed adjacent to the north side of the east abutment. The organic silt was encountered below the bridge deck and adjacent to the south side of the east abutment and both the north and south sides of the west abutment. The return fluid from borings B-2-7 and B-2-7A showed a slight black color just before the abutment foundation was encountered, possibly indicating the presence of organic soils at these locations.

Terrace Deposits – Terrace deposits were encountered in nine of the thirteen borings. The terrace deposit consisted primarily of brown to gray, fine to coarse sand with varying amounts of gravel and silt. The thickness of the terrace deposit was approximately 25 feet at boring B-2-1. The bottom of this deposit was not encountered in any of the other borings. The terrace deposit ranged from medium dense to very dense with SPT N-values ranging from 27 to split spoon refusal. Excluding split spoon refusal, the average N-value is 49. Split spoon refusal was encountered 28 times in this soil and casing and auger refusal were encountered 7 times and 3 times, respectively. The refusals were most likely due to the presence of cobbles and boulders encountered within the terrace deposits. The terrace deposits generally overlay the glacial till materials. In Boring B-2-6, an approximately 1.5-foot thick piece of granite was found over the terrace deposit at 13 feet below the ground surface. The granite is suspected to be part of the abutment foundation. The abutment foundation in the northeastern corner of the bridge bears directly on the terrace deposit.

Glacial Till – Glacial till was encountered at boring B-2-1. The glacial till consisted primarily of grayish brown fine to coarse gravel with varying amounts of sand, silt, and clay. The thickness of the glacial till is unknown as boring B-2-1 was terminated within this deposit. The glacial till was very dense. Split spoon refusal was encountered in this soil at the sample taken at B-2-1.

Table 1 – Summary of Organic Silt Depths, Thicknesses, and Approximate Elevations

Boring #	Depth to Organic Silt (feet)	Approximate Top of Organic Silt Elevation (feet)	Approximate Bottom of Organic Silt Elevation (feet)	Approximate Thickness of Organic Silt (feet)	Location
B-2-1	17	-9.7	-16.2	6.5	South end of the Western Abutment
B-2-2	15	-7.7	-14.7	7	North end of the Western Abutment
B-2-2B	15	-7.9	Not defined[1]	Not defined[1]	North end of the Western Abutment
B-2-2C	13	-5.7	-12.7	7	North end of the Western Abutment
B-2-4A	14	-5.8	-12.3	6.5	South end of the Eastern Abutment
B-2-4B[2]	14	-4.7	-11.2	6.5	South end of the Eastern Abutment
B-2-4C[2]	14	-4.7	Not defined[1]	Not defined[1]	South end of the Eastern Abutment
B-2-4D[2]	14	Not defined[1]	Not defined[1]	Not defined[1]	South end of the Eastern Abutment
B-2-5	12	-4.3	-12.3	8	Center of the Western Abutment
B-2-6	Not Encountered				North end of the Eastern Abutment
B-2-7	Not Encountered				North end of the Western Abutment
B-2-7A	Not Encountered				North end of the Western Abutment

1. Boring was terminated within the organic silt deposit.
2. Extents of organics based on Boring B-2-4 and auger cuttings. No samples taken within organic silt layer.

2.5 Groundwater Observations

Groundwater was encountered in the 2017 borings at depths below ground surface ranging from approximately six feet at borings B-2-2B and B-2-2C to eleven feet at boring B-2-4D. Surface water was encountered in boring B-2-5 performed within the stream channel beneath the bridge deck. The groundwater observations from the recent subsurface exploration are shown in Table 2.

Table 2 – Summary of Groundwater Observation

Boring #	Water Depth (feet below ground surface)	Location
B-2-1	6.3	South end of the Western Abutment
B-2-2	7.0	North end of the Western Abutment
B-2-2B	6.0	North end of the Western Abutment
B-2-2C	6.0	North end of the Western Abutment
B-2-3	7.0	North end of the Eastern Abutment
B-2-4	7.5	South end of the Eastern Abutment
B-2-4B	9.0	South end of the Eastern Abutment
B-2-4C	10.0	South end of the Eastern Abutment
B-2-4D	11.0	South end of the Eastern Abutment
B-2-5	Open Channel Water Level Encountered	Center of the Western Abutment
B-2-6	Groundwater not measured due to the use of drilling fluid used during coring operations	North end of the Eastern Abutment
B-2-7	Groundwater not measured due to the use of drilling fluid used during coring operations	North end of the Western Abutment
B-2-7A	Groundwater not measured due to the use of drilling fluid used during coring operations	North end of the Western Abutment

Note that groundwater was observed in open borings and may not represent the stabilized water depth. Groundwater levels at the site are tidal influenced and fluctuations in groundwater levels will occur due to variations in precipitation, tide and other factors different from those existing at the time the measurements were made.

3.0 GEOTECHNICAL CONSIDERATIONS

The primary geotechnical considerations for this bridge project are:

- **Reuse and Rehabilitation of Existing Abutments and Foundations** – We understand that the existing bridge abutments and foundations are proposed to be reused for support of the new bridge superstructure. Based on the borings performed, the foundation for the north side of the east and west abutments bear on different materials. The north side of the western abutment foundation (composed of concrete) was found to bear on boulders over the Terrace deposit. As previously discussed, it is unknown if the boulders were placed during bridge construction or were naturally deposited. The north side of the east abutment foundation (believed to be composed of a granite block) was found to bear directly on the Terrace deposit. The elevation of the bottom of the foundation for the north side of the east and west abutments are different. The elevation of the northeastern abutment is -7 feet, and the elevation of the northwestern abutment is -8.6 feet. The elevation and bearing materials for the south side of both the east and west abutment are unknown.

- **Reuse and Rehabilitation of Existing Wingwalls** – We understand that existing wingwalls are proposed to remain in place. It is not known what elevation the wingwalls bear at or the materials the wingwalls bear on.

- **New Barrier Walls** – We understand that new barrier walls will be constructed along the sides of the roadway embankment for a distance extending approximately 130 feet and 25 feet to the west and east of the existing bridge, respectively. These new walls will bear on compacted granular fill over the existing fill. The barrier walls must also bear at a depth below the anticipated frost line.

- **Temporary Water-Handling-Cofferdam** – The project site is located within the northern section of Poquetanuck Cove. This body of water is tidal and will influence the groundwater elevations during construction. Repairing and resurfacing the existing abutments and wingwalls will require excavations below groundwater and the water elevations within Poquetanuck Cove. Therefore, a cofferdam and associated dewatering will be required to perform the foundation construction in the dry.

- **Utility Supports** – The overhead and underground utilities will need to be relocated during construction of the bridge. During construction the existing HPFF line will be supported by a strong-back system founded on the existing wingwalls, and then disconnected from the existing bridge deck. Following construction, the HPFF line will be reconnected to the new bridge or wingwalls. The existing gas line will be temporarily supported by a strong-back system supported by pin piles.

- **Cobbles and Boulders** – Cobbles and boulders up to approximately 3 feet in diameter were visible along the existing ground surface of Poquentanuck Cove adjacent to the existing bridge. Cobbles and boulders were also encountered beneath the western bridge abutment. These cobbles and boulders could obstruct driving of sheeting and piles for the cofferdam and support of excavation systems. In addition, cobbles and boulders were encountered within the natural terrace deposits and the interface between the organic silt and natural terrace deposit, which may create difficulties during cofferdam installation.

- **Temporary Support of Excavation** – Based on the proposed construction sequence, a temporary support of excavation (SOE) system will be installed for construction of the new bridge. The presence of soft organic soils and cobbles and boulders within the underlying terrace deposits and beneath the existing western abutment must be accounted for in the design of the SOE. The presence of boulders and disturbance-susceptible organic soils adjacent to the existing bridge foundation preclude the use of driving sheet or piles during construction.

4.0 GEOTECHNICAL DESIGN EVALUATIONS AND RECOMMENDATIONS

4.1 Reuse and Rehabilitation of Existing Abutments and Foundations

As noted above, the intent is to reuse and rehabilitate the existing abutments and foundations. Based on the recent boring program, the bearing elevation and bearing materials differ between the eastern and western abutments. The northern side of the eastern abutment bears at approximate elevation -7.0 feet and is founded on the terrace deposits. The northern side of the western abutment bears at approximate elevation -8.6 feet and is founded on boulders over the terrace deposits. Limited information is available on the geometry of the abutments.

It is our understanding that the weight of the new bridge superstructure will be less than the weight of the existing superstructure. Provided that the total dead weight of the new superstructure is less than or equal to that of the existing superstructure, the existing static factor of safety for stability for the abutments due to loads from the dead weight of the superstructure will either increase or remain the same as the current condition. We also understand that the stability against sliding and overturning of the existing abutments has been evaluated by others.

Corrosion potential laboratory testing performed on soil samples collected adjacent to the bridge indicate subsurface conditions are aggressive. Table 3 provides a summary of the laboratory test results.

Table 3 – Summary of Corrosion Potential Laboratory Tests

Boring #	Sample	Depth (ft)	pH	Soil Resistivity (ohm-cm)	Sulfate Content (ppm)	Chloride Content (ppm)	Oxidation-Reduction Potential (mV)
B-2-2	S-7	15-19*	5.05	609	617	46	135
B-2-2	S-8A						
B-2-5	S-4A						

*Samples were combined for testing

Due to the corrosive nature of the site subsurface environment, the effect of corrosion on the abutment concrete and reinforcement should be considered.

4.2 Reuse and Rehabilitation of Existing Wingwalls and Foundations.

As noted above, the intent is to reuse and rehabilitate the existing wingwalls and wingwall foundations. Based on the recent boring program, the bearing elevations and bearing strata are not known for the wingwalls. We understand that lateral and vertical loads on the wingwalls will not be significantly increased relative to the existing condition. Therefore, the stability of the wingwalls will not be significantly changed from the existing condition.

As for the abutments, the effect of corrosion on the wingwall concrete and reinforcement should be considered.

4.3 New Barrier Walls

New reinforced concrete barrier walls are proposed to be constructed along both the north and south sides of the roadway embankment. The walls are proposed to extend from Stations 82+10.00 to 83+85.00 and from Stations 83+23.00 to 83+85.00 along the south and north sides of the roadway embankment, respectively. The barrier walls are proposed to be supported on shallow reinforced concrete foundations ranging from 6 to 6.5 wide. The height of retained soil is proposed to range from 2 to 5 feet for the new barrier walls.

These walls may bear on a minimum of 12 inches of Compacted Granular Fill placed over the existing embankment fill after removal of all unsuitable materials encountered at the foundation bearing elevations. These unsuitable materials would consist of any topsoil, concrete, asphalt, loose granular soils, and organic soils. These unsuitable soils should be overexcavated and replaced with Compacted Granular Fill. Excavation and placement of the new barrier wall foundations shall follow the excavation and compaction recommendations in Sections 5.1 and 5.5 of this report.

Bearing capacity calculations were performed for the new barrier wall foundations. This evaluation was conducted in accordance with the current AASHTO LRFD Bridge Design Specifications and ConnDOT Bridge Design Manual.

Factored bearing resistance was developed for both strength and extreme limit states. A resistance factor of 0.45 was used for the strength limit state in accordance with Table 10.5.5.2.2-1 of the AASHTO LRFD Bridge Design Specification, and a resistance factor of 1.0 was used for the extreme limit state in accordance with Section 10.5.5.3.3.

The maximum factored bearing resistance for service, strength, and extreme limit states for the barrier wall footings are listed in Table 4. The maximum factored bearing pressures listed in Table 4 apply to the maximum design foundation pressures for the barrier wall spread footings. A minimum footing width of 6 feet was assumed for the barrier wall foundations.

Table 4 – Maximum Design Foundation Pressures for Barrier Wall Spread Footings

Limit State	Maximum Design Foundation Pressure
Service I	2.0 ksf
Strength I	2.7 ksf
Extreme Event II	6.0 ksf

Settlement analyses were also performed for the new barrier wall foundations. For the settlement analyses, a maximum footing width of 6.5 feet was assumed. As previously noted, organic silt was encountered adjacent to the existing bridge underlying the embankment fills. Due to immediate settlement of the embankment fill and potential consolidation settlement of the organic silts, the **average Service I Bearing Pressures for the barrier wall foundations should not exceed 1.1 ksf**, as indicated in Table 5.

Table 5 - Maximum Design Average Service I Foundation Pressures for Barrier Wall Spread Footings

Limit State	Maximum Design Average Foundation Pressure
Service I	1.1 ksf

Under this maximum design service load and using a maximum footing with of 6.5 feet, foundation settlements are not anticipated to exceed 1.5" in total settlement. Due to consolidation of the organic silt, it is anticipated that most of this settlement will be long-term settlement and would occur after construction and backfilling of the barrier walls. The potential impact of these anticipated settlements on adjacent utilities supported by the roadway embankment should be considered during barrier wall design.

The foot design should conform with all maximum design foundation pressure listed in Tables 4 and 5.

As previously discussed, no subsurface explorations were performed west of approximately Station 83+48; therefore, subsurface conditions underlying the roadway embankments west of this station are unknown. The settlement calculations assumed that the subsurface conditions encountered in Boring B-2-2A (the westernmost boring) represent conditions underlying the roadway embankment west of the bridge. It should be noted that actual settlements due to barrier wall foundation loading along the western approach embankment may differ from those calculated using the available boring information.

Bearing capacity and settlement calculations are included in Appendix D.

4.3.1 Additional General Recommendations for Spread Footings

Additional general recommendations for spread footings are as follows:

- Footings should have a least lateral dimension of 3 feet or greater.
- Individual footings should be proportioned so that the stress under the footing is as nearly uniform as practical at the service limit state.
- Bottom of footings should be positioned at least 48 inches below lowest adjacent ground surface exposed to freezing.
- Footings should bear on Compacted Granular Fill. If unsuitable material is encountered, it should be removed and replaced with Compacted Granular Fill as discussed in the Construction Recommendations section of this report.

- All below-grade portions of existing structures below a 1.5H:1V line extending downwards from the outer edge of the bottom of new footings should be removed before constructing the new foundations. Footings should bear below a reference line drawn upward and outward on a 1.5H:1V slope from the bottom of any new or existing adjacent utilities.

- Compacted Granular Fill below footings and slabs should be placed within the zone beneath imaginary lines extending 2 feet laterally beyond footings and slabs and down on a 1H:1V slope to the top of suitable bearing material.

Footings will need to be designed for sliding and overturning using the appropriate performance factors. The overturning analyses should indicate that the eccentricity of the resultant of the footing loads should not exceed 1/3 of base width in accordance with Section 10.6.3.3 of the AASHTO LRFD Bridge Design Specifications. Sliding analyses should be performed in accordance with Section 10.6.3.4 of the AASHTO LRFD Bridge Design Specifications. The factored resistance against failure by sliding should be based on a friction factor (tan δ) of 0.70 for cast-in-place concrete on soil (Compacted Granular Fill or suitable bearing native soil). The recommended resistance factor (ϕ_τ) for shear resistance between sand and concrete is 0.80 based on AASHTO LRFD Table 10.5.5.2.2-1.

4.4 Global Slope Stability

As previously mentioned, roadway embankment grades are proposed to be raised by up to approximately 6 inches and reinforced concrete barrier walls are proposed to be constructed on both the north and south sides of the existing embankment. Soft organic soils were found adjacent to the west and southeast side of the bridge abutments. These raises in grade and construction of the barrier walls will increase the vertical loads on the approach embankments. Analyses of the deep-seated (global) static stability of the approach embankments for both the existing and proposed conditions were performed using the slope stability software Slope/W by GeoSlope. The existing and proposed geometries for the embankment used in the analysis was based on those shown for the roadway embankment between Stations 83+23 and 83+85 on the Traffic Subset 90% Submission Design Drawings. Subsurface conditions used in the analyses were based on recent borings B-2-2A and field and laboratory testing. The model geometry, soil properties, and results are shown in Appendix F.

The analysis results indicate that the existing embankment slopes have a factor of safety against deep-seated instability of approximately 1.4 based on the assumed subsurface conditions for the roadway embankment. The analysis indicates that this factor of safety will remain at 1.4 in the proposed final condition. As discussed, the subsurface conditions under the roadway embankment west of the existing borings are unknown; therefore, the actual global stability factors of safety along the western approach embankment may differ from those calculated using the available boring information.

4.5 Lateral Earth Pressures

We recommend the following backfill parameters/assumptions for evaluation of the new barrier walls:

- Level backfill behind the walls

- Wall faces are vertical

- The active earth pressure parameters provided in Table 6 below may be used for the proposed barrier walls

Table 6 – Active Earth Pressure Parameters for Wingwall Backfill

Material	ϕ (deg)	β (deg)	I (deg)	δ (deg)	K_A	γ (pcf)
Existing Fill	30	0	0	20	0.297	125
New Backfill	35	0	0	20	0.245	125

When calculating retaining structure loads, additional lateral pressures due to highway traffic surcharge loads should be applied as required by AASHTO Bridge Design Specifications. For retaining structures, where the calculated pressure behind the structure is less than 250 pounds per square foot (psf), it should be increased to 250 psf to account for stresses created by compaction of fill behind the wall.

If retaining structures are to be designed to resist seismic lateral soil pressures, the seismic force on the back of the wall (pounds per linear foot) should be based on the values presented in Table 7:

Table 7 – Seismic Forces

Material	Δ Force (lb/ft)	
	Yielding (Δ = 0.5in)	Non-Yielding (Δ = 0.0in)
Existing Fill	$3.35H^2$	$7.41H^2$
New Backfill	$2.95H^2$	$6.47H^2$

where H is the height of the wall in feet.

The criteria for yielding walls should be used when the allowable displacements at the top of the wall is at least 0.002H. The resultant seismic force acts at a distance of 0.6H from the bottom of the wall.

Passive lateral earth pressures at the front of the wingwalls should be neglected due to the possibility of scour from adjacent water bodies.

4.6 Relocated Gas Line

Based on the Utilities Drawing Set of the 90% Submission Drawings dated 2/28/2019 and a bridge meeting at the Connecticut Department of Transportation on 1/25/2019, the following utility work is anticipated to be performed.

Along the northern side of the bridge, the overhead utilities are to be relocated further and away from construction on the bridge. The gas line on the south side of the bridge will be relocated and connected to a temporary strong-back system, spanning approximately 50 feet parallel and south of the bridge. The strong-back system will be supported on drilled steel piles located adjacent to the southern wingwalls. After construction, the gas line will be permanently supported on the southern wingwalls. The existing

HPFF line will be temporarily supported using hanger system supported on the northern wingwalls and will not be relocated.

Given the potential for cobbles, and boulders within the terrace deposit and the fill to obstruct driven sheeting and the potential for driven piles to disturb the existing wing wall and abutment foundations given the presence of adjacent soft organic soils, the temporary piles for the gas line should be drilled, not driven. The piles should be HP12x74 sections and installed to a minimum depth of 33 feet below the ground surface. After placement of the piles in the minimum 24-inch diameter drilled hole, the annulus around the piles should be backfilled with grout or concrete with a minimum compressive strength of 4,000 psi. The concrete or grout cover between the piles and adjacent soil should be a minimum of 3 inches. Information on the drilled piles can found in Table 8. Calculations for the drilled pile lateral loading and geotechnical and structural capacity are reported in Appendix E.

Table 8 – Drilled Piles

Parameters	Values
Minimum Concrete Compressive Strength	4,000 psi
Minimum Section Modulus	93.8 in.^{3}
Minimum Embedment Depth	33 ft.
Minimum Borehole Diameter	24 in.
Minimum Concrete or Grout Cover	3 in.

4.7 Geotechnical Seismic Design Considerations

4.6.1 Seismic Site Class and Design Category

Based on the recent subsurface exploration and Table 3.10.3.1-1 in the AASHTO specifications, this site is classified as a Site Class E. In accordance with AASHTO for Site Class E, and data from USGS 2014 AASHTO Seismic Design Maps for a 7% probability of exceedance in 75 years (1,000-year event), and the 2016 Connecticut State Building Code, the design response spectra for the bridge be constructed using the following parameters:

$A_s = 0.16g$ $S_{DS} = 0.418g$ $S_{D1} = 0.210g$

where: A_s is the response spectral acceleration as stated in the ConnDOT Bridge Design Manual
S_{DS} is the design spectral acceleration coefficient at 0.2-second period
S_{D1} is the design spectral acceleration coefficient at 1.0-second period

In accordance with Table 3.10.6-1 of the 2014 AASHTO Guide Specifications for LRFD Bridge Design and based on $0.15 < S_{D1} < 0.30$, the site is located in a Seismic Design Zone of 2.

4.6.2 Liquefaction

Site soils were assessed for liquefaction susceptibility. Based on relative density (SPT N-values), plasticity, grain size distribution, and fines content of soils below groundwater, site soils are judged not susceptible to liquefaction for the AASHTO Seismic Design Event.

4.7 Widening and Raising of Roadway Embankments

Based on the 90% Submission drawings, Section 01.04 – Highway, dated 2/28/2019, the western and eastern approach embankments between Stations 81+50 and 83+60 are proposed to be raised by up to approximately six inches. Near approximately Station 82+00, the southern face of the embankment will be armored with rip rap. Between approximately Stations 83+25 and 83+75, both the southern and northern faces of the embankment behind the wingwalls will be armored with rip rap. We understand that existing slopes steeper than 2H:1V will be armored with rip rap. The new slope protection will be composed of approximately 18 inches of rip rap, 6 inches of granular fill, and a geotextile separating the granular fill from the existing fill. The new slope of this rip rap placed slope is 1.5H:1V. It is our understanding that any new slopes will not exceed a slope of 1.5H:1V. As indicated in Section 6-1.4 of the ConnDOT Geotechnical Engineering Manual, when slopes steeper than 1.5H:1V are considered the slopes are to be evaluated for external stability and internal stability.

The 2016 and 2018 borings and test pits were performed within 26 feet of the center of Bridge 02931. The subsurface conditions under the roadway embankment beyond the area of the site investigated is not known. Therefore, the existing slope external and internal factor of safety is not known.

5.0 CONSTRUCTION RECOMMENDATIONS

5.1 Excavation Requirements

Construction of the proposed new bridge seat and deck and repair and resurface of the existing abutments and wingwalls will require excavation through roadway asphalt and base, miscellaneous fills, alluvial soils, and organic silt. Excavations should be generally feasible using large conventional excavation equipment. However, boulders and former foundations could be encountered in the fill and excavations through these materials may require splitting or hoe-ramming and specialized equipment to facilitate handling and removal.

We recommend that the excavated subgrade be inspected in the field to remove any unsuitable materials encountered at the bearing elevation. The exposed subgrade should then be compacted, followed by the placement and compaction of new granular fills to 95% of the measured maximum dry density.

Where excavation sides are cut back and sloped, they should be in accordance with Occupational Safety and Health Administration (OSHA) Construction Industry Standards.

The presence of utilities within the existing bridge site should be considered when evaluating excavation methodology and excavation support requirements. Utilities that are particularly sensitive to movement should be monitored for horizontal and vertical movement using survey reference points. Also, as previously mentioned certain utilities will need to be temporarily relocated during construction.

5.2 Cobbles and Boulders

Cobbles and boulders were encountered during the exploration program and should be anticipated during installation of temporary utility supports and support of excavation systems. The presence of these materials could impact sheet pile and driven-pile installation if used for the temporary support of excavation, temporary utility supports, and cofferdam systems at the site. Therefore, we recommend the project specifications contain provisions to contend with the anticipated boulders in advance of foundation and earth support installation. One recommendation to address the presence of cobbles and boulders is to use drilled piles. Drilled piles will be able to penetrate the cobbles and boulders by drilling through them.

5.3 Removal of Existing Structures

It is our understanding that only the top portion of the existing abutments are to be removed. Approximately the top 3 feet of the abutments is to be removed to construct a new bridge seat. The remaining portions of the abutment and wingwalls are to be left in place.

5.4 Subgrade Preparation and Compaction

Excavation subgrades should be proof-compacted free of standing water with a minimum of 10 overlapping passes of a large walk-behind vibratory plate or drum compactor. The exposed subgrade will then be compacted, followed by the placement and compaction of new granular fills to 95% of the measured maximum dry density. Where footing subgrades are at or near the groundwater level, static compaction may be recommended by the Geotechnical Engineer in lieu of vibratory compaction. Loose or soft zones observed during proof-compaction should be over excavated to firm and stable ground and replaced with Compacted Granular Fill with appropriate consideration to prevent fine particle migration. We recommend that the final excavation to the footing subgrade in soil be made using a smooth-bladed excavator bucket, to avoid disturbing or loosening the soil.

Foundation subgrades should be free of debris and deleterious materials, be protected from disturbance, and kept free of standing water. Fill should not be placed over frozen soil and subgrades should be protected against frost both during and after construction. Disturbance due to frost, inclement weather, laborer traffic, equipment, and other means could be reduced by maintaining excavation subgrades 12-inches above final subgrade elevations until just before final excavation and footing construction. If bearing soils are disturbed at final subgrade level, they should be excavated and replaced with Compacted Granular Fill.

5.5 Backfill and Compaction

Embankment and backfill placed behind wingwalls and abutments and beneath footings should be in accordance with Section M.02 of the 2016 Connecticut Department of Transportation Standard Specifications for Roads, Bridges, and Incidental Construction, Form 817.

5.5.1 Compacted Granular Fill

Compacted Granular Fill should be placed in loose layers not more than 8-inches loose thickness and compacted to at least 95 percent of the maximum dry density as determined by the AASHTO T 180, Method D where self-propelled compaction equipment can be used. In confined areas, place only 6-inch loose layers and compact with manually operated, powered vibratory compactor acceptable to the geotechnical engineer. Crushed Stone, for any required depth of more than 12 inches, should be compacted to an unyielding surface and wrapped in a non-woven filter fabric.

5.5.2 Pervious Structure Backfill

Pervious Structure Backfill material should be placed in thicknesses not exceeding 6-inches deep after compaction and compacted to at least 100 percent of the maximum dry density at optimum moisture content as determined by the AASHTO T 180, Method D where self-propelled compaction equipment can be used. In confined areas, place only 6-inch loose layers and compact with manually operated, powered vibratory compactor acceptable to the geotechnical engineer.

Where weep holes are installed through walls, bagged stone shall be placed around the inlet end of each weep hole, to prevent movement of the pervious material into the weep hole in accordance with Section 2.16 of the 2016 Connecticut Department of Transportation Standard Specifications for Roads, Bridges, and Incidental Construction Form 817.

5.5.3 Compaction Adjacent to Permanent Walls and Abutments

Extra care should be used when compacting adjacent to walls and the existing abutments. Only hand-operated rollers or plate compactors weighing not more than 250 pounds should be used within a lateral distance of 5 feet of the back of the abutments and walls less than 15 feet high and within 10 feet of walls more than 15 feet high, unless the wall has been designed for higher loading.

5.6 Cofferdam and Dewatering

The excavation for the repair and resurfacing of the existing abutments and wingwalls will extend below groundwater table and surface water levels. Temporary cofferdams will be required to manage and control surface water and groundwater during excavations for the construction for the new bridge seat, repair and resurfacing of the abutment and wingwalls to approximately 1 foot below the mudline, and installation of the proposed 4-foot diameter bypass pipe within the construction area beneath the existing bridge. Cofferdams should not consist of driven sheet piling. Boulders and cobbles were encountered beneath the western bridge abutment. Disturbing the cobbles and boulders beneath the existing abutment by driving sheeting could impact the stability of the existing abutments and wingwalls. Cobbles and boulders were also frequently encountered within the terrace deposits and may present obstacles and cause shortstopping of sheeting if driven into the fill and terrace deposits.

Water-inflated temporary cofferdams or sand bags with impermeable lining may also be used to control surface water flow into the work area. Cofferdams that encroach into water channels should be hydraulically analyzed in accordance with the ConnDOT Bridge Design Manual.

5.7 Construction Dewatering and Temporary Excavation Support

Work within the construction area will extend below the groundwater table and adjacent water elevations. As previously indicated, a temporary cofferdam and support of excavation system will be required for the proposed work on the abutments and wing walls. Options for temporary excavation support systems include drilled-in soldier pile and lagging. Sandbags with plastic seal liners are proposed to be used for the temporary cofferdam.

The Contractor will be required to manage and control the water during foundation excavation, including seepage and hydraulic gradients that could result in instability of the subgrade (as well as to control surface water from entering excavations). The Contractor should be responsible for selecting the dewatering methods based on their proposed methods and equipment used for excavation and excavation support. Dewatering efforts must satisfy requirements of local, state, and federal environmental and conservation authorities. Temporary earth support and dewatering systems should be selected by the Contractor and designed by a Professional Engineer registered in the State of Connecticut and retained by the Contractor. The earth support and dewatering designs are integral with one another and should be submitted as a single submittal for review. Where excavation sides are cut back and sloped, they should be in accordance with OSHA Construction Industry Standards.

We recommend that temporary control measures be implemented to reduce the amount of surface water (from rainfall runoff) that may enter and pond in the excavations. Temporary measures should include, but not be limited to, surface grading and construction of drainage ditches to divert and/or reduce the amount of surface water flowing over exposed subgrades during construction. Dewatering methods must satisfy requirements of local, state, and federal environmental and conservation authorities.

5.8 Reuse of Excavated Materials

Based on the soil descriptions provided on the recent boring logs, we expect that some of the more granular portions of the existing on-site soils could meet the gradation requirements for backfill in areas not requiring a free-draining material, provided that weather conditions are satisfactory, the moisture content can be controlled, and the material meets the backfill specifications and can be compacted to the required density. Re-use of on-site soils should be at the acceptance of the geotechnical engineer prior to placement. Excavated soil that cannot be reused on-site or on other portions of the project should be removed from the site in accordance with applicable local, state, and federal regulations.

5.9 Protection of Existing Structures

The presence of utilities within the existing bridge site should be considered when evaluating excavation methodology and excavation support requirements. Utilities that are particularly sensitive to movement should be monitored for horizontal and vertical movement using survey reference points. Utility owners should be consulted to establish threshold limits for movement and vibrations. Also, certain utilities will need to be temporarily relocated during construction. The existing abutments and wingwalls should also be monitored for both horizontal and vertical movement during construction.

We recommend vibration monitoring of existing utilities and structures during driving of the earth support system and of the piles for temporary support of the gas line. The temporary earth support walls and portions of bridge to remain active should also be monitored during construction for vibration and vertical and lateral movement using survey reference points.

Finally, consideration should be made to perform preconstruction surveys to document conditions of existing nearby structures and utilities that could be impacted by construction-related activities, particularly demolition, pile driving, and other vibration-producing activity.

5.10 Construction Monitoring

It is recommended that a geotechnical engineer or technician qualified by training and experience be present during construction to monitor the work. Construction observation and testing services may include verification of subgrade soils, observation of proof rolling operations and placement of fill, observation of installation of the proposed foundation systems and temporary support of excavation systems, performance of field density tests, and in general, observe compliance with recommendations in this report and the contract documents. This construction oversight is considered an important part of obtaining quality site improvements.

6.0 CLOSING REMARKS

This report has been prepared for specific application to the proposed superstructure replacement planned for Bridge 02931, US Route 2A over Poquentanuck Cove, as understood by Geocomp at this time. If proposed bridge loading conditions become available after the submission of this report, please contact us and we will review and update our recommendations accordingly. Our recommendations are based in part upon data obtained from the referenced subsurface exploration program. The nature and extent of variations between explorations will not become evident until construction. If significant variations then appear, it may be necessary to reevaluate the recommendations of this report.

FIGURES

NO.	DATE	REVISIONS	INIT.
0	6/15/17	ISSUED	CG

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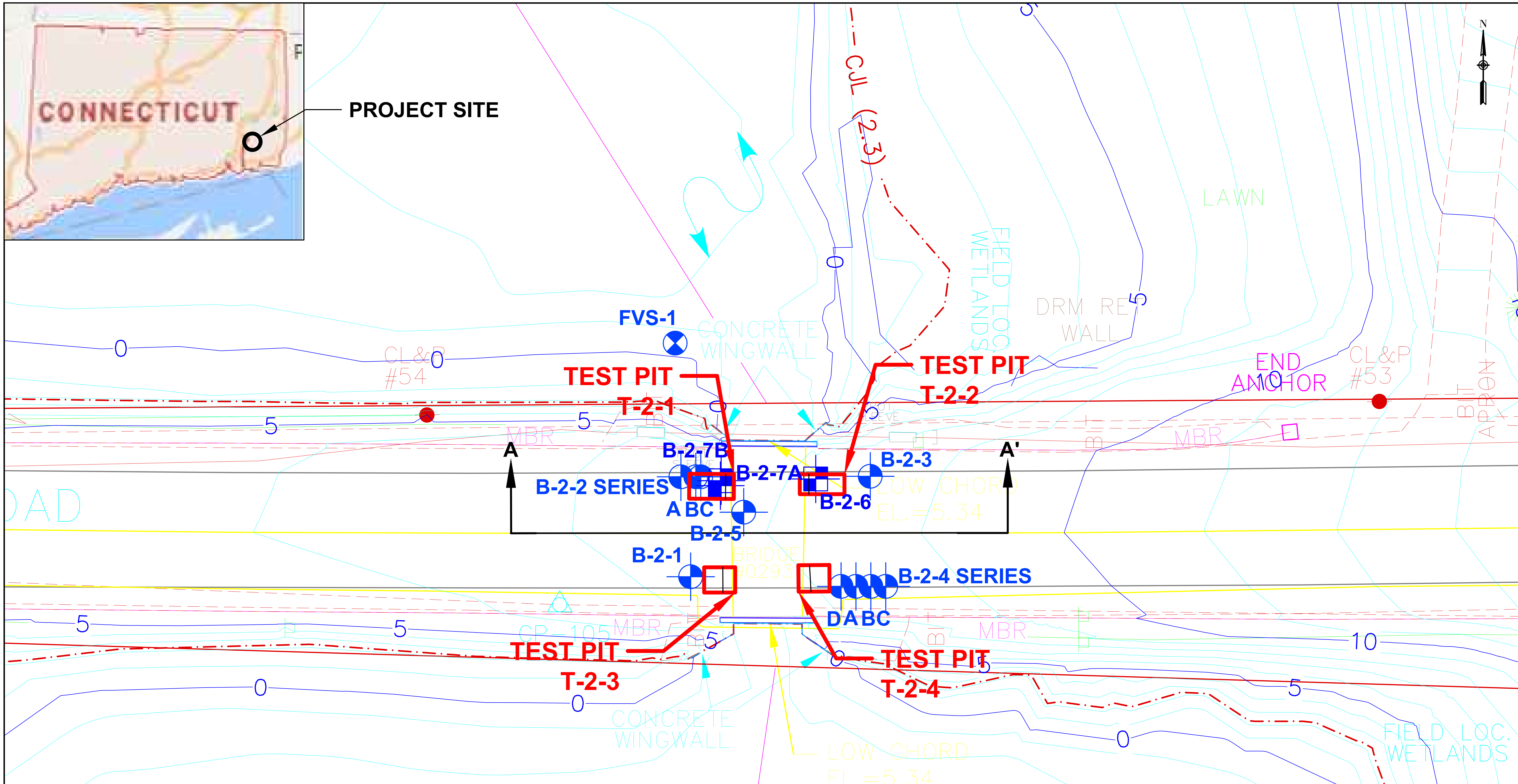
SITE LOCUS PLAN

REPLACEMENT OF BRIDGE NO. 02931
US ROUTE 2A OVER POQUETANUCK COVE
PRESTON, CONNECTICUT

PROJECT NUMBER:	220693	
DATE:	06-15-2017	
DESIGNED CG	DRAWN CG	CHECKED MC
FIGURE	1	



NOTES:

1. THE PROPOSE BRIDGE PROFILE TO DETERMINE LOCATION TO DRILL BORINGS WAS BASED ON AN ELECTRONIC FILE NAMED "PD 30% Structure Plans_CT_PRE_0113-0108.pdf".
2. EXISTING TOPOGRAPHIC CONDITION SURVEY IS BASED ON AN ELECTRONIC FILE NAMED "SV_D2_170_3250F_PRESTON_CT 2A OVER POQUETANUCK COVE BR02931 AND DICKERMANS BROOK BR02932_GRN.dgn" DATED 2/16/2016, PROVIDED BY CME ENGINEERING, INC.
3. 2018 TEST BORINGS PERFORMED BEHIND BRIDGE ABUTMENTS THROUGH FOUNDATION ELEMENTS.

GRAPHIC SCALE

10 0 5 10 20 40

(IN FEET)
1 inch = 20 ft.

BORING LOCATION PLAN
LEGEND

- 2018 TEST PITS
- 2018 TEST BORINGS
- PREVIOUS TEST BORINGS

NO.	DATE	DESCRIPTION

DESIGNED BY: MC
DRAWN BY: RL
CHECKED BY: MC

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BRIDGE NO. 02931
SUBSURFACE
INVESTIGATION PLAN

BRIDGE NO. 02931 IN
PRESTON, CONNECTICUT

PRESTON, CONNECTICUT

JOB #	220693
DATE:	1/16/2019
SCALE:	AS SHOWN
SHEET	2

LEGEND

- B-1-1 — BORING ID
- 57 — SPT-N VALUE
- ∇ — APPROXIMATE GROUNDWATER LEVEL DURING DRILLING
- C1 — ROCK CORE NUMBER
- REC=70% — ROCK CORE RECOVERY
- RQD=27% — ROCK QUALITY DESIGNATION
- B@21FT — BOTTOM OF BORING

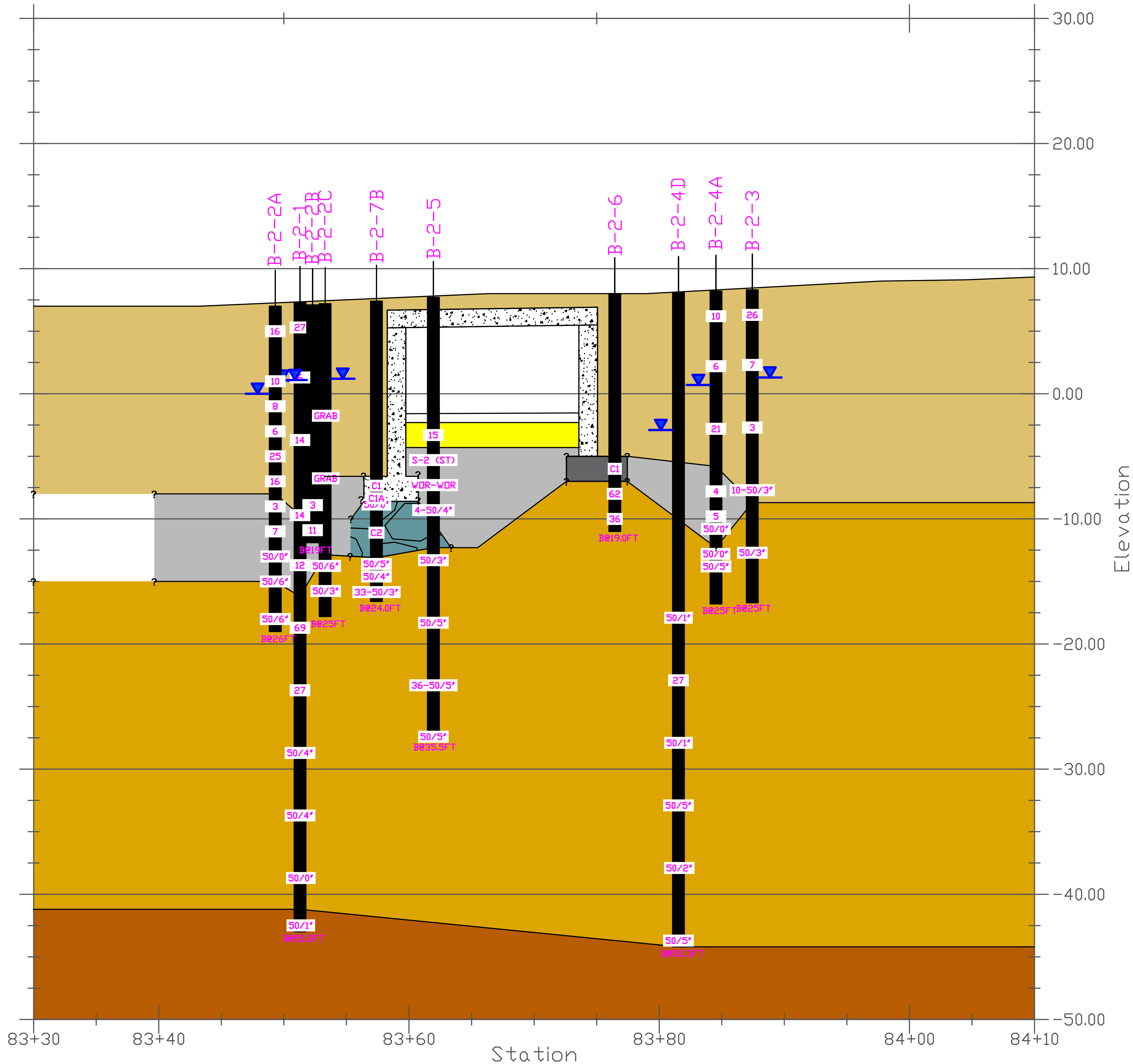
MATERIAL LEGEND

- FILL MATERIAL
- ALLUVIAL DEPOSIT
- ORGANIC SILT
- TERRACE DEPOSIT
- GLACIAL TILL
- CONCRETE
- BOULDERS
- GRANITE

NOTES:

1. STRATIFICATION LINES REPRESENT AN APPROXIMATE BOUNDARY BETWEEN SOIL TYPES. ACTUAL TRANSITIONS MAY VARY FROM THOSE SHOWN. REFER TO BORING LOGS FOR DETAILS. BORINGS B-2-4B, B-2-4C AND B-2-7A ARE NOT SHOWN ON THE CROSS SECTION VIEW FOR GRAPHICAL PURPOSES.
2. B-2-1 THROUGH B-2-5 BORINGS WERE DRILLED BY ALLSTATE DRILLING COMPANY FROM 04/24/2017 TO 05/17/2017.
3. B-2-6 THROUGH B-2-7 BORINGS WERE DRILLED BY NEW ENGLAND BORING CONTRACTRS FROM 12/12/2018 TO 12/14/2018. BORINGS WERE PERFORMED WITHIN TEST PITS OUTLINE. TEST PITS WERE PERFORMED BY LAYDON INDUSTRIES FROM 10/3/2018 TO 10/5/2018.
4. BORING LOCATIONS AND ELEVATIONS ARE APPROXIMATE.
5. SUBSURFACE PROFILE IS TAKEN ALONG CROSS SECTION A-A' AS SHOWN ON THE BORING LOCATION PLAN. EXISTING GROUND SURFACE IS APPROXIMATE BASED ON NAVD88. ELEVATIONS FOR B-2 SERIES BORINGS ARE BASED ON AN ELECTRONIC FILE NAMED "SV_D2_170_3250F_PRESTON_CT 2A OVER POQUETANUCK COVE BR02931 AND DICKERMANS BROOK BR02932_GRN.dgn" DATED 2/16/2016, PROVIDED BY CME ENGINEERING, INC.
6. BRIDGE STRUCTURE IS SHOWN IN EXISTING CONDITION. TJE EXISTING BRIDGE STRUCTURE PROFILE WAS BASED ON INFORMATION COLLECTED FROM THE 2018 TEST PITS AND BORINGS.
7. B-2-4 SERIES WHERE ORGANICS WERE ENCOUNTERED WERE PERFORMED ON SOUTHERN SIDE OF BRIDGE. ORGANICS WERE NOT ENCOUNTERED ON NORTHERN SIDE OF BRIDGE.
8. WINGWALLS NOT SHOWN FOR CLARITY

CROSS SECTION A-A'



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NO. | DATE | DESCRIPTION

DESIGNED BY: NB
DRAWN BY: MTH
CHECKED BY: MC

SUBSURFACE PROFILE

BRIDGE NO. 02931 IN PRESTON, CONNECTICUT
ROUTE 2A OVER POQUETANUCK COVE

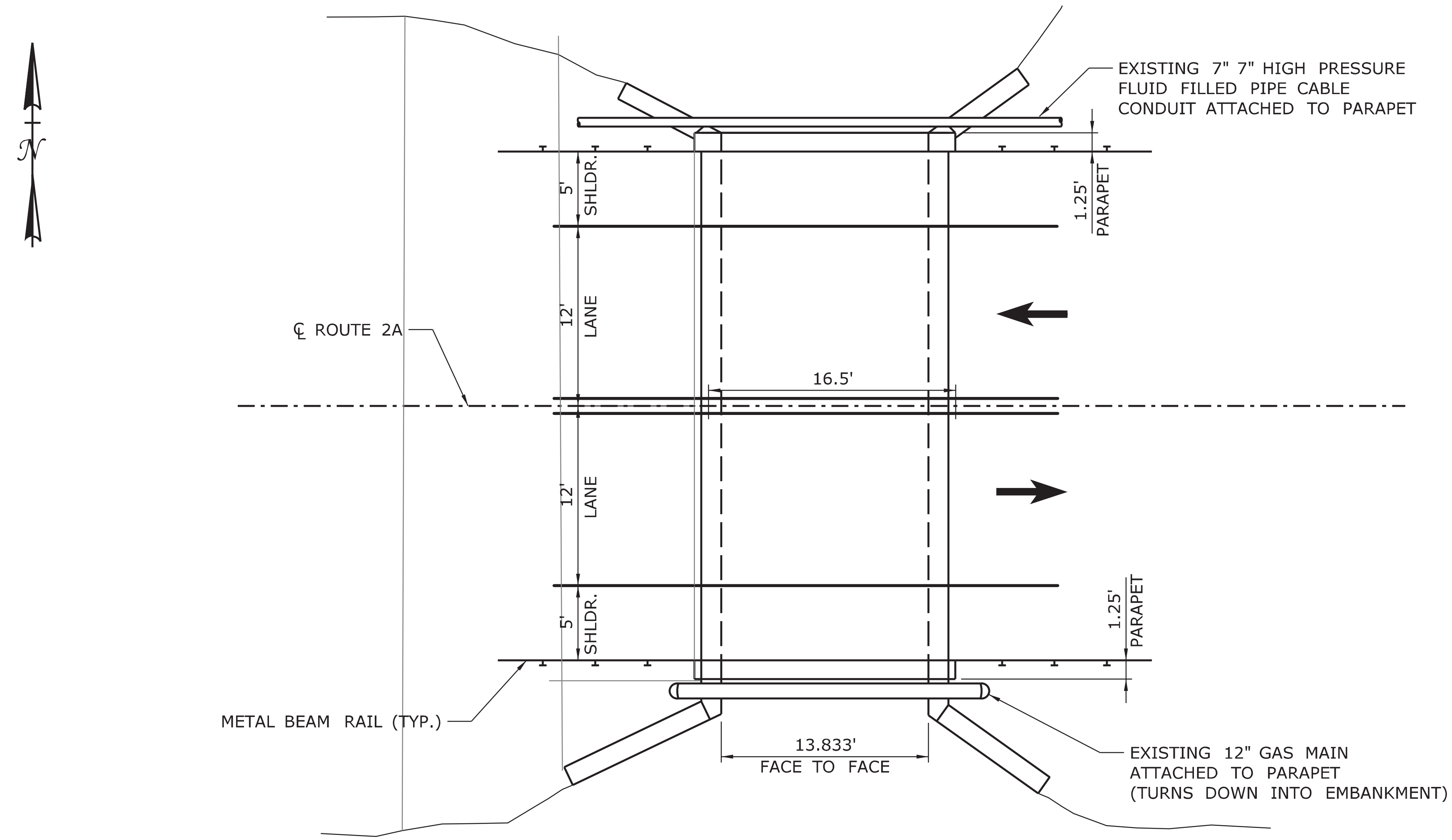
PRESTON, CONNECTICUT

JOB #: 220693
DATE: 1/16/2019
SCALE: NTS
SHEET

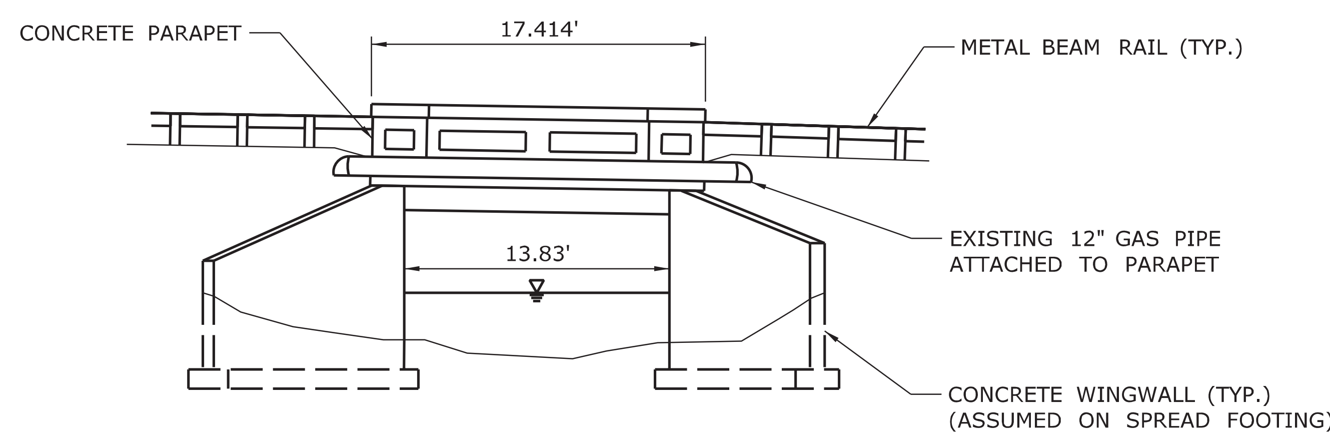
3

Appendix A

Existing and Proposed Bridge Drawings



PLAN



ELEVATION

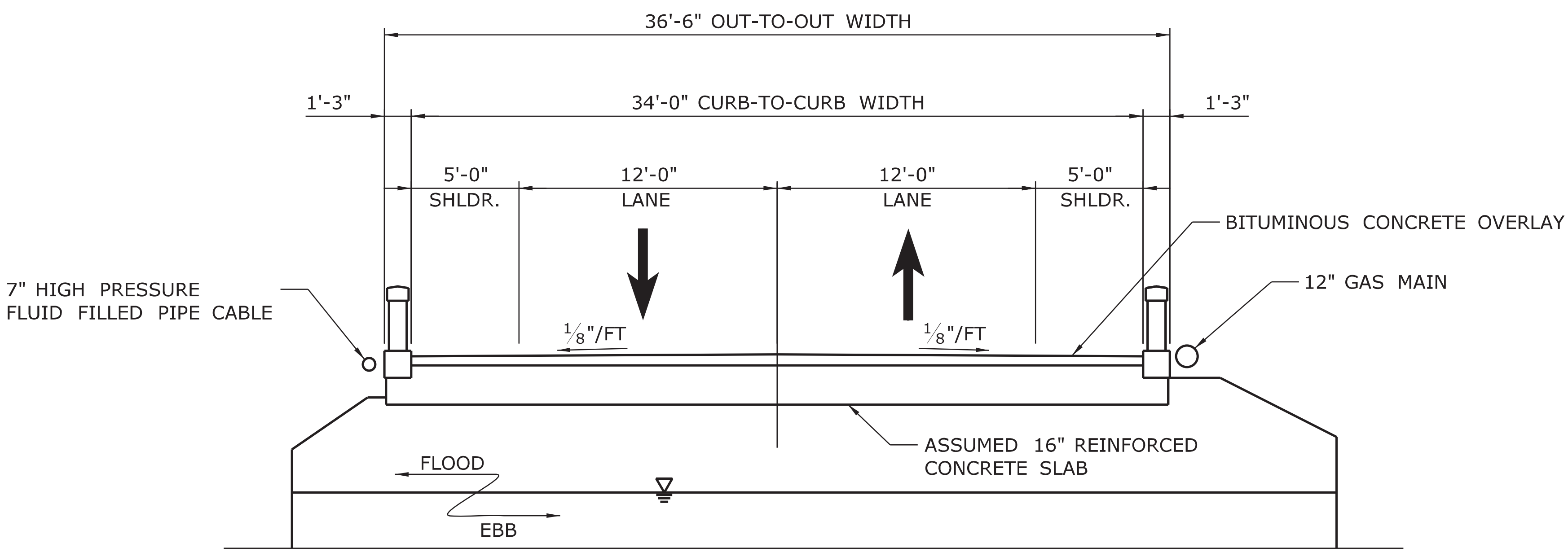
STATE OF CONNECTICUT
DEPARTMENT OF TRANSPORTATION

CME Associates, Inc.
CONSULTING ENGINEERS & ENVIRONMENTAL PLANNERS
333 E. RIVER DR., SUITE 400
EAST HARTFORD, CT 06108

CITY/TOWN:	BRIDGE NO.:	SCALE:
PRESTON	02931	1"=10'

DRAWING TITLE:
EXISTING PLAN AND ELEVATION

STATE PROJECT NO.: 113-107
DATE: 09/13/2013
SHEET NO.: 1 OF 2



EXISTING SECTION

STATE OF CONNECTICUT DEPARTMENT OF TRANSPORTATION			CME Associates, Inc. CONSULTING ENGINEERS & ENVIRONMENTAL PLANNERS 333 E. RIVER DR., SUITE 400 EAST HARTFORD, CT 06108	DRAWING TITLE: EXISTING SECTION
CITY/TOWN: PRESTON	BRIDGE NO.: 02931	SCALE: $\frac{1}{8}$" = 1'		

STATE PROJECT NO.:	113-107
DATE:	09/13/2013
SHEET NO.:	2 OF 2

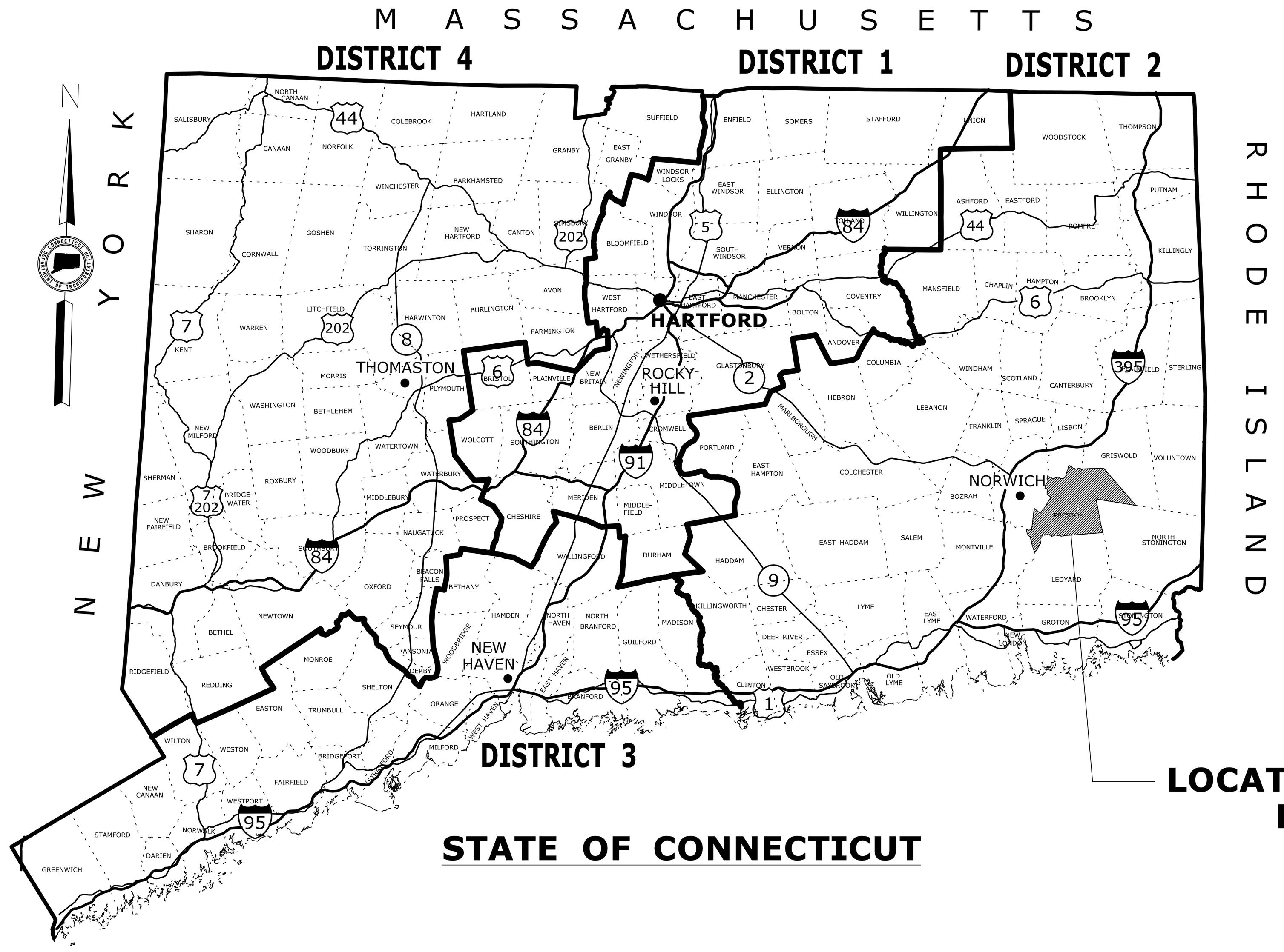
CONNECTICUT DEPARTMENT OF TRANSPORTATION

Plans For

REHABILITATION OF MULTIPLE BRIDGES ROUTE 2A

Town of

PRESTON



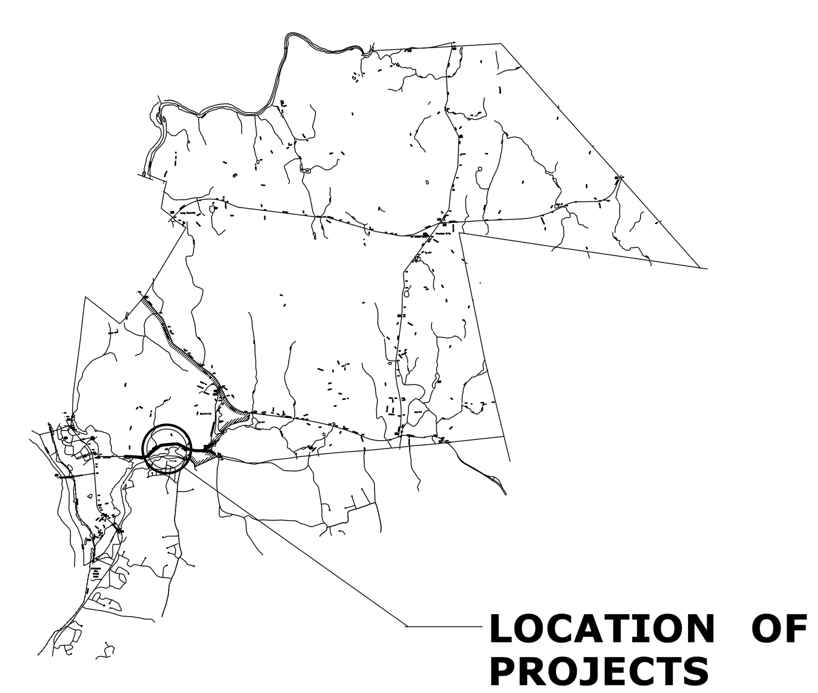
STATE OF CONNECTICUT

ROAD	MAINTENANCE RESPONSIBILITY	LENGTH
Bridge No. 02931 Route 2A (113-107)	STATE	500 FEET
Bridge No. 02932 Route 2A (113-108)	STATE	FEET

F.A.P. #	MAINTENANCE RESPONSIBILITY	PROJECT #
0032(199)	STATE	0113-0107
0032(200)	STATE	0113-0108

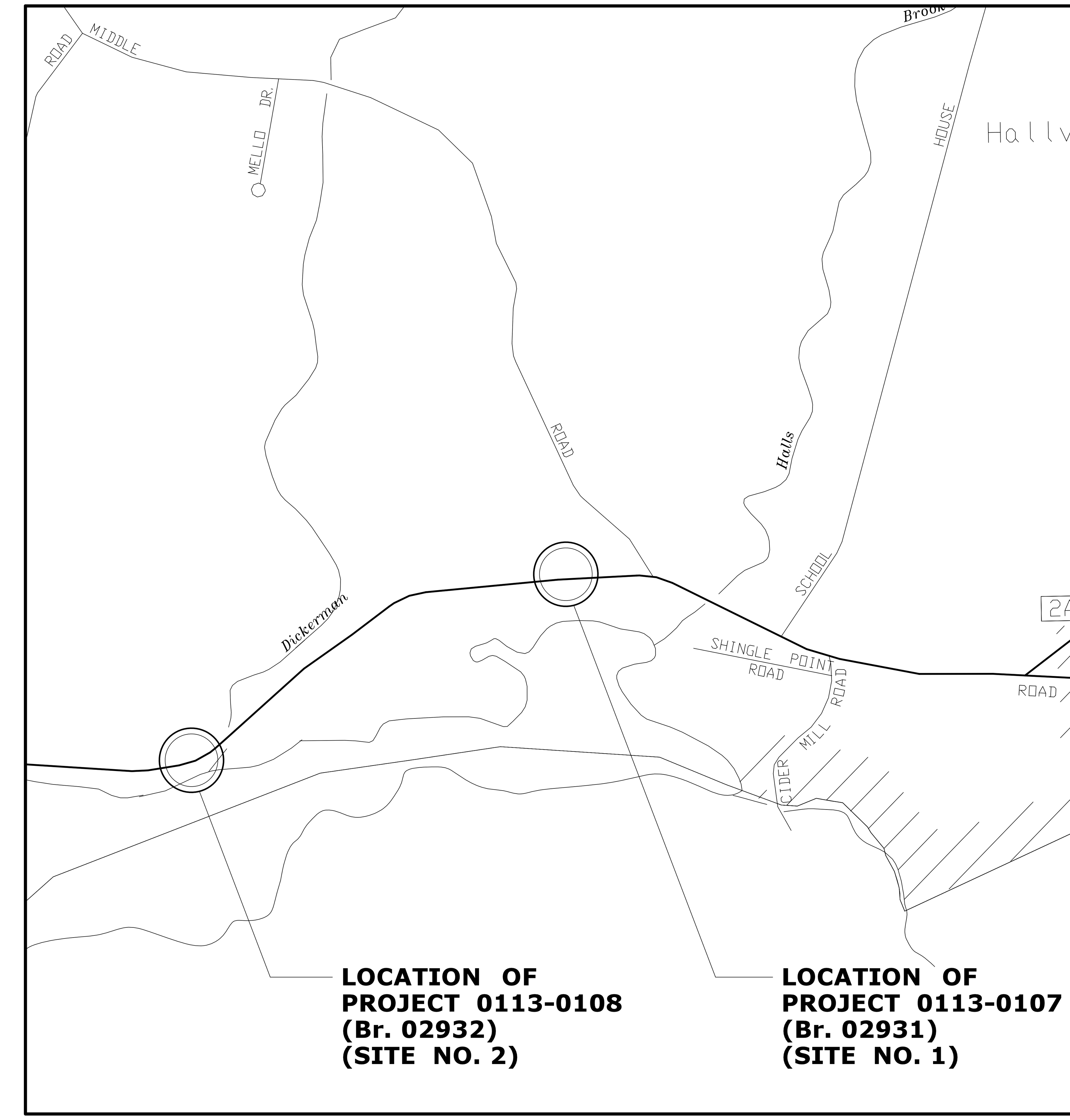
GENERAL NOTES:

1. FEDERAL AID PROJECT NO.
2. CONSTRUCTION SPECIFICATIONS:
   Connecticut Department of Transportation, Standard Specifications for Roads, Bridges and Incidental Construction, Form 817, dated 2016; and Special Provisions
3. 400 FOOT GRID BASED ON CONNECTICUT COORDINATE SYSTEM SYSTEM N.A.D. 1983
4. VERTICAL DATUM BASED ON NAVD 1988
5. PROPOSED DESIGN SPEED: 35 MPH
6. HIGHWAY CLASSIFICATION: URBAN PRINCIPAL ARTERIAL - OTHER
7. AVERAGE DAILY TRAFFIC: 13,300 VPD (2012)



TOWN LOCATION MAP

NTS



LOCATION PLAN

1"=500'

LIST OF VOLUMES

VOLUME NO.	SUBSET TITLE	*VOLUME SHEET COUNT
01	PROJECT 113-107 REHABILITATION OF BRIDGE NO. 02931 ROUTE 2A OVER POQUETANUCK COVE	X
02	PROJECT 113-108 REHABILITATION OF BRIDGE NO. 02932 ROUTE 2A OVER DICKERMANS (HALSEY) BROOK	X

*THE INITIAL SUBSET SHEET COUNT DOES NOT INCLUDE ADDENDUMS AND CHANGE ORDERS

LIST OF DRAWINGS SUBSET 01.01 - COVER SHEET

DRAWING TITLE	DRAWING NO.
TITLE SHEET	COV-01

FINAL PLANS FOR REVIEW

Plans For

REHABILITATION OF MULTIPLE BRIDGES ROUTE 2A

Town OF

PRESTON

STATE PROJECT NO.

0113-0107
0113-0108

DRAWING NO. COV-01

SHEET NO.

REV. No.	SHEET No.	DATE mm/dd/yy	NEW	REV.	DEL.	DESCRIPTION	BY	REV. No.	SHEET No.	DATE mm/dd/yy	NEW	REV.	DEL.	DESCRIPTION	BY	REV. No.	SHEET No.	DATE mm/dd/yy	NEW	REV.	DEL.	DESCRIPTION	BY

REV.	DATE	REVISION DESCRIPTION	SHEET NO.

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Plotted Date: 10/7/2011

DESIGNER/DRAFTER:

CHECKED BY:

STATE OF CONNECTICUT
DEPARTMENT OF TRANSPORTATION

Filename: ...\New_Revision_Sheet.dgn

SIGNATURE BLOCK:

OFFICE OF ENGINEERING

PROJECT TITLE:

REHABILITATION OF
MULTIPLE BRIDGES
ROUTE 2A

TOWN:

PRESTON

DRAWING TITLE:

LIST OF REVISIONS

PROJECT NO. 113-107
113-108

DRAWING NO. **REV-1**

SHEET NO.

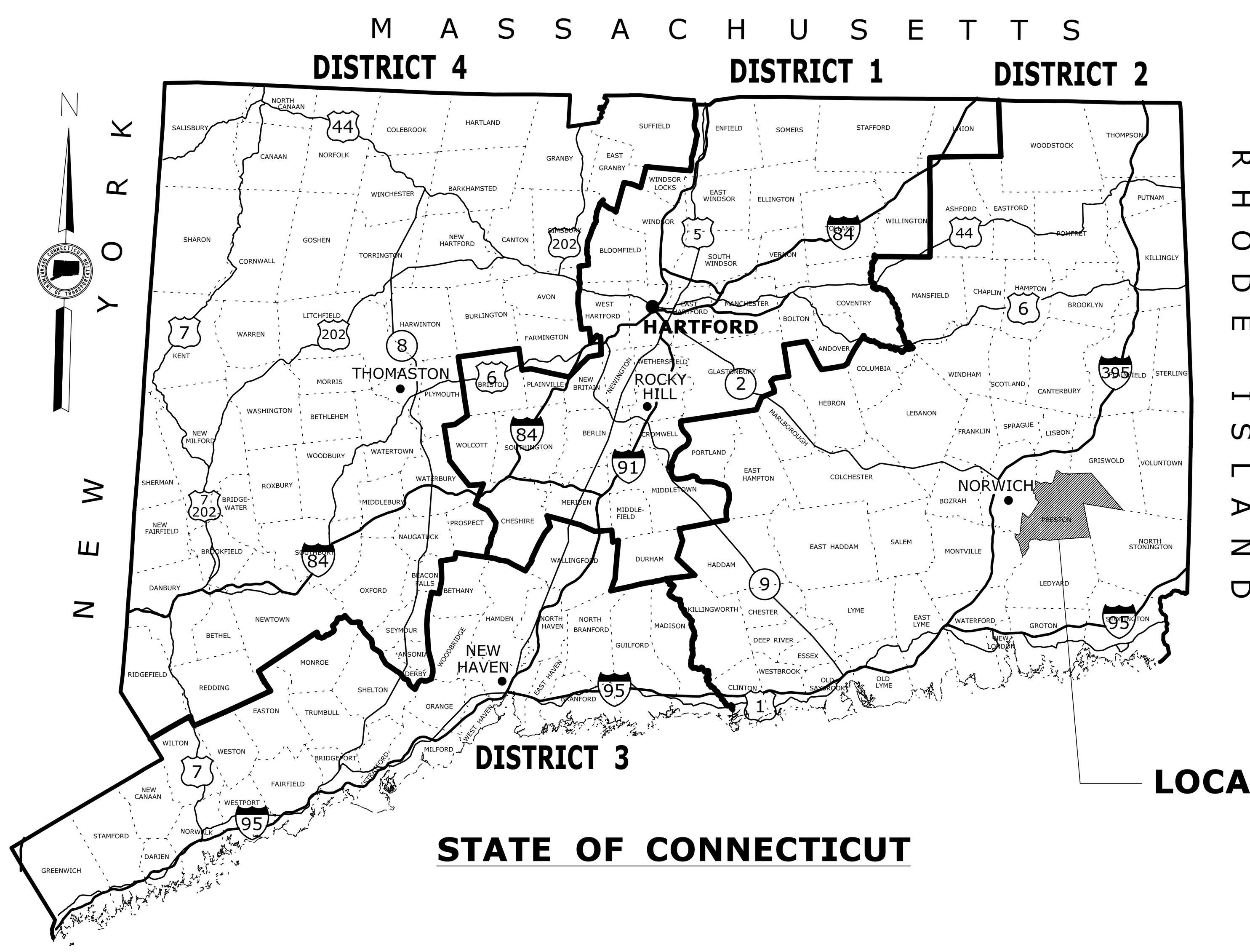
CONNECTICUT DEPARTMENT OF TRANSPORTATION

Plans For

REHABILITATION OF BRIDGE NO. 02931 ROUTE 2A OVER POQUETANUCK COVE

Town of

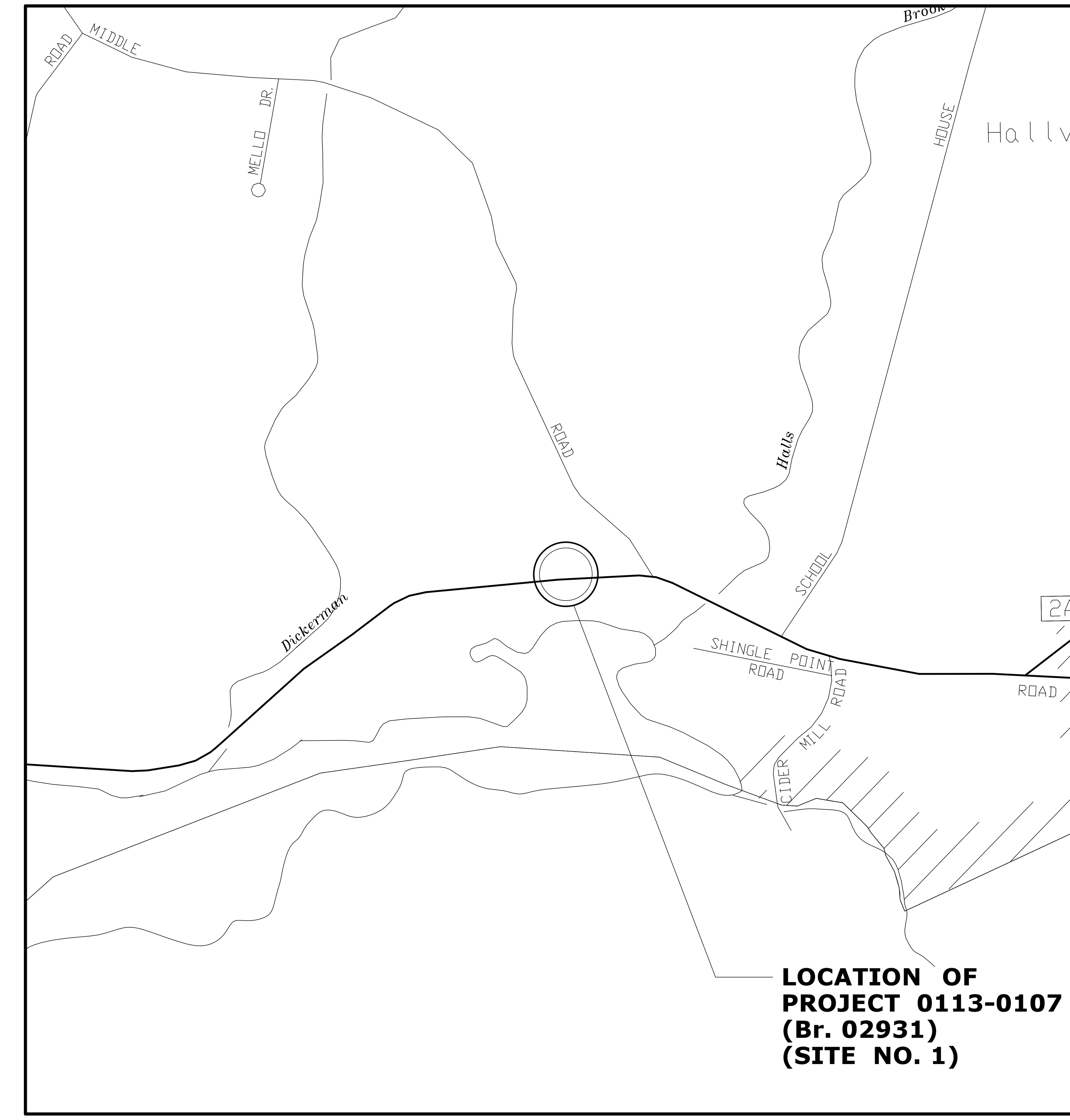
PRESTON



STATE OF CONNECTICUT

ROAD	MAINTENANCE RESPONSIBILITY	LENGTH
Bridge No. 02931		
Route 2A (113-107)	STATE	500 FEET

F.A.P. #	MAINTENANCE RESPONSIBILITY	PROJECT #
0032(199)	STATE	0113-0107



LOCATION PLAN

1"=500'

GENERAL NOTES:

1. FEDERAL AID PROJECT NO.
2. CONSTRUCTION SPECIFICATIONS:
   Connecticut Department of Transportation, Standard Specifications for Roads, Bridges and Incidental Construction, Form 817, dated 2016; and Special Provisions
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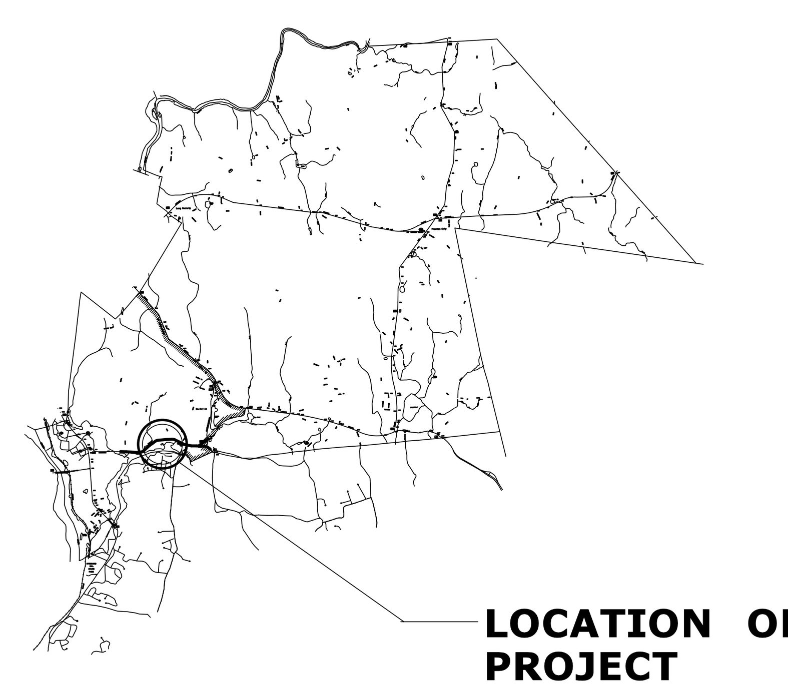
4. VERTICAL DATUM BASED ON NAVD 1988
5. PROPOSED DESIGN SPEED: 35 MPH
6. HIGHWAY CLASSIFICATION: URBAN PRINCIPAL ARTERIAL - OTHER
7. AVERAGE DAILY TRAFFIC: 13,300 VPD (2012)

DISCLAIMER

IT IS THE RESPONSIBILITY OF EACH BIDDER AND ALL OTHER INTERESTED PARTIES TO OBTAIN ALL BIDDING RELATED INFORMATION AND DOCUMENTS FROM OFFICIAL SOURCES WITHIN THE DEPARTMENT.

PERSONS AND/OR ENTITIES WHICH REPRODUCE AND/OR MAKE SUCH INFORMATION AVAILABLE BY ANY MEANS ARE NOT AUTHORIZED BY THE DEPARTMENT TO DO SO AND MAY BE LIABLE FOR CLAIMS RESULTING FROM THE DISSEMINATION OF UNOFFICIAL, INCOMPLETE AND/OR INACCURATE INFORMATION.



TOWN LOCATION MAP

NTS

VOLUME 1
LIST OF SUBSETS

SUBSET NO.	SUBSET TITLE	*SUBSET SHEET COUNT
01.01	COVER	#
01.02	REVISIONS	#
01.03	GENERAL	#
01.04	HIGHWAYS	#
01.05	STRUCTURE	#
01.06	TRAFFIC	#
01.07	UTILITIES	

*THE INITIAL SUBSET SHEET COUNT DOES NOT INCLUDE ADDENDUMS AND CHANGE ORDERS

LIST OF DRAWINGS
SUBSET 01.03 - GENERAL

DRAWING TITLE	DRAWING NO.
TITLE SHEET	G-01
DETAILED ESTIMATE SHEET	EST-01
DETAILED ESTIMATE SHEET	EST-02

STANDARD CONVENTIONS

North Arrow W/No. Coor.
Edge Of Road
Concrete Pavement
Dirt Road
B.C.L.C.
Granite Curb
Guide Rail
Concrete Median Barrier
Bit. Walk
Conc. Sidewalk
Railroad Tracks
Grid Arrow
Limit Of Marsh
Stone Wall
Ledge Outcrop
Inland Wetland Limits
STATE LINE
Power Line
Swamp
Building
Transmission Tower
Chain Link Fence
Rustic Fence
Pipe Fence
Board Fence
Property Line
Lot Line
Easement Line
Water Edge
Stream
Ditch
TOWN LINE
Highway Line
Street Line
Riprap
Hedge Row
Tree Line
Shrub
Evergreen Tree
Deciduous Tree
Retaining Wall

FINAL DESIGN REVIEW

Plans For

REHABILITATION OF BRIDGE NO. 02931 ROUTE 2A OVER POQUETANUCK COVE

Town OF
PRESTON

STATE PROJECT NO.
0113-0107

DRAWING NO.
G-01

SHEET NO.

EARTHWORK

ITEM NUMBER	0202000 P	0202100 P	0203000 P
ITEM	EARTH EXCAVATION	ROCK EXCAVATION	STRUCTURE EXCAVATION-EARTH (COMPLETE)
UNIT	C.Y.	C.Y.	C.Y.
RTE 2A SITE 1	427	39	330
SUBTOTAL	300	30	
SHRINKAGE -10%	-30		
ROCK SWELL	12		
UNSUITABLE MATERIAL -10%	-30		
FILL REQUIRED	10		
SURPLUS	242		
BORROW			
BORROW WITH 10% SHRINKAGE			
SUBTOTAL	290	30	
UNASSIGNED	10	-	
TOTAL	300	30	

ROADWAY

ITEM NUMBER	ITEM	UNIT	ROUTE 2A	SUBTOTAL	UNASSIGNED	TOTAL
0201001	CLEARING AND GRUBBING	L.S.	LS			
0202529 P	CUT BITUMINOUS CONCRETE PAVEMENT	L.F.	600			
0209001 P	FORMATION OF SUBGRADE	S.Y.	750			
0212000 P	SUBBASE	C.Y.	250			
0213100 P	GRANULAR FILL	C.Y.	18			
0219001A P	SEDIMENTATION CONTROL SYSTEM	L.F.	1000			
0305000 P	PROCESSED AGGREGATE	TON	80			
0404101A P	BITUMINOUS CONCRETE PATCHING - PARTIAL DEPTH	S.Y.	275			
0406170 P	HMA S1	TON	175			
0406171 P	HMA S0.5	TON	310			
0406236 P	MATERIAL FOR TACK COAT	GAL.	200			
0406275A P	FINE MILLING OF BITUMINOUS CONCRETE (0" TO 4")	S.Y.	1150			
0406999A P	ASPHALT ADJUSTMENT COST	EST.	6000			
0703012 P	MODIFIED RIPRAP	C.Y.	50			
0755009 P	GEOTEXTILE	S.Y.	100			
0910170 P	METAL BEAM RAIL (TYPE R-B 350)	L.F.	100			
0910300 P	METAL BEAM RAIL (R-B MASH)	L.F.	700			
0910323 P	METAL BEAM RAIL SPAN SECTION (TYPE III)	EA.	1			
0911924 P	R-B END ANCHORAGE - TYPE II	EA.	3			
0912503 P	REMOVE METAL BEAM RAIL	L.F.	950			
0922501 P	BITUMINOUS CONCRETE DRIVEWAY	S.Y.	50			
0939001 P	SWEEPING FOR DUST CONTROL	HR.	10			
0942001 P	CALCIUM CHLORIDE FOR DUST CONTROL	TON	5			
0943001 P	WATER FOR DUST CONTROL	M GAL.	140			
0944000 P	FURNISHING AND PLACING TOPSOIL	S.Y.	690			
0950005 P	TURF ESTABLISHMENT	S.Y.	310			
0950202A P	SHORELINE GRASS ESTABLISHMENT	S.Y.	700			
0974106A P	TIMBER SUPPORT MATS	LS	1			
1803300 P	IMPACT ATTENUATION SYSTEM (TANGENTIAL)	EA.	1			

TRAFFIC

ITEM NUMBER	ITEM	UNIT	RTE 2A SITE 1	SUBTOTAL	UNASSIGNED	TOTAL
0822001	TEMPORARY PRECAST CONCRETE BARRIER CURB	L.F.	380			
0822002 P	RELOCATED TEMPORARY PRECAST CONCRETE BARRIER CURB	L.F.	380			
0969062A P	CONSTRUCTION FIELD OFFICE, MEDIUM	MO.	12			
0970006 P	TRAFFICPERSON (MUNICIPAL POLICE OFFICER)	HR.	47520			
0970007 P	TRAFFICPERSON (UNIFORMED FLAGGER)	HR.	1268			
0971001A P	MAINTENANCE AND PROTECTION OF TRAFFIC (4%)	L.S.	LS			
0975004 P	MOBILIZATION AND PROJECT CLOSEOUT (7%)	L.S.	LS			
0976002 P	BARRICADE WARNING LIGHTS - HIGH INTENSITY	DAY	1500			
0978002 P	TRAFFIC DRUM	EA.	25			
0979003 P	CONSTRUCTION BARRICADE TYPE III	EA.	6			
0980001 P	CONSTRUCTION STAKING (1%)	L.S.	LS			
0981100 P	42" TRAFFIC CONE	EA.	25			
1020003A P	TEMPORARY ILLUMINATION UNIT	EA.	2			
1118051A P	TEMPORARY SYGNALIZATION (SITE NO.1)	L.S.	LS			
1131002 P	REMOTE CONTROL CHANGEABLE MESSAGE SIGN	DAY	1869			
1205217 P	TYPE DE-7D DELINEATOR	EA.	19			
1208931A P	SIGN FACE - SHEET ALLUMINUM (TYPE IX RETROREFLECTIVE SHEETING)	EA.	6			
1209114 P	HOT APPLIED PAINTED PAVEMENT MARKINGS - 4" YELLOW	L.F.	5000			
1209124 P	HOT APPLIED PAINTED PAVEMENT MARKINGS - 4" WHITE	L.F.	5000			
1209131 P	HOT APPLIED PAINTED LEGEND, ARROWS AND MARKINGS	S.F.	40			
1210101 P	4" WHITE EPOXY RESIN PAVEMENT MARKINGS	L.F.	1500			
1210102 P	4" YELLOW EPOXY RESIN PAVEMENT MARKINGS	L.F.	1500			
1211001 P	REMOVAL OF PAVEMENT MARKINGS	S.F.	2000			
1216020 P	4" BLACK AGGREGATE COVER UP	L.F.	2000			
1220027 P	CONSTRUCTION SIGNS	S.F.	500			
1802210.04 P	TEMPORARY IMPACT ATTENUATION SYSTEM TYPE A MODULE 400 LB	EA.	2			
1802210.07 P	TEMPORARY IMPACT ATTENUATION SYSTEM TYPE A MODULE 700 LB	EA.	6			
1802210.14 P	TEMPORARY IMPACT ATTENUATION SYSTEM TYPE A MODULE 1400 LB	EA.	8			
1802210.21 P	TEMPORARY IMPACT ATTENUATION SYSTEM TYPE A MODULE 2100 LB	EA.	4			
1802211.04 P	RELOCATION OF TEMPORARY SAND BARREL (400 LB)	EA.	2			
1802211.07 P	RELOCATION OF TEMPORARY SAND BARREL (700 LB)	EA.	6			
1802211.14 P	RELOCATION OF TEMPORARY SAND BARREL (1400 LB)	EA.	8			
1802211.21 P	RELOCATION OF TEMPORARY SAND BARREL (2100 LB)	EA.	4			

P = FEDERAL AID PARTICIPATING
NP= FEDERAL AID NON PARTICIPATING
=FOR INTERNAL USE ONLY
NOT A LEGAL DEFINITION

FINAL PLANS FOR REVIEW

REV.	DATE	REVISION DESCRIPTION	SHEET NO.

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Plotted Date: 3/1/2019

DESIGNER/DRAFTER: K. PATCH
CHECKED BY: S.HARRIS

STATE OF CONNECTICUT
DEPARTMENT OF TRANSPORTATION

Filename: ...\HW_MSH_0113_0107_EST-01.dgn

SIGNATURE/BLOCK:

PROJECT TITLE: REHABILITATION OF BRIDGE NO. 02931 RTE 2A OVER POQUETANUCK COVE AND BRIDGE NO. 02932 RTE 2A OVER DICKERMANS BROOK

TOWN: PRESTON

DRAWING TITLE: DETAILED ESTIMATE SHEET

PROJECT NO. 113-107/108
DRAWING NO. DET-01
SHEET NO.

STRUCTURES

ITEM NUMBER	0202216A P	0203000 P	0204401A P	0214000 P	0216000 P	0402401 P	0406171 P	0406173 P	0503151 P	0514202A P
ITEM	EXCAVATION AND REUSE OF EXISTING CHANNEL BOTTOM MATERIAL	STRUCTURE EXCAVATION - EARTH (COMPLETE)	HANDLING WATER (SITE NO. 1)	COMPACTED GRANULAR FILL	PREVIOUS STRUCTURE BACKFILL	SAWING AND SEALING JOINTS IN BITUMINOUS CONCRETE PAVEMENT	HMA S0.5	HMA S0.25	REMOVAL OF SUPERSTRUCTURE (SITE NO.1)	PRESTRESSED DECK UNIT (3'-0"X 1'-3")
UNIT	C.Y.	C.Y.	L.S.	C.Y.	C.Y.	LF	TON	TON	L.S.	L.F.
RTE 2A SITE 1	15	85	LS	22	85	68	10	10	LS	36
SUBTOTAL										
UNASSIGNED										
TOTAL										

ITEM NUMBER	0514222A P	0521001 P	06010XXA P	06010XXA P	0601201 P	0601504 P	0602000 P	0602910A P	0707009A P	708001 P
ITEM	PRESTRESSED DECK UNIT (4'-0"X 1'-3")	ELASTOMERIC BEARING PADS	ULTRA HIGH PERFORMANCE CONCRETE KEYWAYS	ULTRA HIGH PERFORMANCE CONCRETE FACING	CLASS "F" CONCRETE	1" PREFORMED EXPANSION JOINT FILLER FOR BRIDGES	DEFORMED STEEL BARS	DRILLING HOLES AND GROUTING DOWELS	MEMBRANE WATERPROOFING (COLD LIQUID ELASTOMERIC)	DAMPPROOFING
UNIT	L.F.	CI	C.Y.	C.Y.	C.Y.	S.F.	LB.	EA.	S.Y.	S.Y.
RTE 2A SITE 1	120	3900	4	11	128	30	13000	100	60	61
SUBTOTAL										
UNASSIGNED										
TOTAL										

ITEM NUMBER	0716000A P	0717000 P	0751731 P	0819002A P	0822005A P	0822006A P	0904051A P	0910173 P	0974001 P	1504011A P
ITEM	TEMPORARY EARTH RETAINING SYSTEM	EARTH RETAINING SYSTEM LEFT IN PLACE	6" FOUNDATION UNDERDRAIN	PENETRATING SEALER PROTECTIVE COMPOUND	TEMPORARY PRECAST BARRIER CURB (STRUCTURE)	RELOCATED TEMPORARY PRECAST BARRIER CURB (STRUCTURE)	3 TUBE CURB MOUNTED BRIDGE RAIL	R-B 350 BRIDGE ATTACHMENT - VERTICAL SHAPE PARAPET	REMOVAL OF EXISTING MASONRY	TEMPORARY SUPPORT OF UTILITIES - (SITE NO.1)
UNIT	S.F.	S.F.	L.F.	SY	L.F.	L.F.	L.F.	EA.	C.Y.	L.S.
RTE 2A SITE 1	800	400	210	10	20	20	151	4	10	LS
SUBTOTAL										
UNASSIGNED										
TOTAL										

LANDSCAPE

ITEM NUMBER	L1	L2 P	L3 P	L4 P	0952051A P
ITEM	SPARTINA ALTERNIFLORA	HIBISCUS MOSCHEUTOS	IVA FRUTESCENS	BACCHARIS HALMIFOLIA	CONTROL AND REMOVAL OF INVASIVE VEGETATION
UNIT	EA.	EA.	EA.	EA.	S.Y.
	340	40	65	70	1000
SUBTOTAL					
UNASSIGNED					
TOTAL					

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FINAL PLANS FOR REVIEW

REV.	DATE	REVISION DESCRIPTION	SHEET NO.

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Plotted: 3/1/2019

DESIGNER/DRAFTER: **J.GUZZE**
CHECKED BY: **S.HARRIS**

STATE OF CONNECTICUT
DEPARTMENT OF TRANSPORTATION

Filename: ...\HW_MSH_0113_0107_EST-01.dgn

SIGNATURE/BLOCK:

PROJECT TITLE: **REHABILITATION OF BRIDGE NO. 02931 RTE 2A OVER POQUETANUCK COVE AND BRIDGE NO. 02932 RTE 2A OVER DICKERMANS BROOK**

TOWN: **PRESTON**

DRAWING TITLE: **DETAILED ESTIMATE SHEET**

PROJECT NO. **113-107/108**

DRAWING NO. **DET-02**

SHEET NO.

01.04 - HIGHWAY
INDEX OF DRAWINGS

DRAWING NUMBER	DRAWING TITLE	DRAWING NUMBER	DRAWING TITLE
INX-01	HIGHWAY INDEX OF DRAWINGS		
MDS-01	MISCELLANEOUS DETAILS		
TYP-01	TYPICAL CROSS SECTIONS		
HWY-01	HIGHWAY PLAN		
PRO-01	PROFILE ROUTE 2A		
SEC-01	SEDIMENTATION AND EROSION CONTROL PLAN		
ROW-01	RIGHT OF WAY		
LND-01	PLANTING PLAN		
XSC-01	CROSS SECTIONS		

DESIGNED BY:
FUSS & O'NEILL INC.
146 HARTFORD ROAD
MANCHESTER, CT 06040

FINAL PLANS FOR REVIEW

REV.	DATE	REVISION DESCRIPTION	SHEET NO.

Plotted: 2/26/2019

DESIGNER/DRAFTER: J.MAZEK
CHECKED BY: S.HARRIS

STATE OF CONNECTICUT
DEPARTMENT OF TRANSPORTATION

Filename: ...\HW_MSH_0113-0107_03_INX-01.dgn

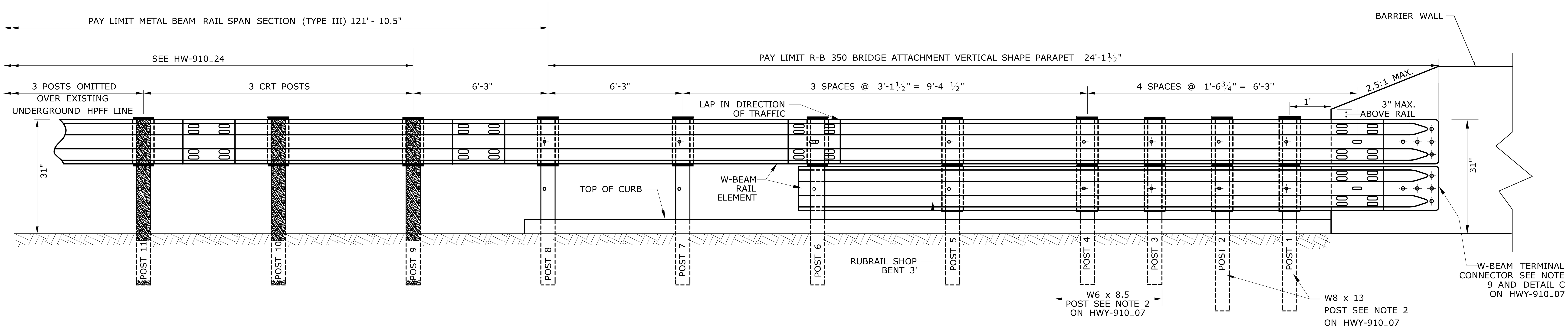
SIGNATURE/
BLOCK:

PROJECT TITLE: REHABILITATION OF BRIDGE NO. 02931
ROUTE 2A
OVER POQUETANUCK COVE

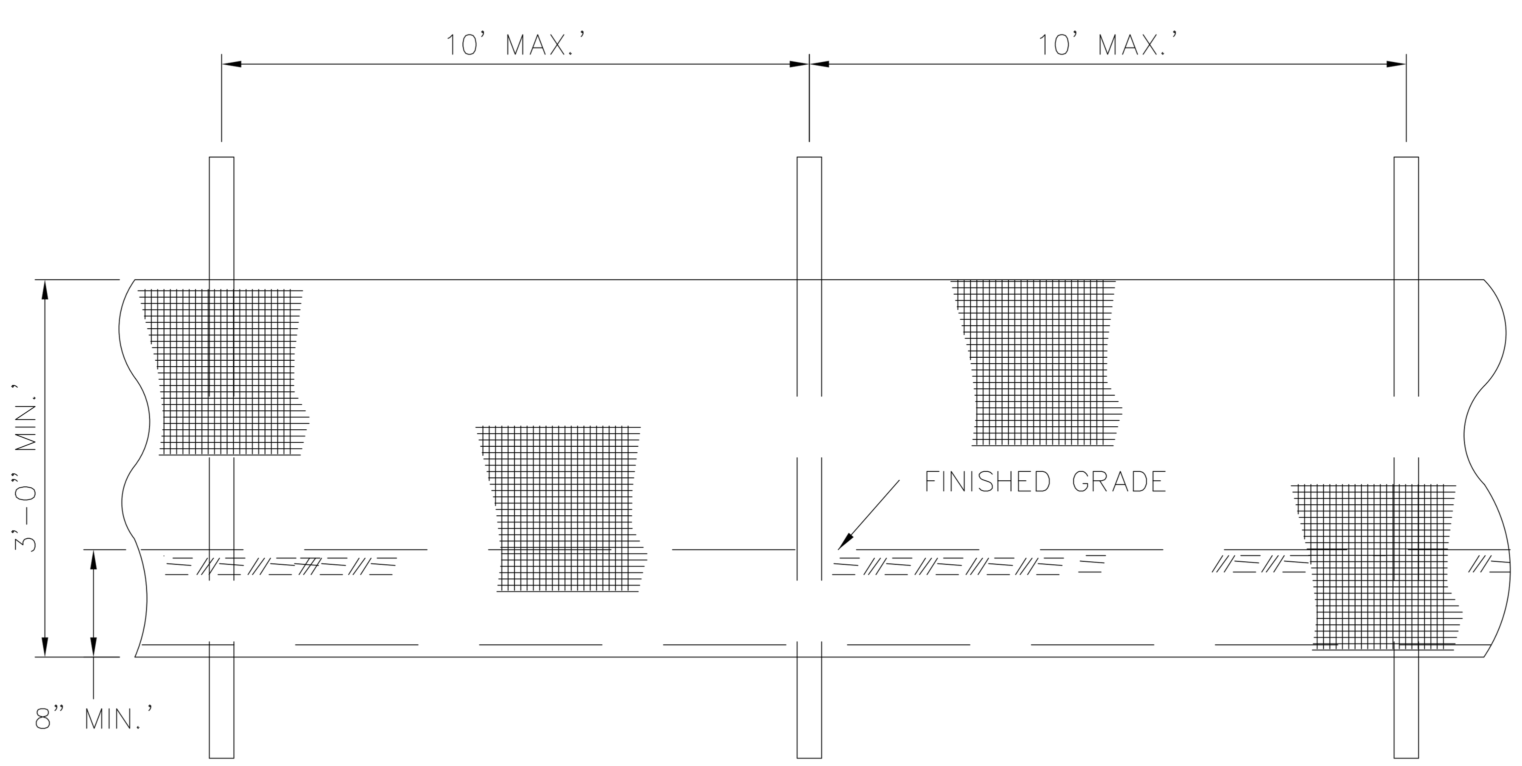
TOWN: PRESTON

DRAWING TITLE: HIGHWAY
INDEX OF DRAWINGS

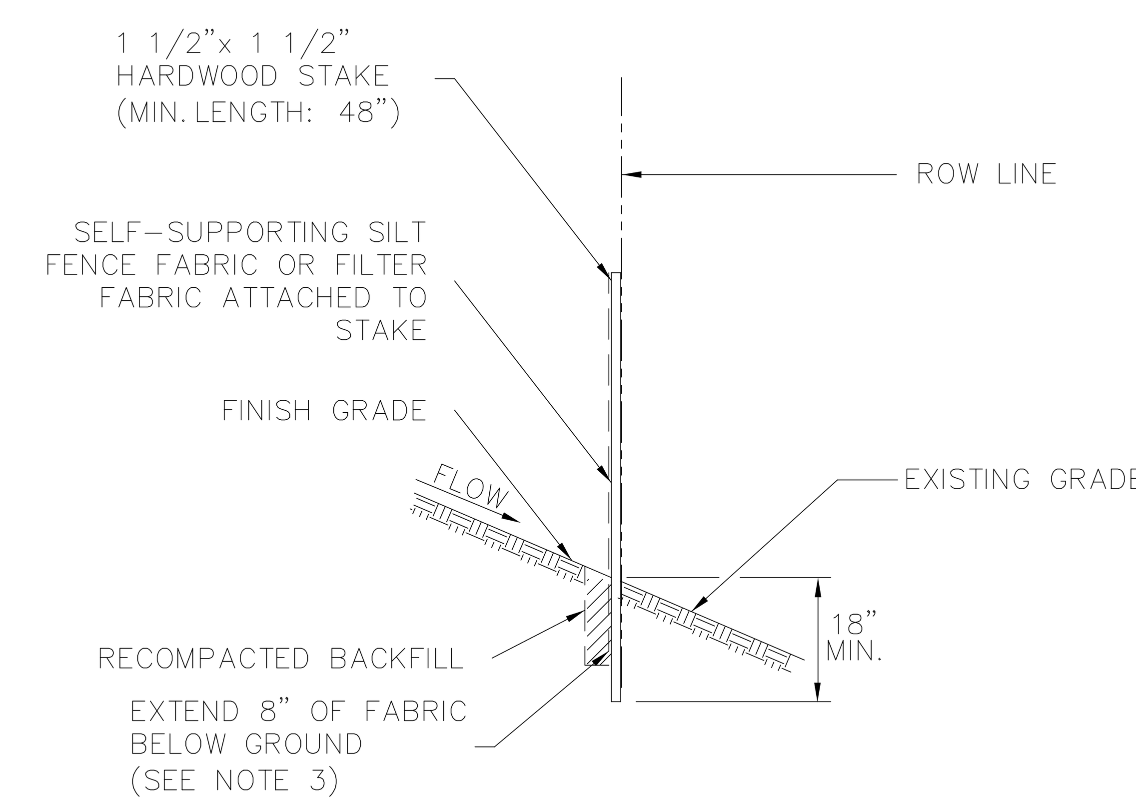
PROJECT NO. 113-107
DRAWING NO. INX-01
SHEET NO.



GUIDE RAIL ATTACHMENT DETAIL AT NORTHWEST CORNER ONLY



ELEVATION



SECTION

SILT FENCE NOTES:

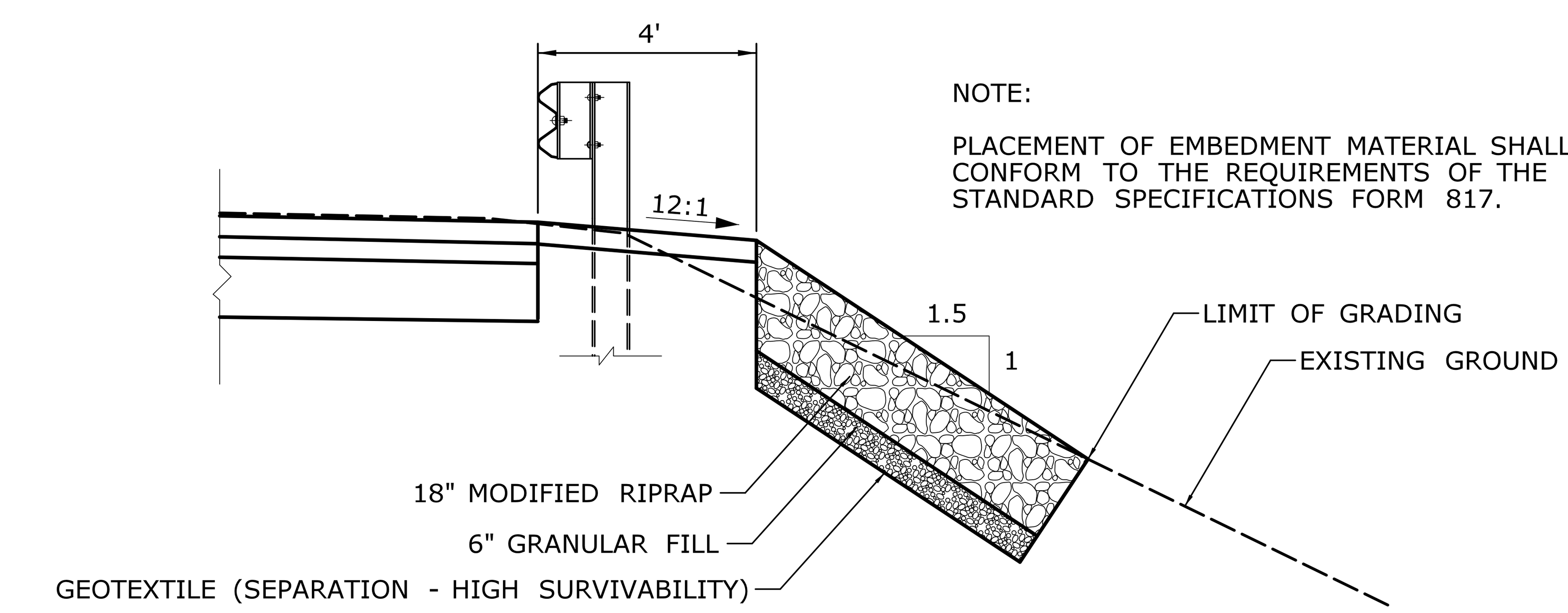
1.) INSTALL SILT FENCE & WOOD STAKES AS RECOMMENDED BY MANUFACTURER.

2.) SYNTHETIC FILTER FABRIC SHALL BE A PERVIOUS SHEET OF PROPYLENE, NYLON, POLYESTER OR ETHYLENE FILAMENTS AND SHALL BE CERTIFIED BY THE MANUFACTURER OR SUPPLIER AS CONFORMING TO THE SPECIFICATIONS.

2.) NO EXCAVATION IS ALLOWED BEYOND THE ROW LINE.

SILT FENCE

N.T.S.

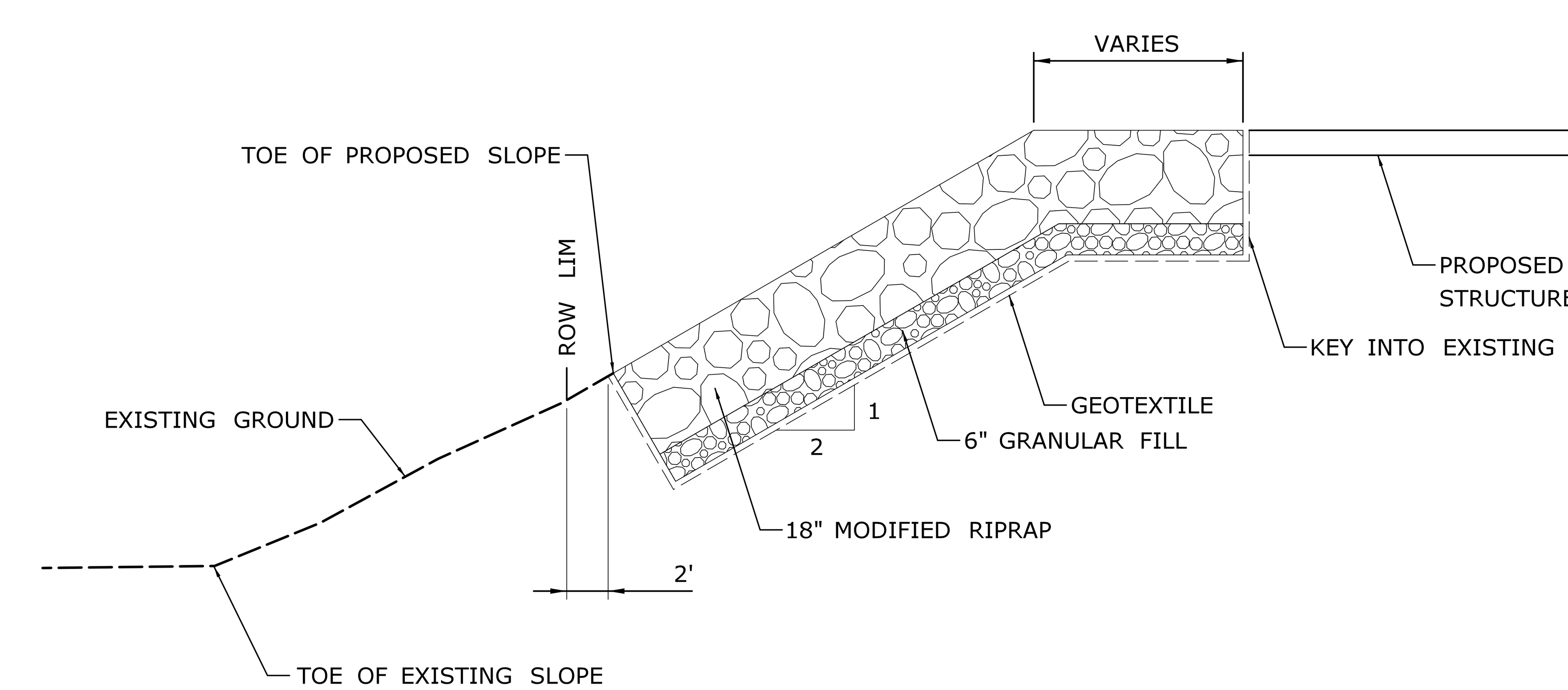


NOTE:

PLACEMENT OF EMBEDMENT MATERIAL SHALL CONFORM TO THE REQUIREMENTS OF THE STANDARD SPECIFICATIONS FORM 817.

STEEPENED SLOPE PROTECTION FOR SLOPES STEEPER THAN 1(V):2(H)

N.T.S.



RIPRAP SLOPE PROTECTION (AT END OF BARRIER WALLS)

N.T.S.

FINAL PLANS FOR REVIEW

REV.	DATE	REVISION DESCRIPTION	SHEET NO.

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Plotted Date: 2/25/2019

DESIGNER/DRAFTER: J.MAZEK

CHECKED BY: S.HARRIS

SCALE AS NOTED

STATE OF CONNECTICUT DEPARTMENT OF TRANSPORTATION

Filename: ...\HW_MSH_0113_0107_MDS-01.dgn

SIGNATURE/BLOCK:

PROJECT TITLE: **REHABILITATION OF BRIDGE NO. 02931 ROUTE 2A OVER POQUETANUCK COVE**

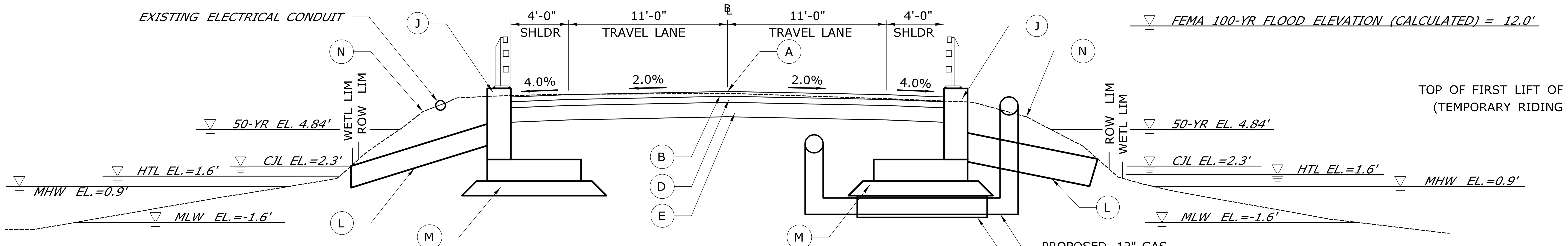
TOWN: **PRESTON**

DRAWING TITLE: **MISCELLANEOUS DETAILS**

PROJECT NO. **113-107**

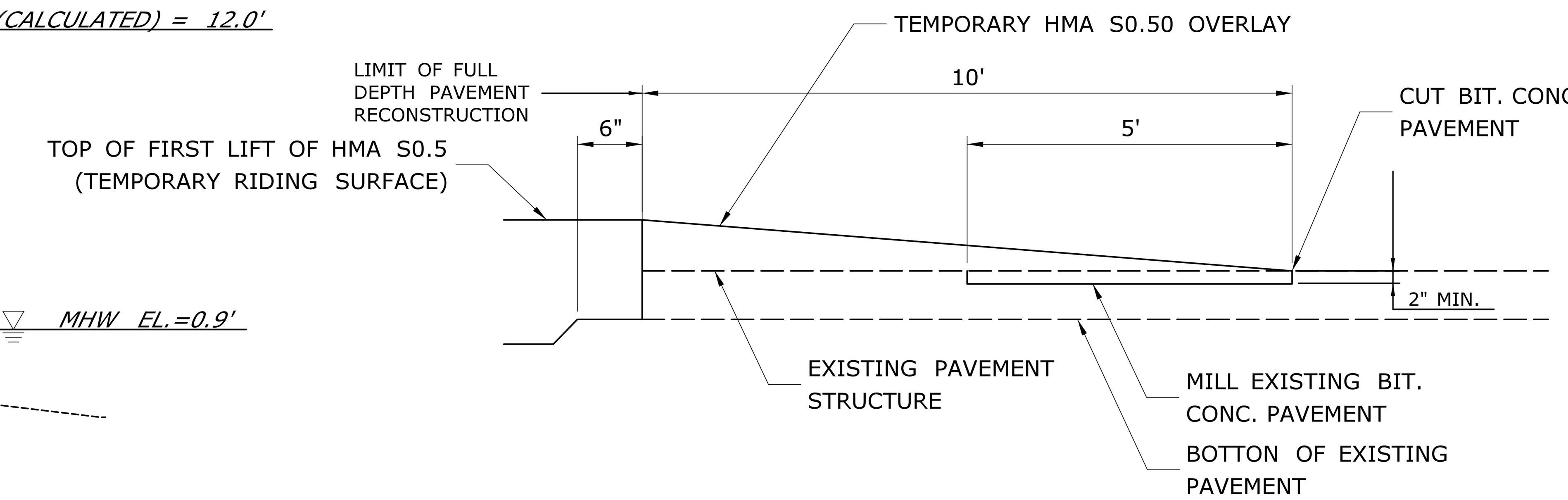
DRAWING NO. **MDS-01**

SHEET NO.



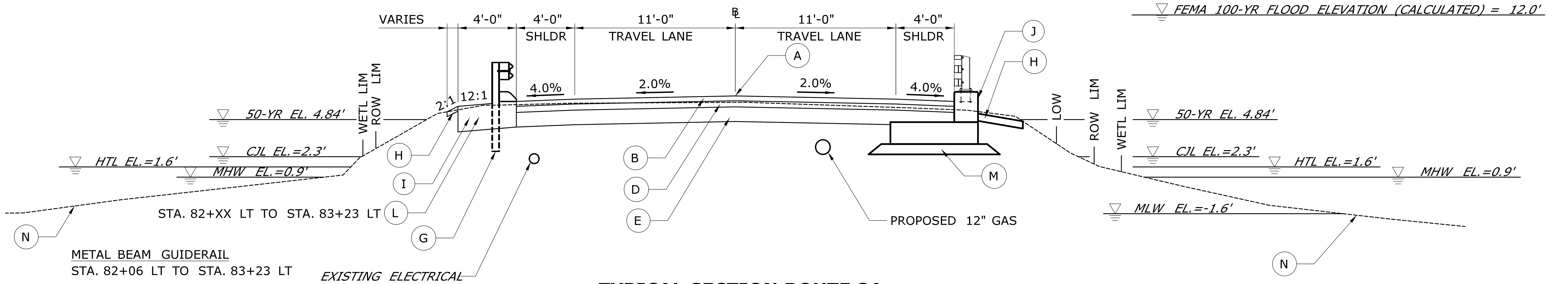
TYPICAL SECTION ROUTE 2A

STA. 83+23 TO STA. 83+85
SCALE: 1" = 5'



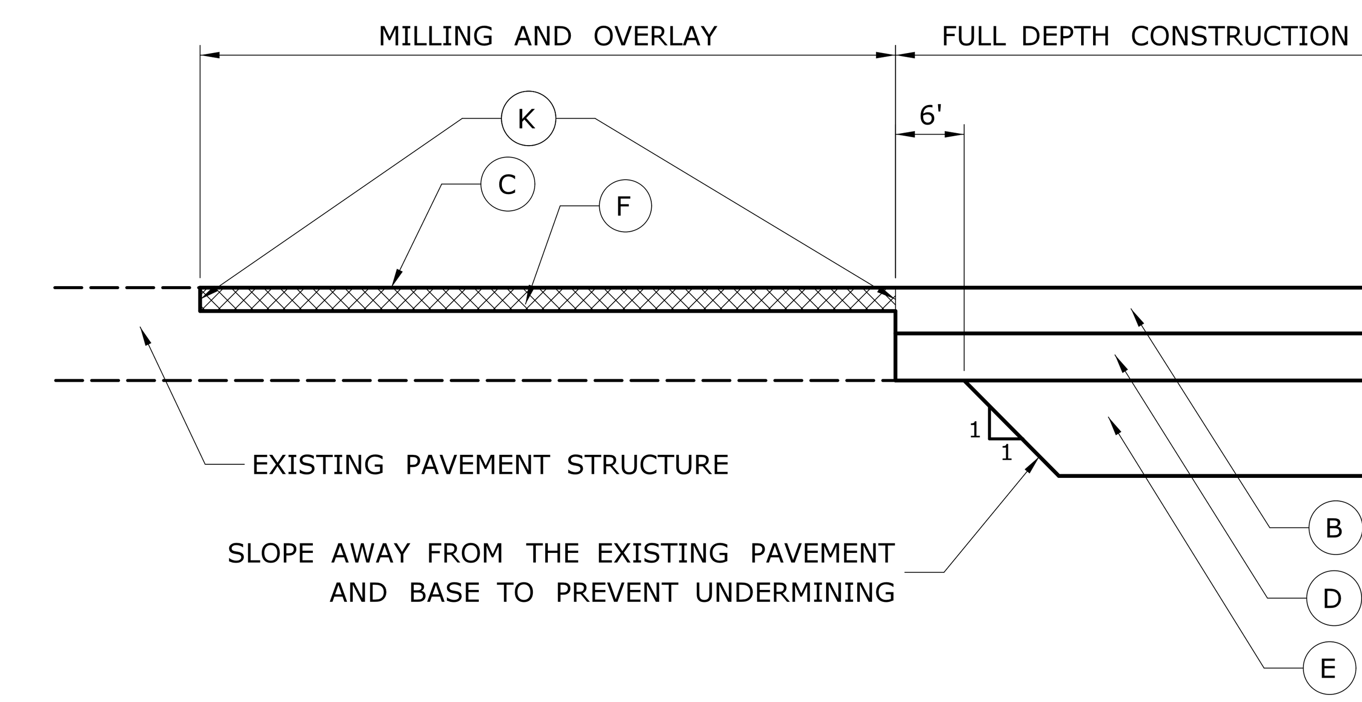
TEMPORARY PAVEMENT TRANSITION

N.T.S.



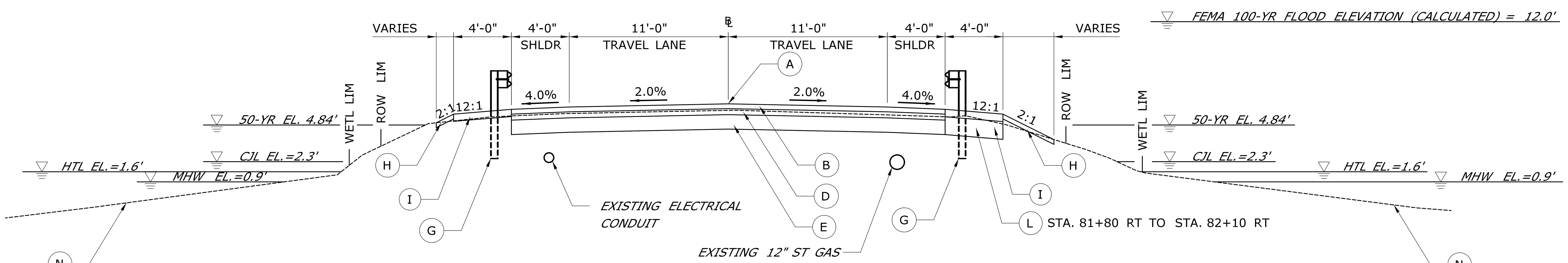
TYPICAL SECTION ROUTE 2A

STA. 82+10 TO STA. 83+23
SCALE: 1" = 5'



PAVEMENT TRANSITIONS

N.T.S.

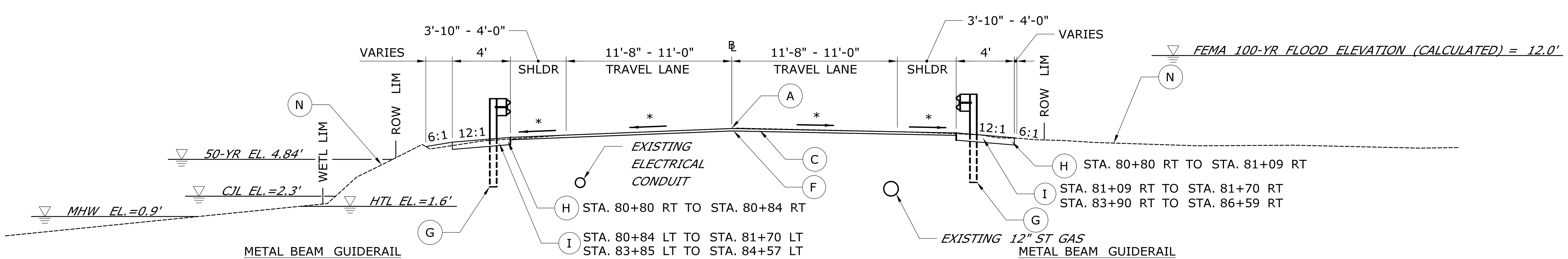


TYPICAL SECTION ROUTE 2A

STA. 81+70 TO STA. 82+10 AND 83+85 TO STA. 83+90
SCALE: 1" = 5'

LEGEND

- (A) POINT OF APPLICATION OF GRADE
- (B) 4" HMA S0.5 TRAFFIC LEVEL 2 (PLACED IN TWO EQUAL LIFTS)
- (C) HMA S0.5 TRAFFIC LEVEL 2 (PLACED IN MULTIPLE LIFTS, EACH VARYING IN THICKNESS BETWEEN 1" MIN. AND 3.5" MAX. WITH THE FINAL SURFACE LIFT BEING A UNIFORM 2"
- (D) 4" HMA S1.0 TRAFFIC LEVEL 2
- (E) 12" SUBBASE
- (F) 2" FINE MILLING DEPTH FROM EXISTING
- (G) METAL BEAM RAIL (TYPE R-B MASH)
- (H) 4" TOPSOIL AND SHORELINE GRASS ESTABLISHMENT
- (I) 6" PROCESSED AGGREGATE
- (J) BARRIER WALL
- (K) SAW CUT PAVEMENT
- (L) RIPRAP SLOPE PROTECTION (SEE DETAIL ON SHEET HWY-MDS-01)
- (M) 12" COMPACTED GRANULAR FILL
- (N) EXISTING GROUND



TYPICAL SECTION ROUTE 2A

STA. 80+80 TO STA. 81+70 AND 83+90 TO STA. 85+80
SCALE: 1" = 5'

* CROSS SLOPE VARIES

FINAL PLANS FOR REVIEW

REV.	DATE	REVISION DESCRIPTION	SHEET NO.

THE INFORMATION, INCLUDING ESTIMATED QUANTITIES OF WORK, SHOWN ON THESE SHEETS IS BASED ON LIMITED INVESTIGATIONS BY THE STATE AND IS IN NO WAY WARRANTED TO INDICATE THE CONDITIONS OF ACTUAL QUANTITIES OF WORK WHICH WILL BE REQUIRED.

Plotted Date: 3/1/2019

DESIGNER/DRAFTER: K. PATCH
CHECKED BY: S. HARRIS
SCALE AS NOTED

STATE OF CONNECTICUT
DEPARTMENT OF TRANSPORTATION

Filename: ...\HW_MSH_0113_0107_TYP-01.dgn

SIGNATURE/BLOCK:

PROJECT TITLE: REHABILITATION OF BRIDGE NO. 02931 ROUTE 2A OVER POQUETANUCK COVE

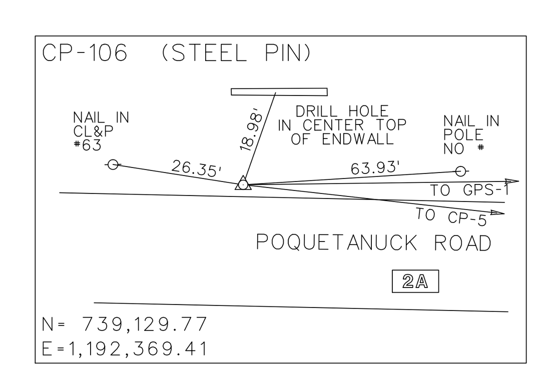
TOWN: PRESTON

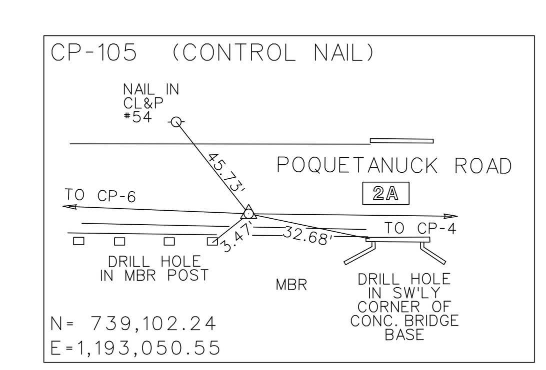
DRAWING TITLE: TYPICAL SECTIONS

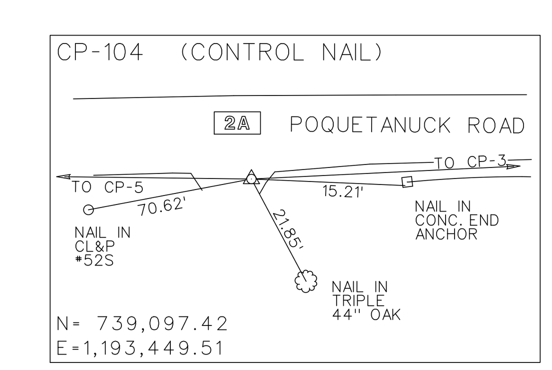
PROJECT NO. 113-107
DRAWING NO. TYP-01
SHEET NO.

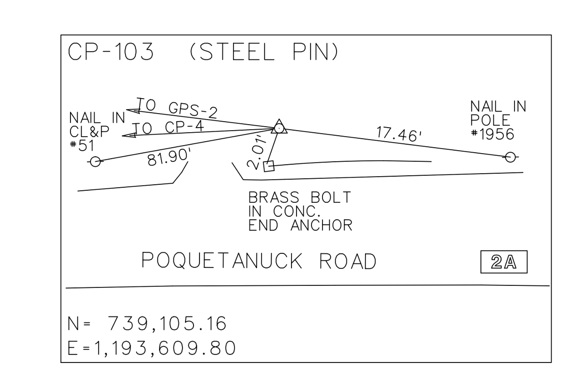
GENERAL NOTES:

1. SURVEY INFORMATION SHOWN IS BASED UPON A FIELD SURVEY PERFORMED BY CTDOT DISTRICT 2. THE HORIZONTAL 400 FOOT GRID AS WELL AS HORIZONTAL CONTROLS ARE BASED ON THE CONNECTICUT STATE PLANE COORDINATE SYSTEM (NAD 83). ALL ELEVATIONS REFER TO THE NORTH AMERICAN VERTICAL DATUM OF 1988 (NAVD 88). RIGHT OF WAY, PROPERTY LINE AND ABUTTERS INFORMATION AS SHOWN ON THE PLANS ARE BASED UPON INFORMATION FURNISHED BY THE CTDOT DISTRICT 2.
2. THE CONTRACTOR SHALL NOTIFY "CALL BEFORE YOU DIG" AT 1-800-922-4455 AT LEAST 72 HOURS BEFORE COMMENCING ANY CONSTRUCTION WORK.
3. EXISTING UTILITIY INFORMATION IS BASED ON THE BEST AVAILABLE AND MAY BE INCOMPLETE. ASSUME NO GUARANTEE AS TO THE COMPLETENESS, SERVICEABILITY, EXISTENCE, OR ACCURACY OF UNDERGROUND FACILITIES. CONTRACTOR SHALL FIELD VERIFY THE EXACT LOCATIONS, SIZES, AND ELEVATIONS OF UNDERGROUND UTILITIES BEFORE COMMENCING CONSTRUCTION WORK. ANY UTILITY LOCATION DISCREPANCIES FOUND SHALL BE BROUGHT TO THE ATTENTION OF THE ENGINEER FOR RESOLUTION.
4. THE CONTRACTOR SHALL HAND DIG AROUND EXISTING UTILITIES AND MUST PROVIDE TEMPORARY SUPPORT FOR EXISTING UTILITIES AS REQUIRED TO ACCOMPLISH THE WORK. THERE SHALL BE NO SEPERATE PAYMENT FOR THIS WORK, BUT SUCH WORK SHALL BE INCLUDED IN THE VARIOUS ITEMS COMPRISING THE WORK. TEMPORARY SUPPORT OF THE NEW GAS MAIN CROSSING THE BRIDGE WILL BE PAID FOR SEPARATELY.
5. SEDIMENT AND EROSION CONTROL DEVICES MEASURES SHALL BE IN PLACE PRIOR TO CONSTRUCTION AND MAINTAINED UNTIL PERMANENT COVER STABILIZATION IS ESTABLISHED. ALL SEDIMENT AND EROSION CONTROL MEASURES SHALL CONFORM TO THE "2002 CONNECTICUT GUIDELINES FOR SOIL EROSION & SEDIMENT CONTROL", AND IN ALL CASES BEST MANAGEMENT PRACTICES SHALL PREVAIL.
6. THE CONTRACTOR SHALL COORDINATE CONSTRUCTION WITH APPROPRIATE UTILITY COMPANIES REGARDING RELOCATIONS OF THEIR FACILITIES AND SCHEDULING SUCH WORK.
7. THE CONTRACTOR SHALL NOTE THAT ALL SIGNS, ETC. ARE TO BE RELOCATED USING EXISTING SUPPORTS. WHERE EXISTING SUPPORTS ARE NOT SUITABLE FOR RELOCATION, THE CONTRACTOR SHALL PROVIDE A SIMILAR APPLICATION.
8. ALL EXISTING GUIDE RAIL WITHIN THE PROJECT LIMITS SHALL BE REMOVED AND PROPERLY DISPOSED OFF SITE.
9. SLOPES AND DISTURBED AREAS SHALL BE STABILIZED WITH 4" TOPSOIL AND TURF ESTABLISHMENT, UNLESS OTHERWISE NOTED ON THE PLANS. CONTRACTOR SHALL YORK RAKE TOPSOIL PRIOR TO SHORELINE GRASS ESTABLISHMENT. COST OF YORK RAKING SHALL BE INCLUDED IN ITEM "FURNISHING AND PLACING TOPSOIL".









FINAL PLANS FOR REVIEW

REV.	DATE	REVISION DESCRIPTION	SHEET NO.

THE INFORMATION, INCLUDING ESTIMATED QUANTITIES OF WORK, SHOWN ON THESE SHEETS IS BASED ON LIMITED INVESTIGATIONS BY THE STATE AND IS IN NO WAY WARRANTED TO INDICATE THE CONDITIONS OF ACTUAL QUANTITIES OF WORK WHICH WILL BE REQUIRED.

Plotted Date: 2/28/2019

DESIGNER/DRAFTER: J. GUZZE
CHECKED BY: S. HARRIS
SCALE IN FEET 0 40 80
SCALE 1"=40'

STATE OF CONNECTICUT
DEPARTMENT OF TRANSPORTATION

Filename: ...\HW_MSH_0113_0107_PLN-01.dgn

SIGNATURE/BLOCK: OFFICE OF ENGINEERING
APPROVED BY:

PROJECT TITLE: REHABILITATION OF BRIDGE NO. 02931
ROUTE 2A
OVER POQUETANUCK COVE

TOWN: PRESTON
DRAWING TITLE: HIGHWAY PLAN

PROJECT NO. 113-107
DRAWING NO. HWY-01
SHEET NO.

FINAL PLANS FOR REVIEW

REV.	DATE	REVISION DESCRIPTION	SHEET NO.

THE INFORMATION, INCLUDING ESTIMATED QUANTITIES OF WORK, SHOWN ON THESE SHEETS IS BASED ON LIMITED INVESTIGATIONS BY THE STATE AND IS IN NO WAY WARRANTED TO INDICATE THE CONDITIONS OF ACTUAL QUANTITIES OF WORK WHICH WILL BE REQUIRED.

Plotted Date: 2/28/2019

DESIGNER/DRAFTER: J. GUZZE
CHECKED BY: S. HARRIS

HORIZ. SCALE IN FEET 0 40 80
VERT. SCALE IN FEET 0 4 8

STATE OF CONNECTICUT
DEPARTMENT OF TRANSPORTATION

Filename: ...\HW_MSH_0113_0107_PRO-01.dgn

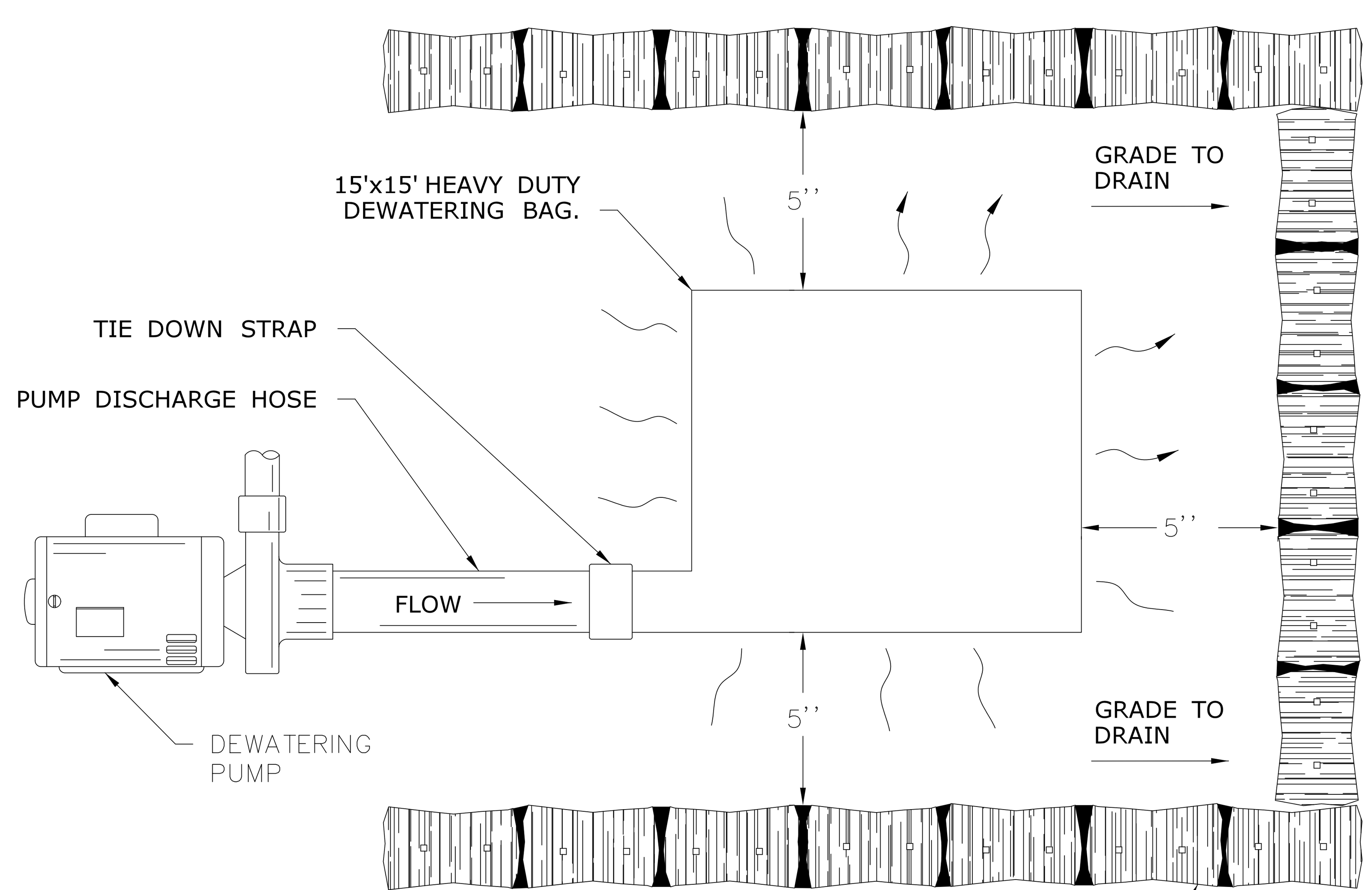
SIGNATURE/ BLOCK:

PROJECT TITLE:
REHABILITATION OF BRIDGE NO. 02931
ROUTE 2A
OVER POQUETANUCK COVE

TOWN: **PRESTON**

DRAWING TITLE: **PROFILE ROUTE 2A**

PROJECT NO. **113-107**
DRAWING NO. **PRO-01**
SHEET NO.



SEDIMENTATION BASIN

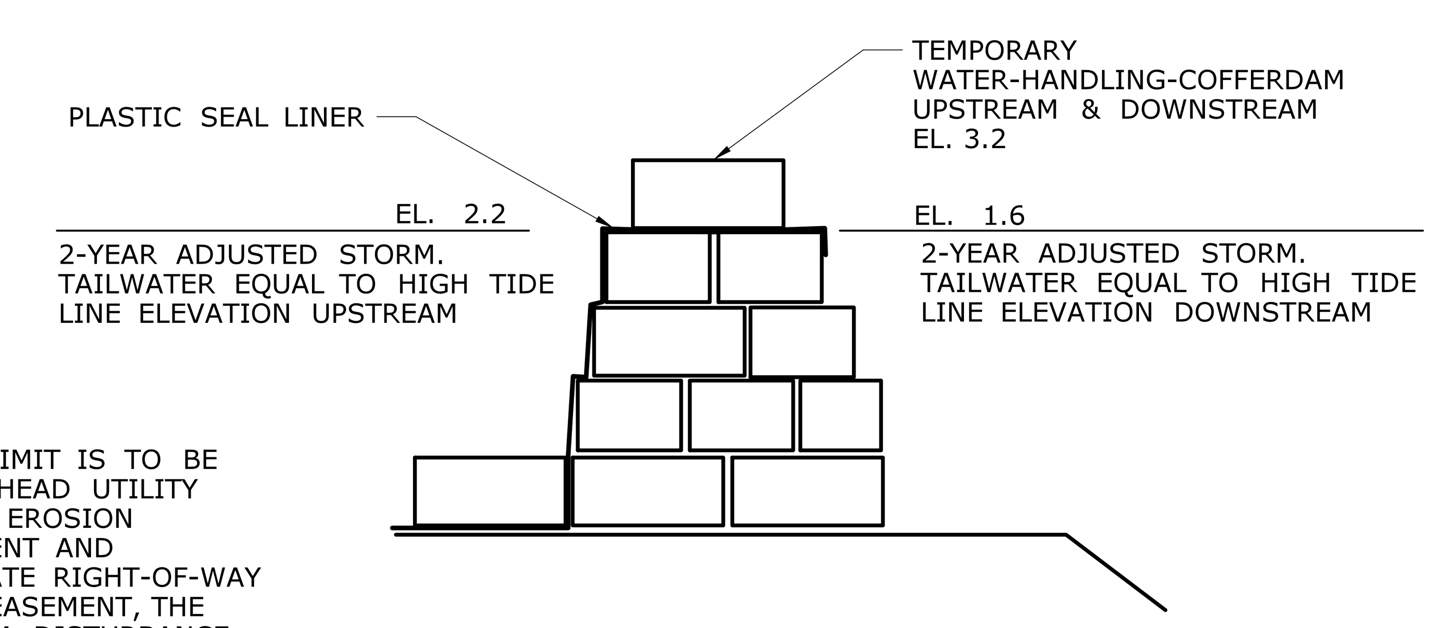
SCALE: NTS

WATER HANDLING NOTES:

1. THE CONTRACTOR SHALL MAINTAIN WATER THROUGH TEMPORARY BYPASS PIPE AS SHOWN DURING CONSTRUCTION OF THE NEW STRUCTURE.
2. EQUIPMENT SHALL NOT BE PERMITTED IN THE STREAM WHEN TEMPORARY BYPASS IS NOT IN PLACE WITHOUT APPROVAL FROM THE ENGINEER.
3. DUE TO ARCHAEOLOGICAL SENSATIVITY OF THE SITE, A SEDIMENTATION BASIN SHALL BE ESTABLISHED OUTSIDE OF THE WETLAND LIMITS AND WITHIN THE RIGHT OF WAY IF POSSIBLE. THE LOCATION OF THE DEWATERING BASIN IS APPROXIMATE. THE EXACT POSITION MAY VARY BASED ON THE PUMPING DESIGN SUBMISSION ACCEPTED BY THE ENGINEER.
4. TEMPORARY WATER-HANDLING-COFFERDAM SHALL CONSIST OF PLASTIC LINER, SANDBAGS, OR ANY OTHER APPROVED SYSTEM THAT THE CONTRACTOR ELECTS TO USE WHICH WILL SAFELY CONVEY WATER FLOWS THROUGH THE CONSTRUCTION AREA, SHALL BE ABLE TO SUPPORT CONSTRUCTION ACTIVITY AND EXCAVATION, AND SHALL CONFORM TO PERMITS.

GROUND DISTURBANCE NOTE:

GROUND DISTURBANCE OUTSIDE OF THE ROW LIMIT IS TO BE LIMITED TO INSTALLATION OF TEMPORARY OVERHEAD UTILITY POLES, AND STAKING FOR SEDIMENTATION AND EROSION CONTROL. FOR THE USE OF MOTORIZED EQUIPMENT AND DEWATERING FILTER BAGS OUTSIDE OF THE STATE RIGHT-OF-WAY AND IN AREAS OF TEMPORARY CONSTRUCTION EASEMENT, THE CONTRACTOR SHALL PROTECT THE GROUND FROM DISTURBANCE WITH THE USE TIMBER MATTING OR OTHER GROUND PROTECTION AS ACCEPTED BY THE ENGINEER. THE CONTRACTOR SHALL NOT LOCATE CRANES OR SIMILAR LARGE EQUIPMENT OUTSIDE THE STATE RIGHT-OF-WAY AND IN AREAS WITHIN THE CONSTRUCTION EASEMENTS.



WATER-HANDLING-COFFERDAM

SCALE: NTS

FINAL PLANS FOR REVIEW

REV.	DATE	REVISION DESCRIPTION	SHEET NO.

THE INFORMATION, INCLUDING ESTIMATED QUANTITIES OF WORK, SHOWN ON THESE SHEETS IS BASED ON LIMITED INVESTIGATIONS BY THE STATE AND IS IN NO WAY WARRANTED TO INDICATE THE CONDITIONS OF ACTUAL QUANTITIES OF WORK WHICH WILL BE REQUIRED.

Plotted Date: 3/1/2019

DESIGNER/DRAFTER: J.MAZEK
CHECKED BY: S.HARRIS
SCALE IN FEET 0 40 80
SCALE 1"=40'

STATE OF CONNECTICUT
DEPARTMENT OF TRANSPORTATION

Filename: ...\HW_MSH_0113_0107_SEC-01.dgn

SIGNATURE/BLOCK:

PROJECT TITLE: REHABILITATION OF BRIDGE NO. 02931 ROUTE 2A OVER POQUETANUCK COVE

TOWN: PRESTON

DRAWING TITLE: SEDIMENTATION AND EROSION CONTROL PLAN

PROJECT NO. 113-107

DRAWING NO. SEC-01

SHEET NO.

SCHEDULE OF RIGHTS AND EASEMENTS

(A) RIGHT TO CONSTRUCT DRIVEWAYS REQUIRED.

(B) CONSTRUCTION EASEMENT

FINAL PLANS FOR REVIEW

REV.	DATE	REVISION DESCRIPTION	SHEET NO.

THE INFORMATION, INCLUDING ESTIMATED QUANTITIES OF WORK, SHOWN ON THESE SHEETS IS BASED ON LIMITED INVESTIGATIONS BY THE STATE AND IS IN NO WAY WARRANTED TO INDICATE THE CONDITIONS OF ACTUAL QUANTITIES OF WORK WHICH WILL BE REQUIRED.

Plotted Date: 2/28/2019

DESIGNER/DRAFTER: J.MAZEK

CHECKED BY: S.HARRIS

SCALE IN FEET 0 40 80

SCALE 1"=40'

STATE OF CONNECTICUT
DEPARTMENT OF TRANSPORTATION

Filename: ...\HW_MSH_0113_0107_ROW-01.dgn

SIGNATURE/ BLOCK:

PROJECT TITLE: REHABILITATION OF BRIDGE NO. 02931 ROUTE 2A OVER POQUETANUCK COVE

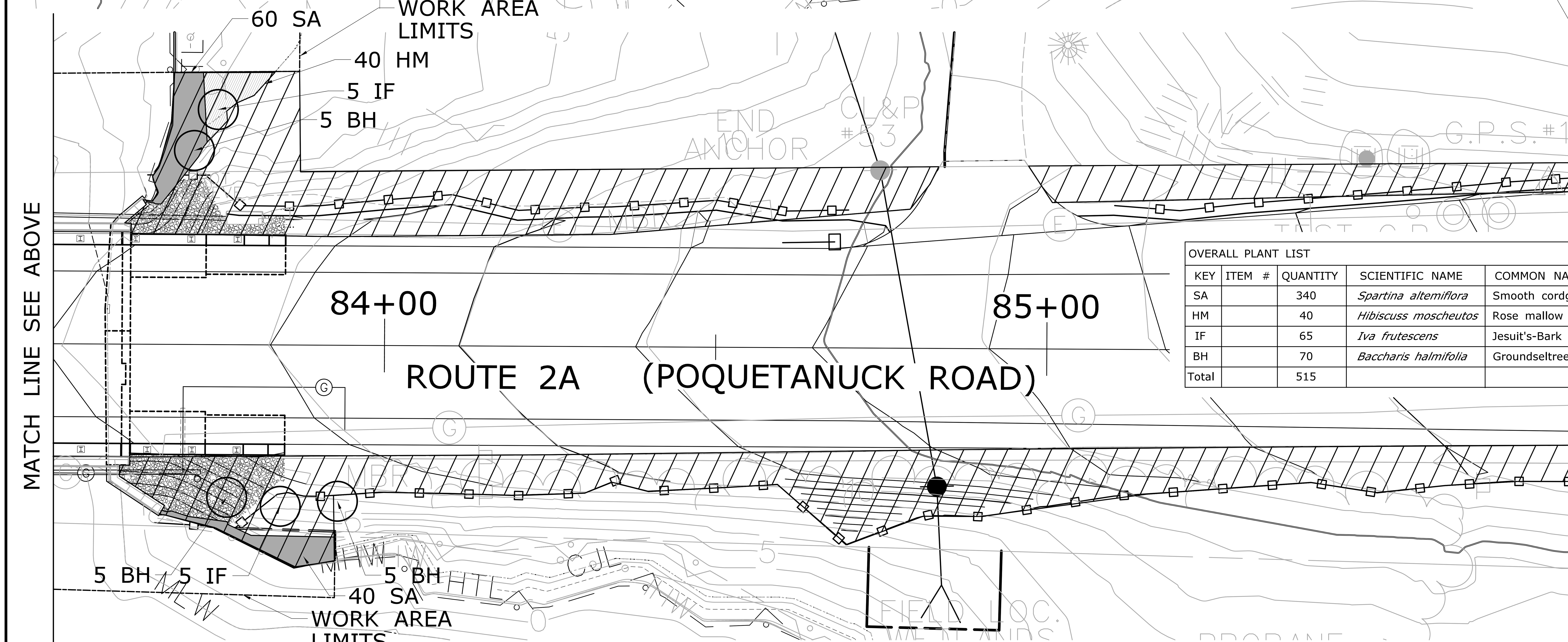
TOWN: PRESTON

DRAWING TITLE: RIGHT OF WAY PLAN

PROJECT NO. 113-107

DRAWING NO. ROW-01

SHEET NO.



OVERALL PLANT LIST

KEY	ITEM #	QUANTITY	SCIENTIFIC NAME	COMMON NAME	SIZE	SPACING	COMMENTS	WETLAND INDICATOR
SA		340	*Spartina alterniflora*	Smooth cordgrass	2" plug	18-inches on center		OBL
HM		40	*Hibiscuss moscheutos*	Rose mallow	18-24" container	18-inches on center		OBL
IF		65	*Iva frutescens*	Jesuit's-Bark	18-24" container	2-feet on center		FACW
BH		70	*Baccharis halmifolia*	Groundseltree	18-24" container	2-feet on center		FACW
Total		515						

NOTES

1. PLANTINGS ON THE SHEET ARE FOR ENVIRONMENTAL PERMITTING. ANY CHANGES TO PERMIT PLANTINGS SHALL BE COORDINATED WITH THE DEPARTMENT'S OFFICE OF ENVIRONMENTAL PLANNING.

2. WOOD CHIP MULCH SHALL NOT BE PLACED IN THE WETLAND AREA.

3. DISTURBED AREAS BELOW THE WETLAND LIMIT AND ON THE RECONSTRUCTED ROADWAY EMBANKMENTS SHALL BE SEEDED WITH A SHORELINE SEED MIX. ALL OTHER DISTURBED AREAS SHALL BE RESTORED WITH 4" TOPSOIL AND TURF ESTABLISHMENT.

4. ALL SPARTINA ALTERNIFLORA LOCATED WITHIN THE PROPOSED PERMANENT TIDAL WETLAND IMPACT AREAS WILL BE TRANSPLANTED TO THE AREA DESIGNATED ON THE PLANTING PLAN BY OEP PRIOR TO THE AREAS BEGIN IMPACTED.

5. ANY EXCAVATED SOIL WITHIN THE REGULATED AREAS MUST BE STOCKPILED OUTSIDE OF THE REGULATED AREAS AND ENCLOSED WITH SEC FENCING.

FINAL PLANS FOR REVIEW

REV.	DATE	REVISION DESCRIPTION	SHEET NO.

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Plotted Date: 3/1/2019

DESIGNER/DRAFTER: J. GUZZE
CHECKED BY: S. HARRIS
SCALE IN FEET 0 10 20
SCALE 1"=10'

STATE OF CONNECTICUT
DEPARTMENT OF TRANSPORTATION

Filename: ...\HW_MSH_0113_0107_LND-01.dgn

SIGNATURE/BLOCK: OFFICE OF ENGINEERING
APPROVED BY:

PROJECT TITLE:
REHABILITATION OF BRIDGE NO. 02931 ROUTE 2A OVER POQUETANUCK COVE

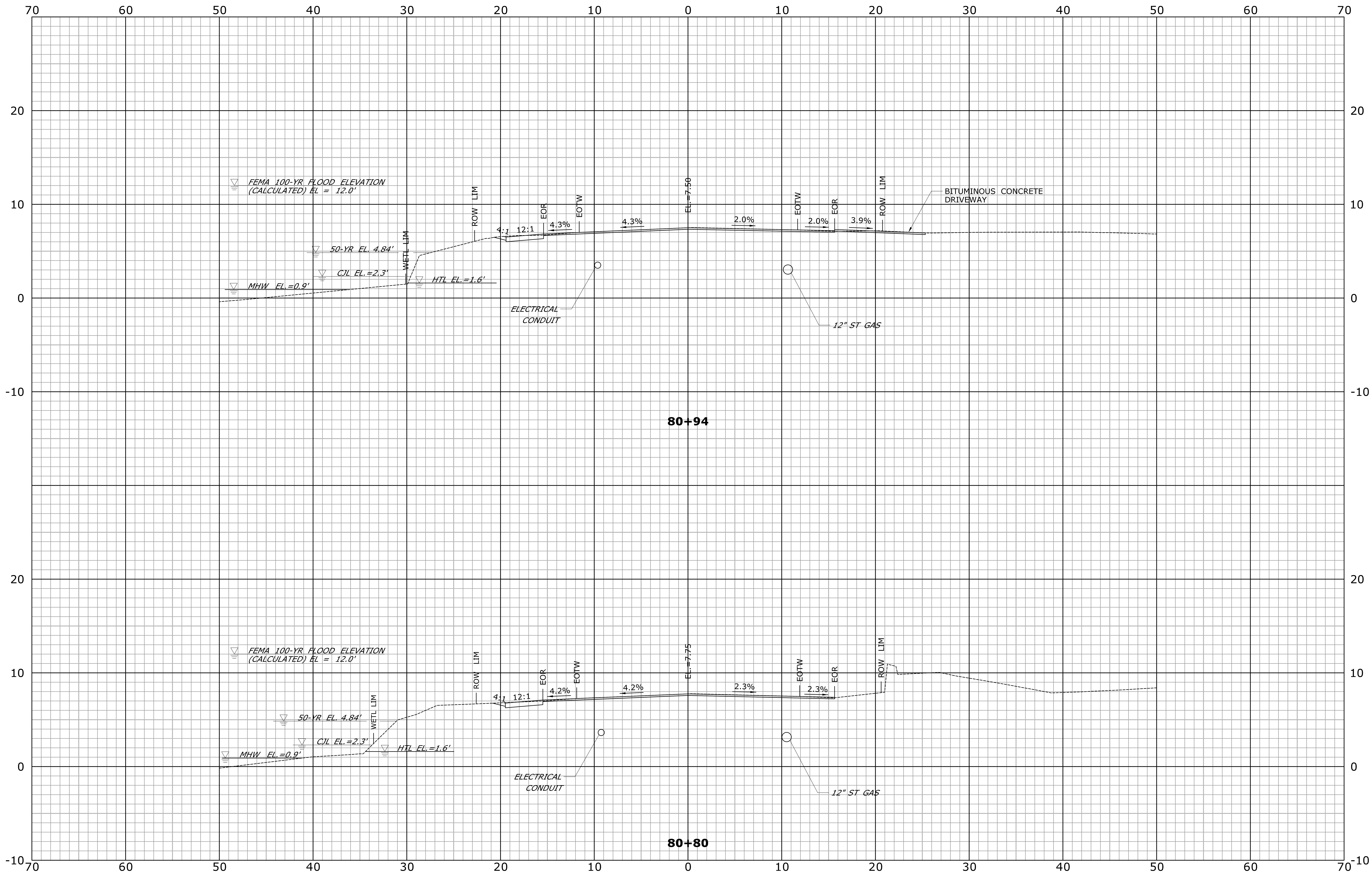
TOWN: PRESTON

DRAWING TITLE: PLANTING PLAN

PROJECT NO. 113-107

DRAWING NO. LND-01

SHEET NO.



STA. 80+80 TO STA. 80+94

REV.	DATE	REVISION DESCRIPTION	SHEET NO.

Plotted Date: 2/28/2019

DESIGNER/DRAFTER: J. GUZZE/K. PATCH

CHECKED BY: S. HARRIS

SCALE IN FEET 0 5 10

SCALE 1" = 5'

STATE OF CONNECTICUT
DEPARTMENT OF TRANSPORTATION

Filename: ...\HW_MSH_0113_0107_XSC-01.dgn

SIGNATURE/ BLOCK:

PROJECT TITLE:
REHABILITATION OF BRIDGE NO. 02931
ROUTE 2A
OVER POQUETANUCK COVE

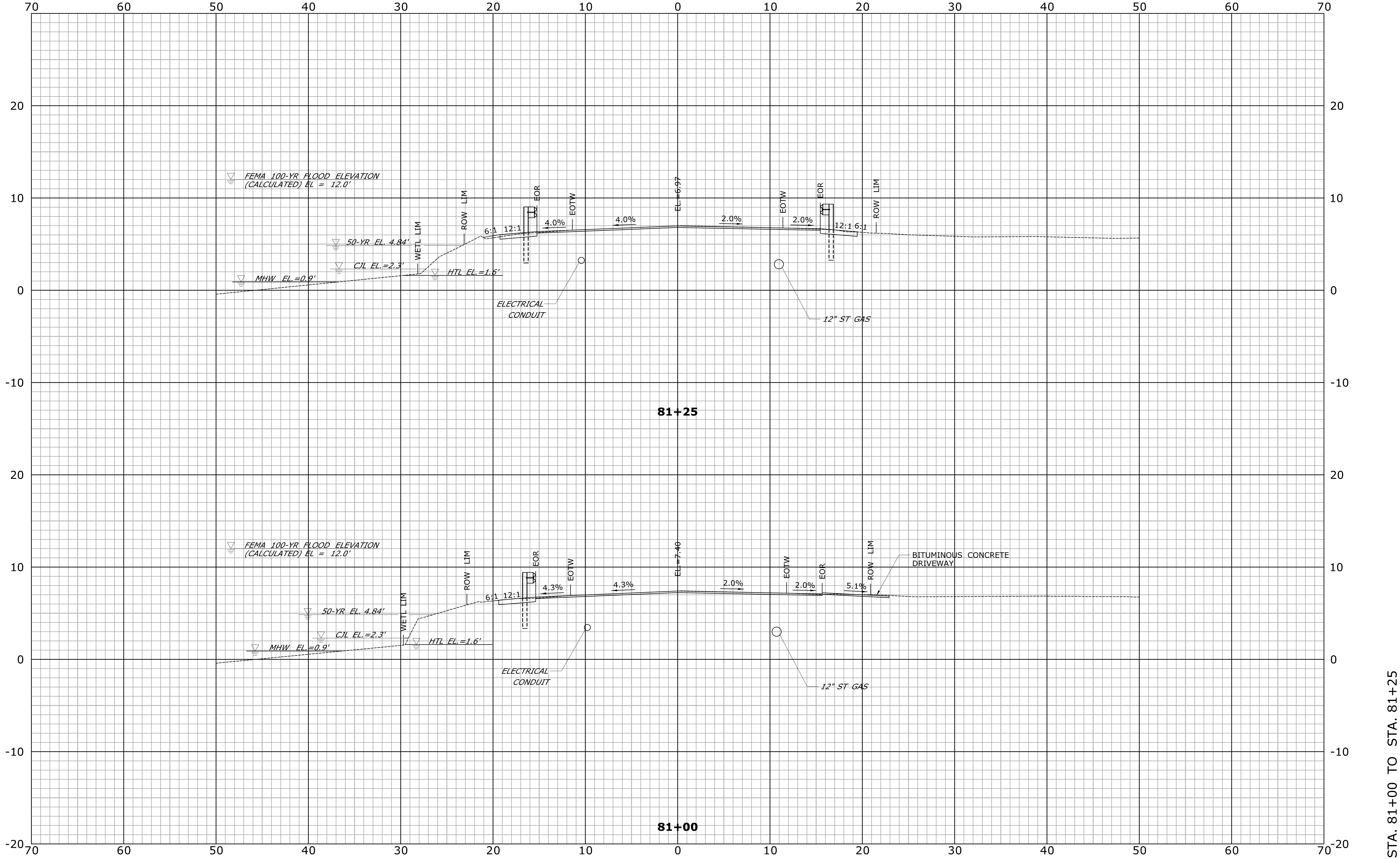
TOWN: PRESTON

DRAWING TITLE: CROSS SECTIONS

PROJECT NO. 113-107

DRAWING NO. XSC-01

SHEET NO.



REV.	DATE	REVISION DESCRIPTION	SHEET NO.

Plotted Date: 2/28/2019

DESIGNER/DRAFTER: J. GUZZE/K. PATCH

CHECKED BY: S. HARRIS

SCALE IN FEET 0 5 10

SCALE 1" = 5'

STATE OF CONNECTICUT
DEPARTMENT OF TRANSPORTATION

Filename: ...\HW_MSH_0113_0107_XSC-01.dgn

SIGNATURE/BLOCK:

PROJECT TITLE: REHABILITATION OF BRIDGE NO. 02931 ROUTE 2A OVER POQUETANUCK COVE

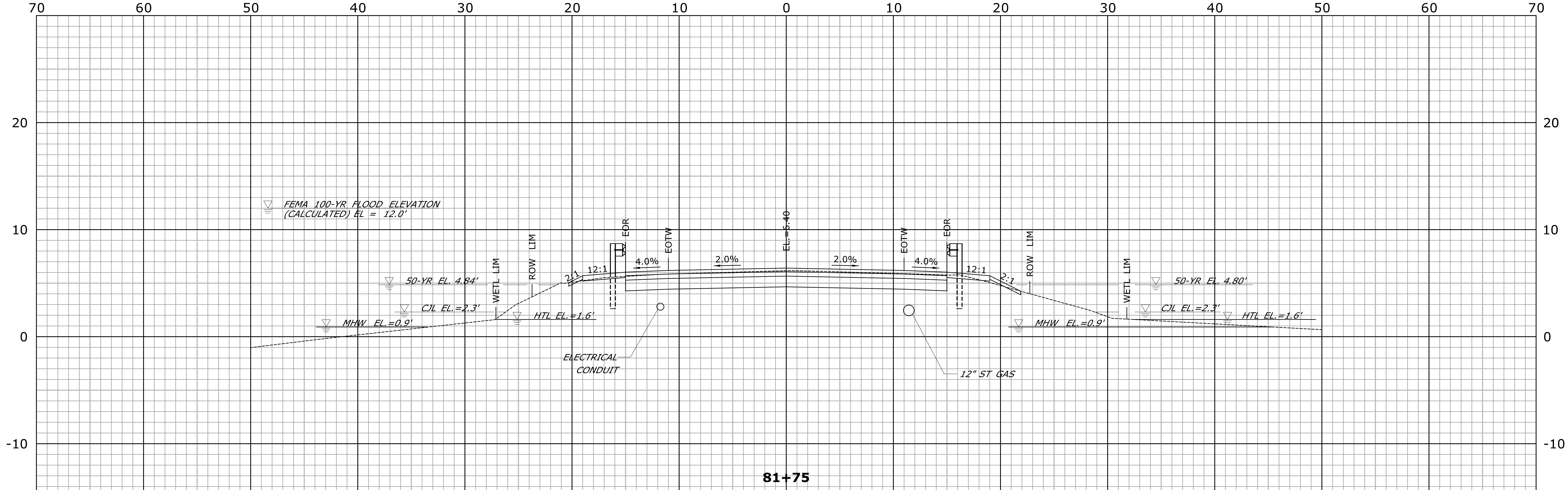
TOWN: PRESTON

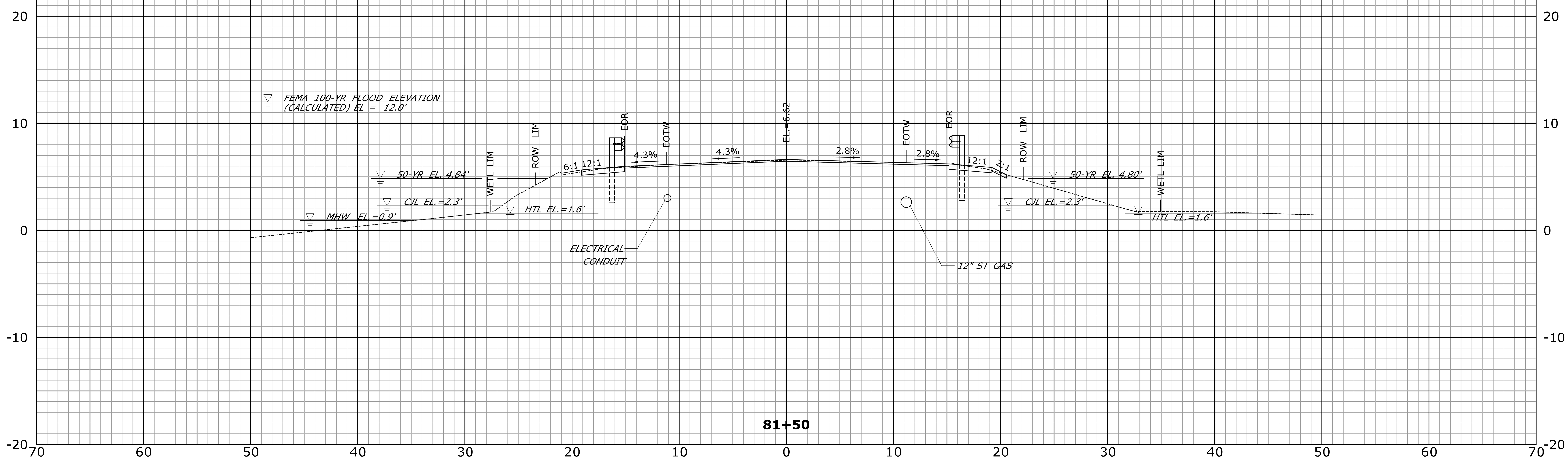
DRAWING TITLE: CROSS SECTIONS

PROJECT NO. 113-107

DRAWING NO. XSC-02

SHEET NO.





STA. 81+50 TO STA. 81+75

REV.	DATE	REVISION DESCRIPTION	SHEET NO.

Plotted Date: 2/28/2019

DESIGNER/DRAFTER: J. GUZZE/K. PATCH
CHECKED BY: S. HARRIS
SCALE IN FEET
0 5 10
SCALE 1" = 5'

STATE OF CONNECTICUT
DEPARTMENT OF TRANSPORTATION

Filename: ...\HW_MSH_0113_0107_XSC-01.dgn

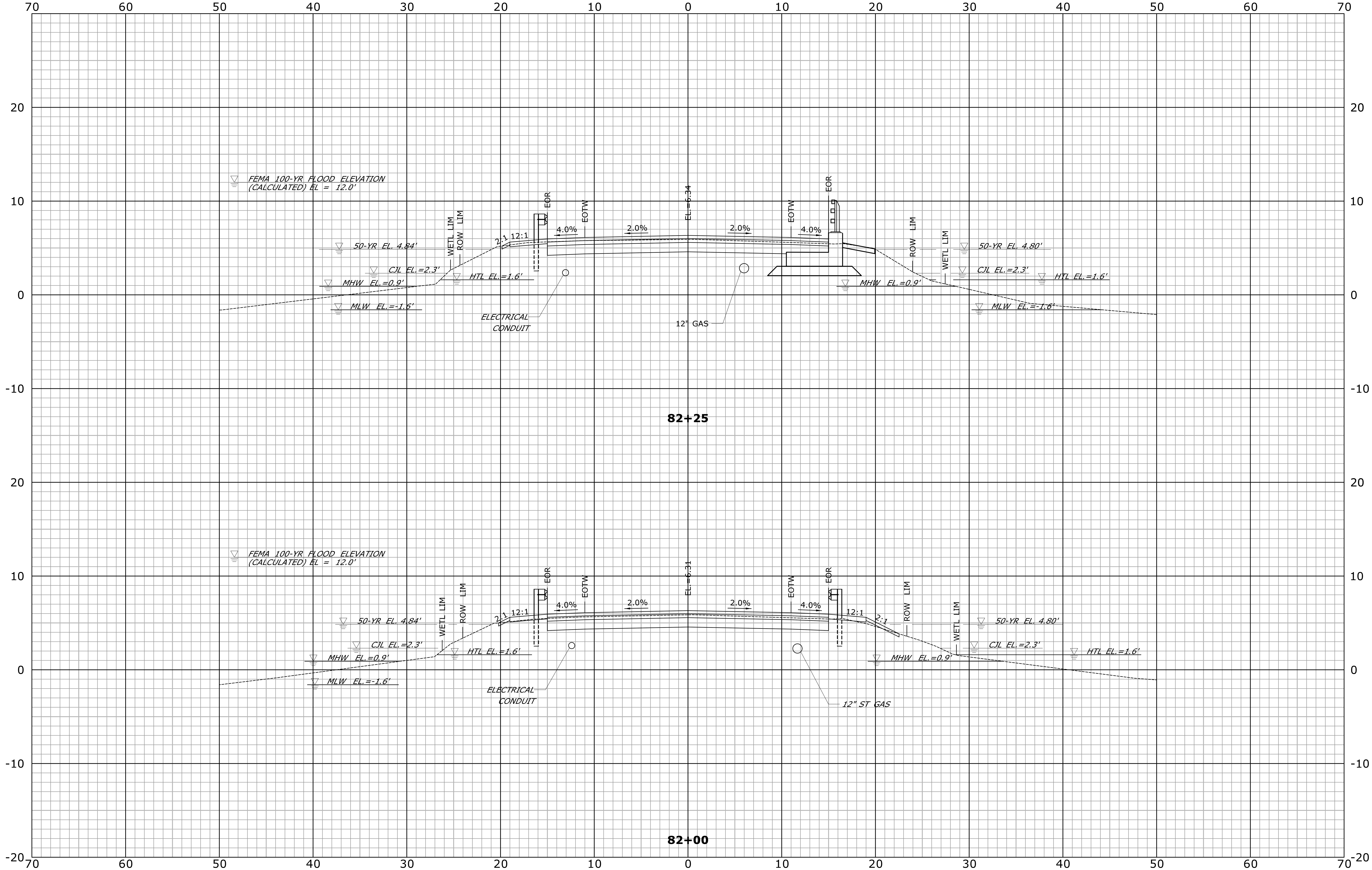
SIGNATURE/
BLOCK:

PROJECT TITLE:
REHABILITATION OF BRIDGE NO. 02931
ROUTE 2A
OVER POQUETANUCK COVE

TOWN:
PRESTON

DRAWING TITLE:
CROSS SECTIONS

PROJECT NO.
113-107
DRAWING NO.
XSC-03
SHEET NO.



STA. 82+00 TO STA. 82+25

REV.	DATE	REVISION DESCRIPTION	SHEET NO.

Plotted Date: 2/28/2019

DESIGNER/DRAFTER: J. GUZZE/K. PATCH
CHECKED BY: S. HARRIS
SCALE IN FEET
0 5 10
SCALE 1" = 5'

STATE OF CONNECTICUT
DEPARTMENT OF TRANSPORTATION

Filename: ...\HW_MSH_0113_0107_XSC-01.dgn

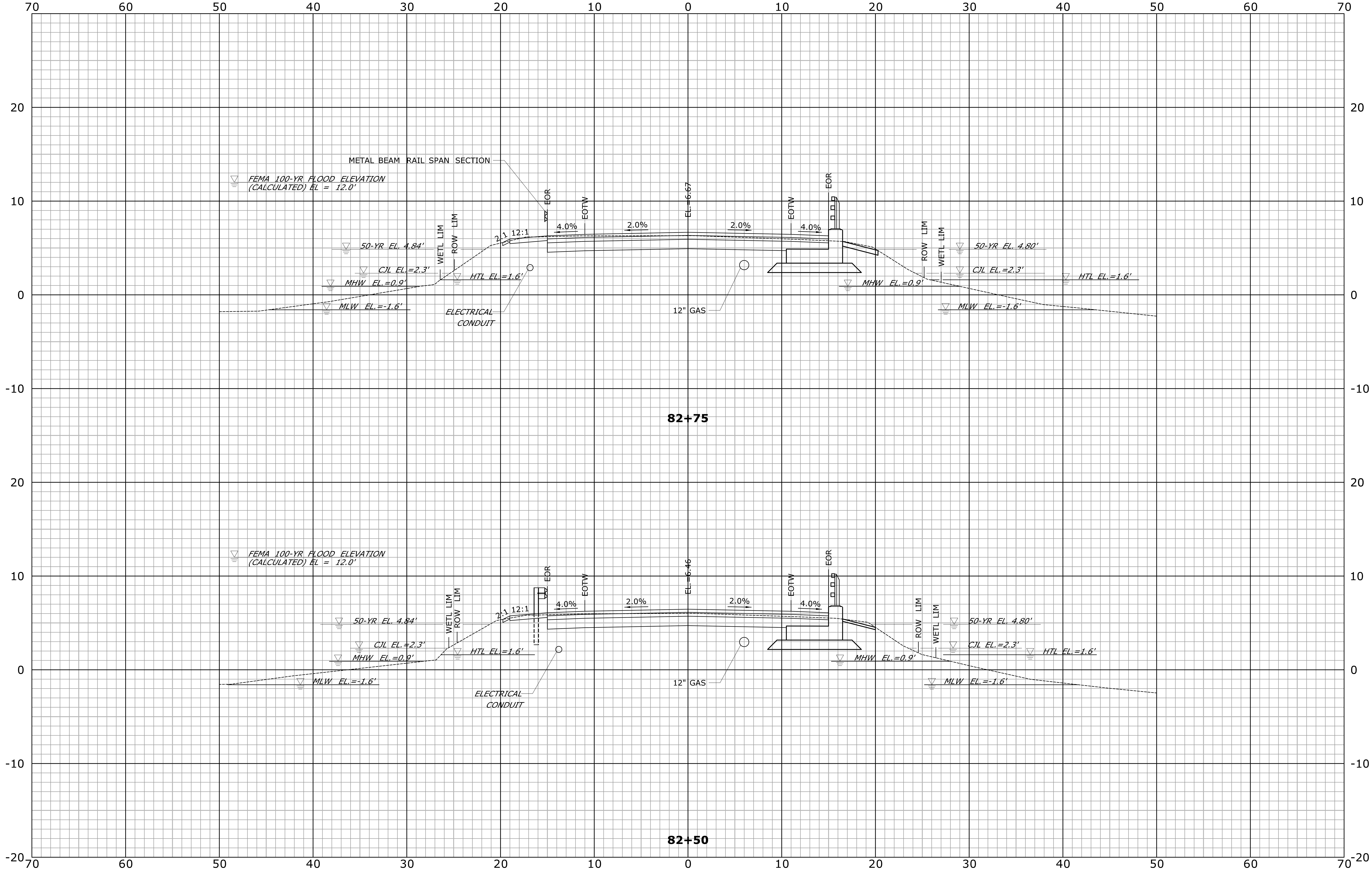
SIGNATURE/ BLOCK:

PROJECT TITLE:
REHABILITATION OF BRIDGE NO. 02931
ROUTE 2A
OVER POQUETANUCK COVE

TOWN: PRESTON

DRAWING TITLE: CROSS SECTIONS

PROJECT NO. 113-107
DRAWING NO. XSC-04
SHEET NO.



STA. 82+50 TO STA. 82+75

REV.	DATE	REVISION DESCRIPTION	SHEET NO.

Plotted Date: 2/28/2019

DESIGNER/DRAFTER: J. GUZZE/K. PATCH

CHECKED BY: S. HARRIS

SCALE IN FEET 0 5 10

SCALE 1" = 5'

STATE OF CONNECTICUT
DEPARTMENT OF TRANSPORTATION

Filename: ...\HW_MSH_0113_0107_XSC-01.dgn

SIGNATURE/BLOCK:

PROJECT TITLE:
REHABILITATION OF BRIDGE NO. 02931
ROUTE 2A
OVER POQUETANUCK COVE

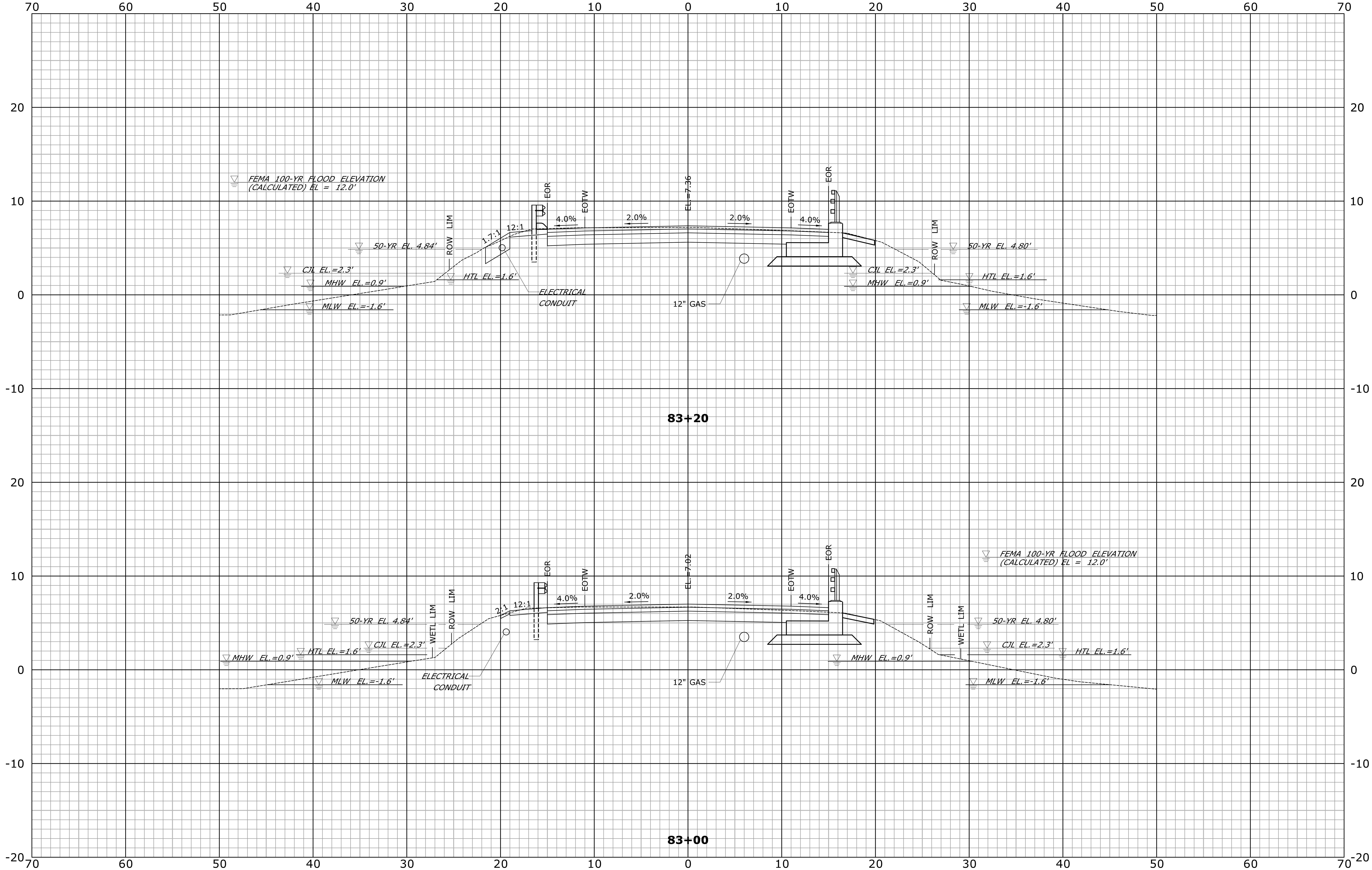
TOWN: PRESTON

DRAWING TITLE: CROSS SECTIONS

PROJECT NO. 113-107

DRAWING NO. XSC-05

SHEET NO.



STA. 83+00 TO STA. 83+20

REV.	DATE	REVISION DESCRIPTION	SHEET NO.

Plotted Date: 2/28/2019

DESIGNER/DRAFTER: J. GUZZE/K. PATCH

CHECKED BY: S. HARRIS

SCALE IN FEET 0 5 10

SCALE 1" = 5'

STATE OF CONNECTICUT
DEPARTMENT OF TRANSPORTATION

Filename: ...\HW_MSH_0113_0107_XSC-01.dgn

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PROJECT TITLE: REHABILITATION OF BRIDGE NO. 02931 ROUTE 2A OVER POQUETANUCK COVE

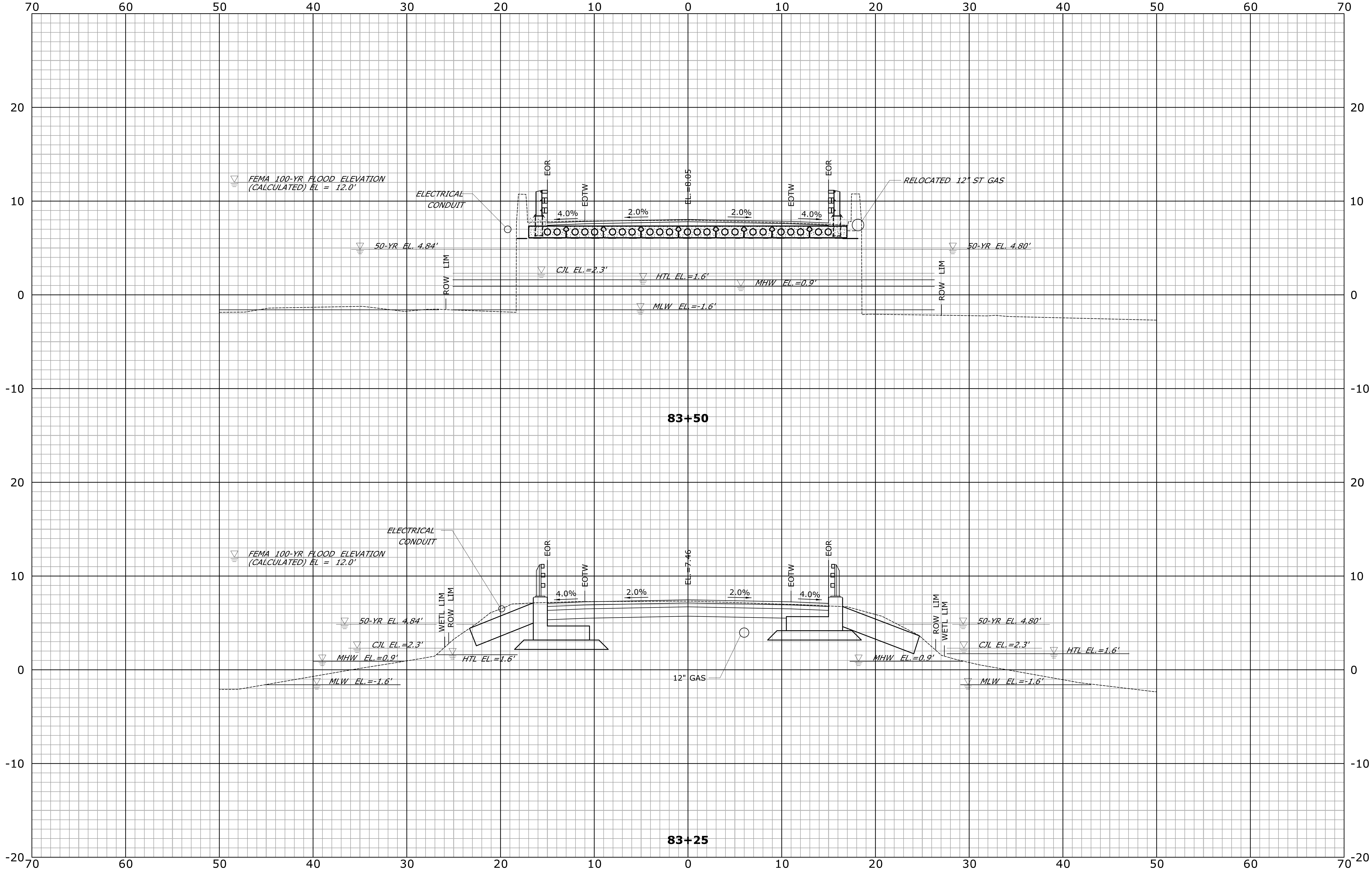
TOWN: PRESTON

DRAWING TITLE: CROSS SECTIONS

PROJECT NO. 113-107

DRAWING NO. XSC-06

SHEET NO.



STA. 83+25 TO STA. 83+50

REV.	DATE	REVISION DESCRIPTION	SHEET NO.

Plotted Date: 2/28/2019

DESIGNER/DRAFTER: J. GUZZE/K. PATCH
CHECKED BY: S. HARRIS
SCALE IN FEET 0 5 10
SCALE 1" = 5'

STATE OF CONNECTICUT
DEPARTMENT OF TRANSPORTATION

Filename: ...\HW_MSH_0113_0107_XSC-01.dgn

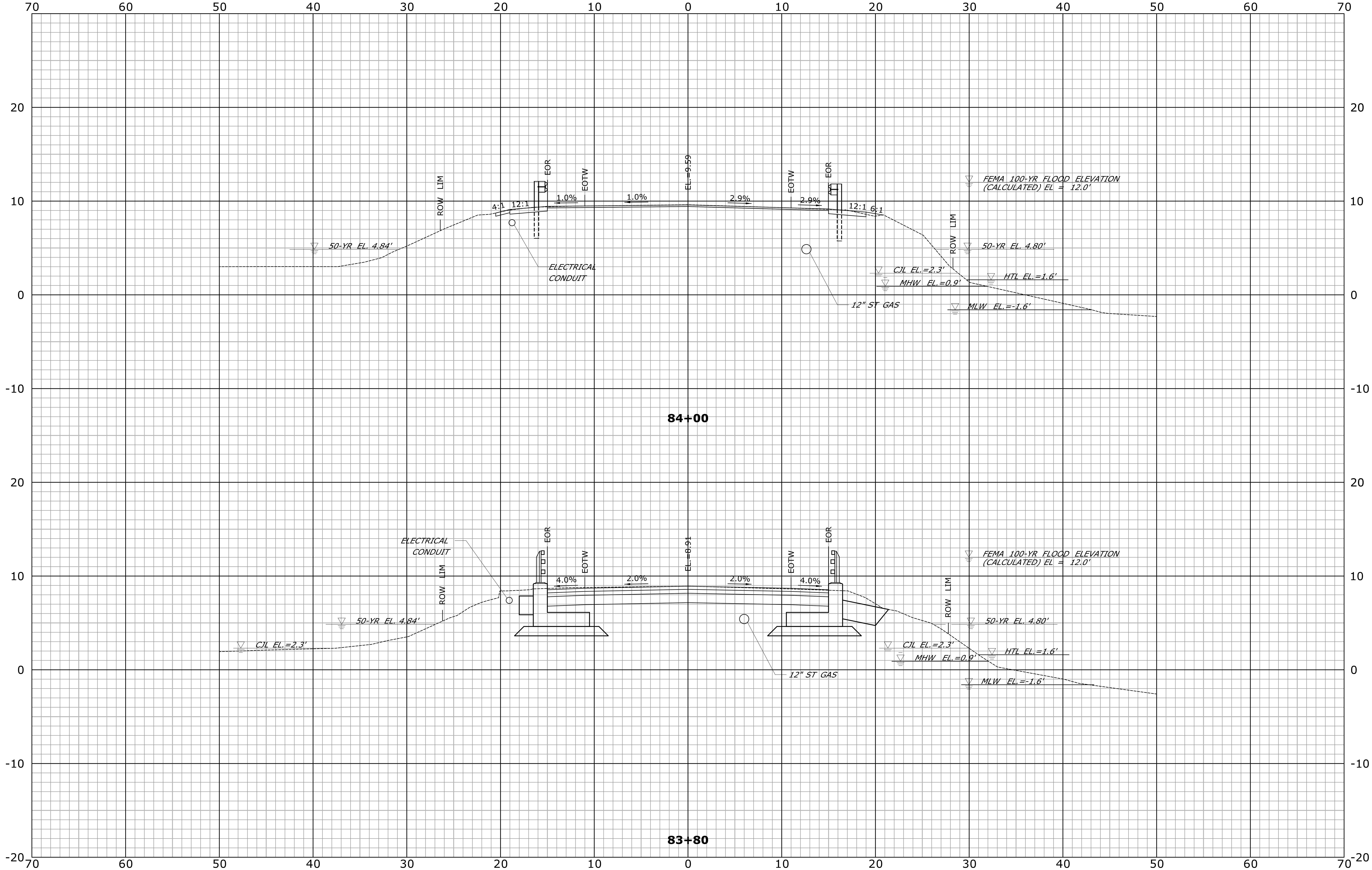
SIGNATURE/ BLOCK:

PROJECT TITLE:
REHABILITATION OF BRIDGE NO. 02931
ROUTE 2A
OVER POQUETANUCK COVE

TOWN: PRESTON

DRAWING TITLE: CROSS SECTIONS

PROJECT NO. 113-107
DRAWING NO. XSC-07
SHEET NO.



STA. 83+80 TO STA. 84+00

REV.	DATE	REVISION DESCRIPTION	SHEET NO.

Plotted Date: 2/28/2019

DESIGNER/DRAFTER: J. GUZZE/K. PATCH

CHECKED BY: S. HARRIS

SCALE IN FEET 0 5 10

SCALE 1" = 5'

STATE OF CONNECTICUT
DEPARTMENT OF TRANSPORTATION

Filename: ...\HW_MSH_0113_0107_XSC-01.dgn

SIGNATURE/ BLOCK:

PROJECT TITLE:
REHABILITATION OF BRIDGE NO. 02931
ROUTE 2A
OVER POQUETANUCK COVE

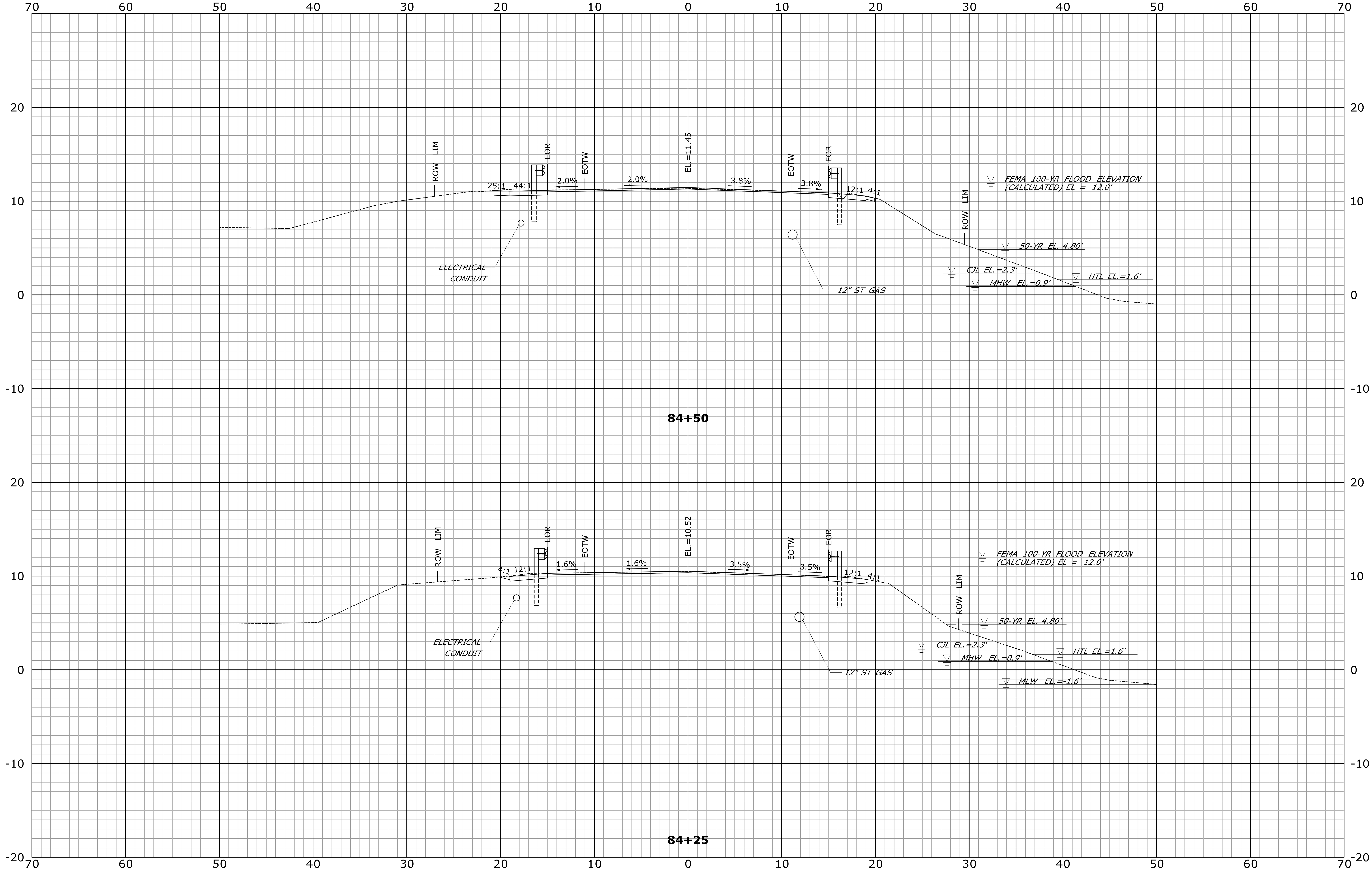
TOWN: PRESTON

DRAWING TITLE: CROSS SECTIONS

PROJECT NO. 113-107

DRAWING NO. XSC-08

SHEET NO.



STA. 84+25 TO STA. 84+50

REV.	DATE	REVISION DESCRIPTION	SHEET NO.

Plotted Date: 2/28/2019

DESIGNER/DRAFTER: J. GUZZE/K. PATCH

CHECKED BY: S. HARRIS

SCALE IN FEET 0 5 10

SCALE 1" = 5'

STATE OF CONNECTICUT
DEPARTMENT OF TRANSPORTATION

Filename: ...\HW_MSH_0113_0107_XSC-01.dgn

SIGNATURE/ BLOCK:

PROJECT TITLE:
REHABILITATION OF BRIDGE NO. 02931
ROUTE 2A
OVER POQUETANUCK COVE

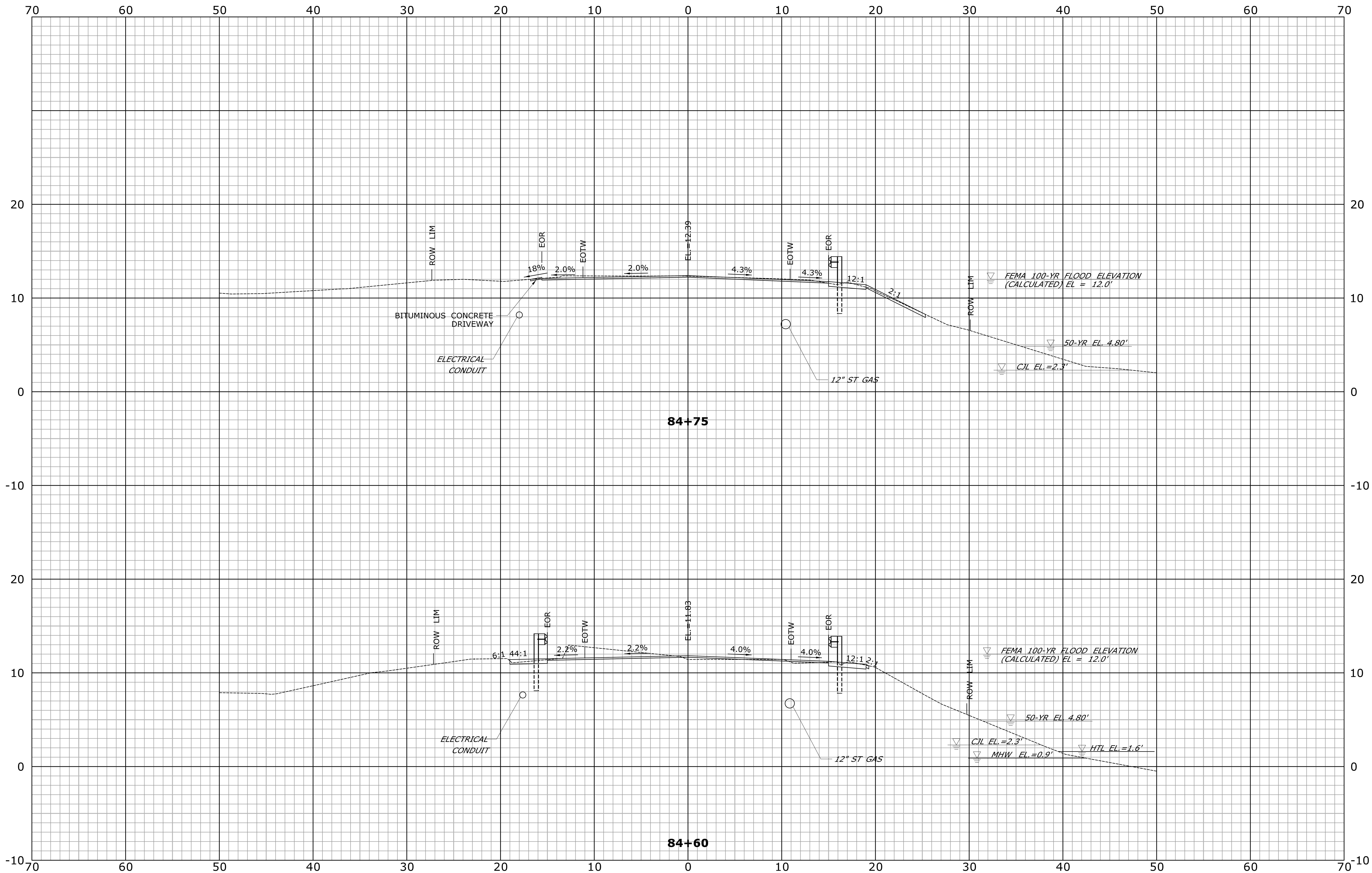
TOWN: PRESTON

DRAWING TITLE: CROSS SECTIONS

PROJECT NO. 113-107

DRAWING NO. XSC-09

SHEET NO.



STA. 84+60 TO STA. 84+75

REV.	DATE	REVISION DESCRIPTION	SHEET NO.

Plotted Date: 2/28/2019

DESIGNER/DRAFTER: J. GUZZE/K. PATCH

CHECKED BY: S. HARRIS

SCALE IN FEET 0 5 10

SCALE 1" = 5'

STATE OF CONNECTICUT
DEPARTMENT OF TRANSPORTATION

Filename: ...\HW_MSH_0113_0107_XSC-01.dgn

SIGNATURE/BLOCK:

PROJECT TITLE:
REHABILITATION OF BRIDGE NO. 02931
ROUTE 2A
OVER POQUETANUCK COVE

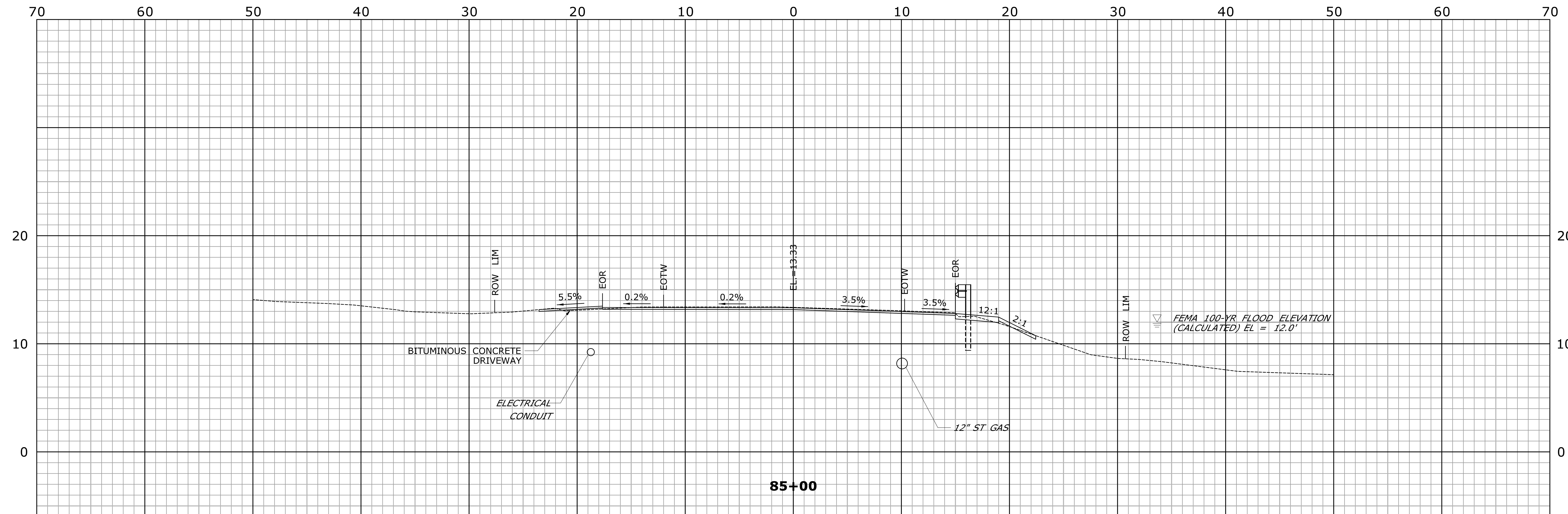
TOWN: PRESTON

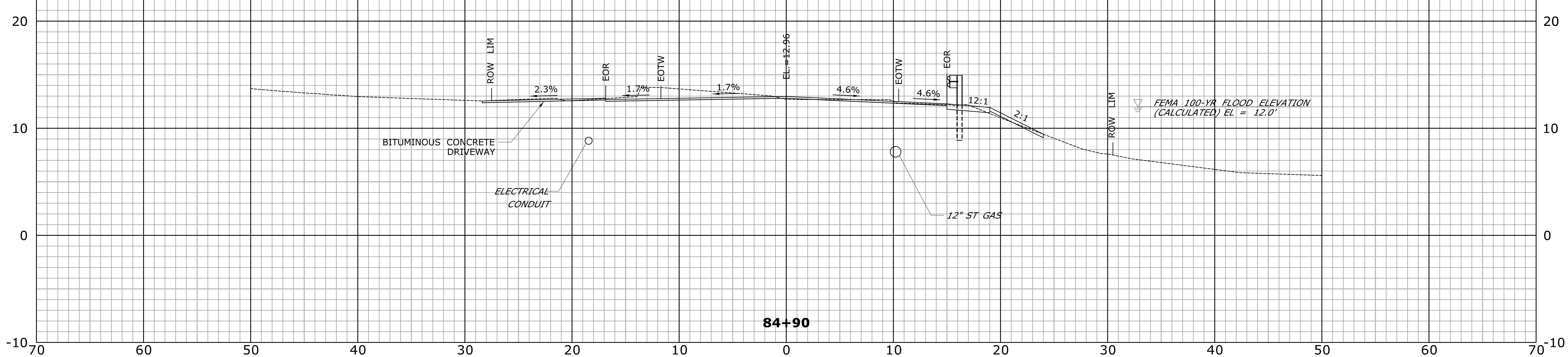
DRAWING TITLE: CROSS SECTIONS

PROJECT NO. 113-107

DRAWING NO. XSC-10

SHEET NO.





STA. 84+90 TO STA. 85+00

REV.	DATE	REVISION DESCRIPTION	SHEET NO.

Plotted Date: 2/28/2019

DESIGNER/DRAFTER: J. GUZZE/K. PATCH

CHECKED BY: S. HARRIS

SCALE IN FEET 0 5 10

SCALE 1" = 5'

STATE OF CONNECTICUT
DEPARTMENT OF TRANSPORTATION

Filename: ...\HW_MSH_0113_0107_XSC-01.dgn

SIGNATURE/BLOCK:

PROJECT TITLE:
REHABILITATION OF BRIDGE NO. 02931
ROUTE 2A
OVER POQUETANUCK COVE

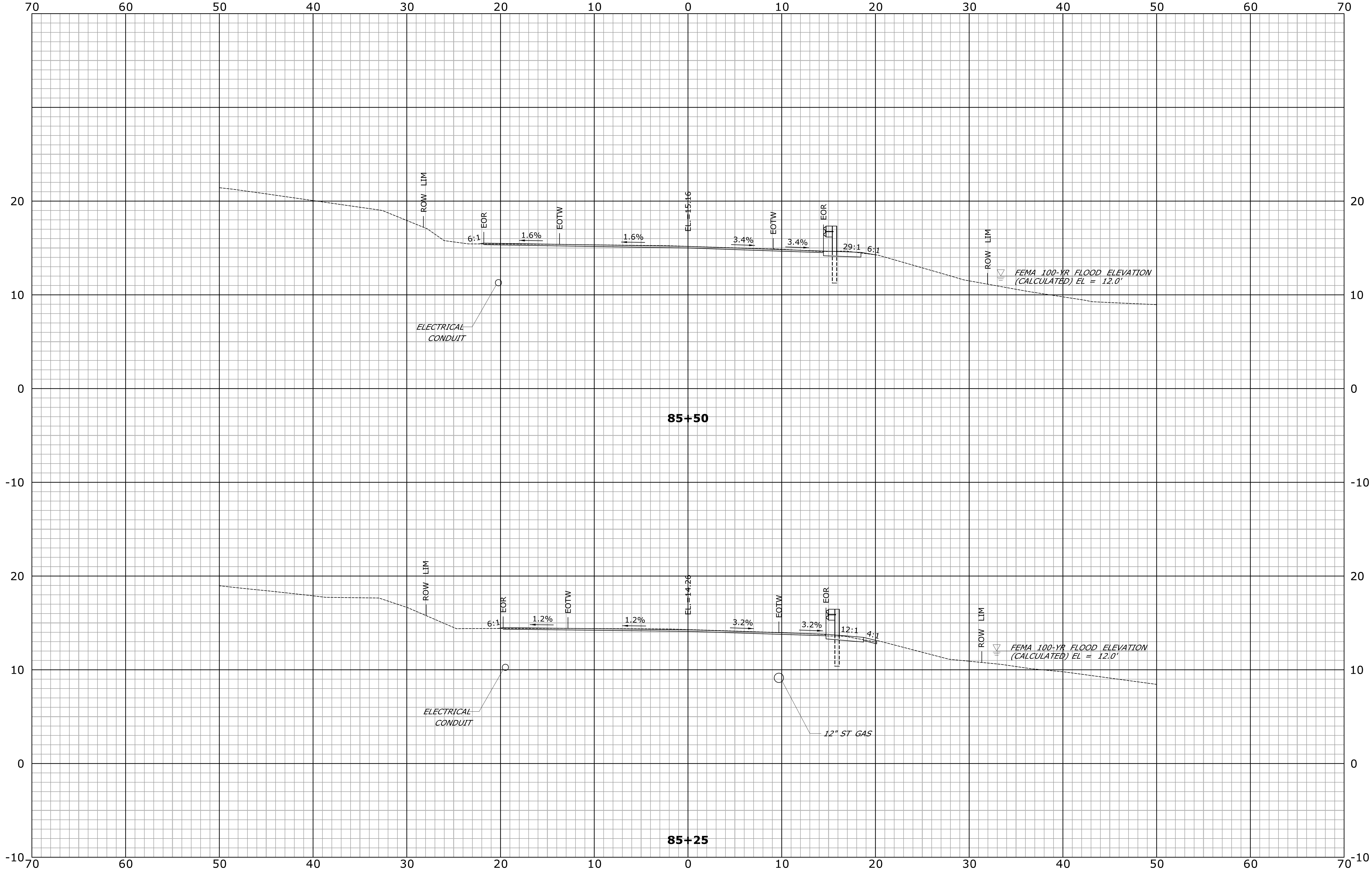
TOWN: PRESTON

DRAWING TITLE: CROSS SECTIONS

PROJECT NO. 113-107

DRAWING NO. XSC-11

SHEET NO.



STA. 85+25 TO STA. 85+50

REV.	DATE	REVISION DESCRIPTION	SHEET NO.

Plotted Date: 3/1/2019

DESIGNER/DRAFTER: J. GUZZE/K. PATCH

CHECKED BY: S. HARRIS

SCALE IN FEET 0 5 10

SCALE 1" = 5'

STATE OF CONNECTICUT
DEPARTMENT OF TRANSPORTATION

Filename: ...\HW_MSH_0113_0107_XSC-01.dgn

SIGNATURE/BLOCK:

PROJECT TITLE:
REHABILITATION OF BRIDGE NO. 02931
ROUTE 2A
OVER POQUETANUCK COVE

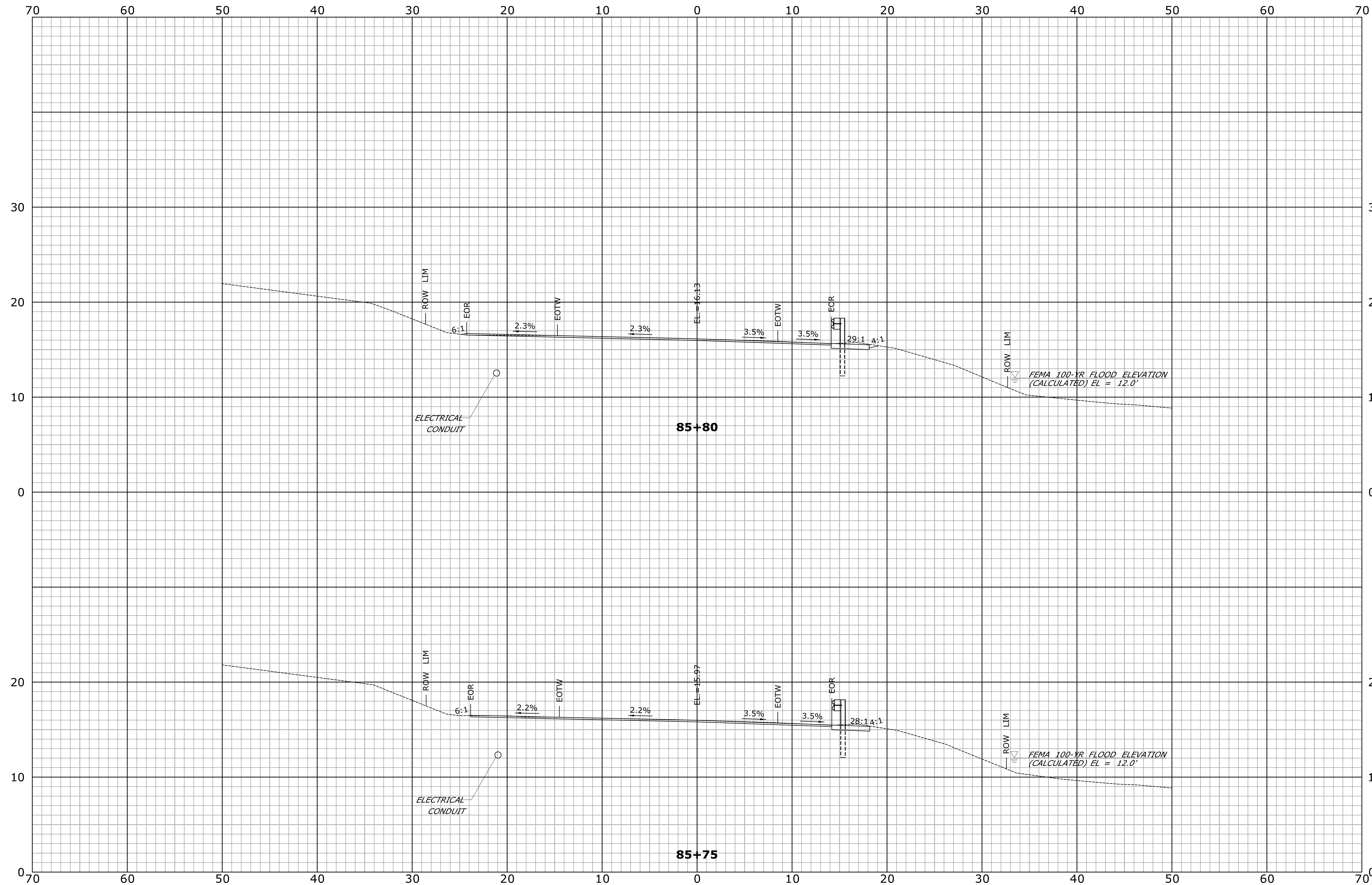
TOWN: PRESTON

DRAWING TITLE: CROSS SECTIONS

PROJECT NO. 113-107

DRAWING NO. XSC-12

SHEET NO.



STA. 85+75 TO STA. 85+80

REV.	DATE	REVISION DESCRIPTION	SHEET NO.

Plotted Date: 3/1/2019

DESIGNER/DRAFTER: J. GUZZE/K. PATCH
CHECKED BY: S. HARRIS
SCALE IN FEET 0 5 10
SCALE 1" = 5'

STATE OF CONNECTICUT
DEPARTMENT OF TRANSPORTATION

Filename: ...\HW_MSH_0113_0107_XSC-01.dgn

SIGNATURE/BLOCK:

PROJECT TITLE: REHABILITATION OF BRIDGE NO. 02931
ROUTE 2A
OVER POQUETANUCK COVE

TOWN: PRESTON

DRAWING TITLE: CROSS SECTIONS

PROJECT NO. 113-107
DRAWING NO. XSC-13
SHEET NO.

01.05 - STRUCTURE
INDEX OF DRAWINGS

DRAWING NUMBER	DRAWING TITLE	DRAWING NUMBER	DRAWING TITLE
S-01	STRUCTURE INDEX OF DRAWINGS		
S-02	GENERAL PLAN ELEVATION AND SECTION		
S-03	BRIDGE LAYOUT		
S-04	CROSS SECTIONS		
S-05	WATER HANDLING		
S-06	WEST ABUTMENT PLAN AND ELEVATION		
S-07	EAST ABUTMENT PLAN AND ELEVATION		
S-08	ABUTMENT DETAILS		
S-09	ABUTMENT REINFORCING		
S-10	WINGWALL PLAN AND SECTIONS		
S-11	FRAMING PLAN AND DETAILS		
S-12	PRESTRESSED DECK UNIT DETAILS - 1		
S-13	PRESTRESSED DECK UNIT DETAILS - 2		
S-14	BARRIER WALL ELEVATIONS		
S-15	BARRIER WALL DETAILS		
S-16	BRIDGE RAIL		
S-17	END BLOCK AND RAIL DETAILS		

DESIGNED BY:
FUSS & O'NEILL INC.
146 HARTFORD ROAD
MANCHESTER, CT 06040

FINAL DESIGN REVIEW

REV.	DATE	REVISION DESCRIPTION	SHEET NO.

Plotted: 2/28/2019

DESIGNER/DRAFTER: D. WHITTEMORE
CHECKED BY: S. HARRIS

STATE OF CONNECTICUT
DEPARTMENT OF TRANSPORTATION

Filename: ...\04_SB_MSH_113-107_INX.dgn

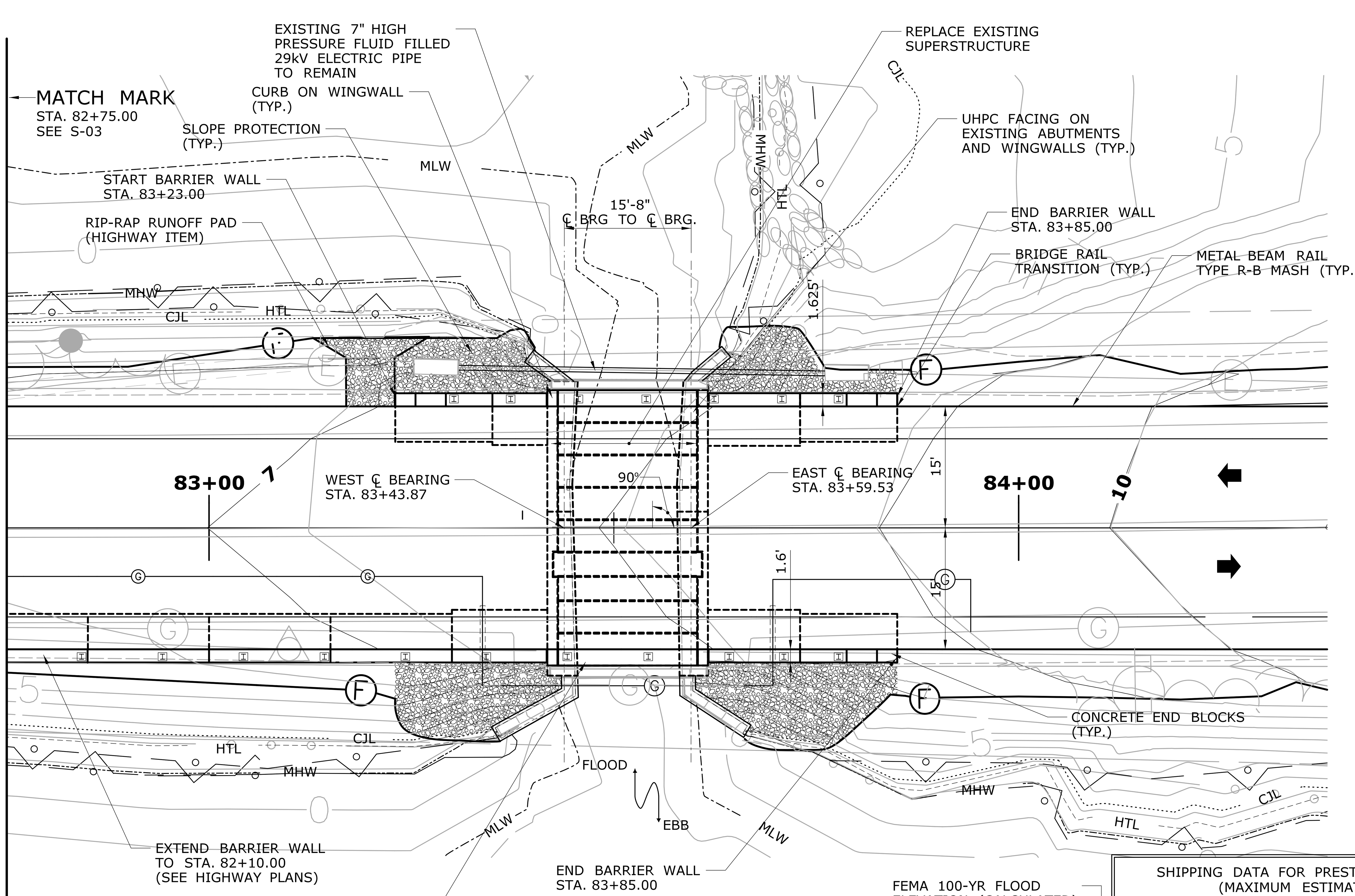
SIGNATURE/ BLOCK:

PROJECT TITLE: REHABILITATION OF BRIDGE 02931 ROUTE 2A OVER POQUETANUCK COVE

TOWN: PRESTON

DRAWING TITLE: STRUCTURE INDEX OF DRAWINGS

PROJECT NO. 113-107
DRAWING NO. S-01
SHEET NO.

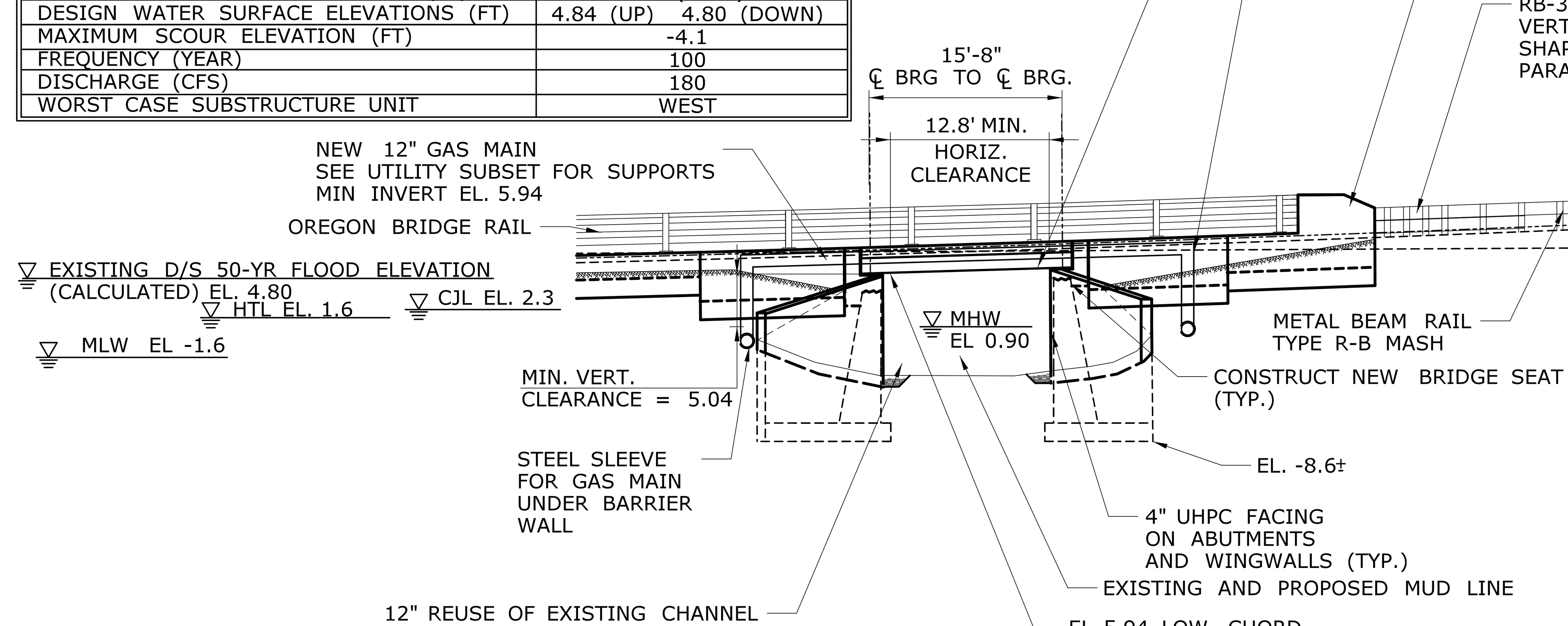


PLAN

SCALE: 1"=10'-0"

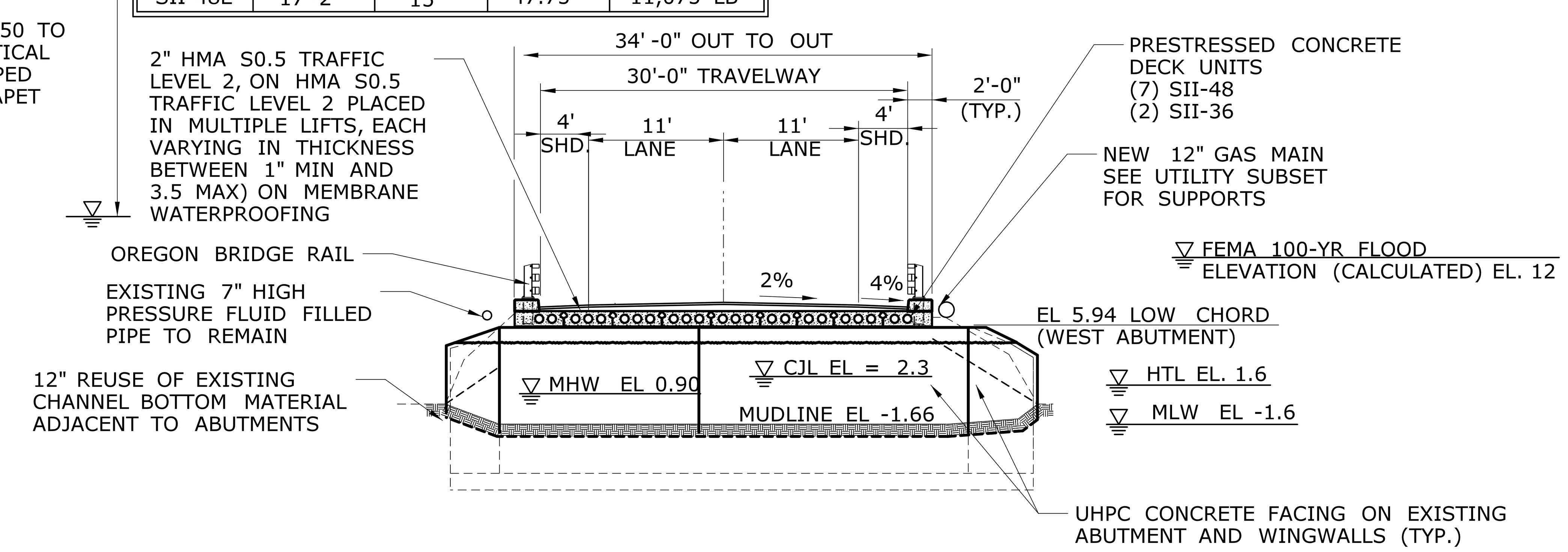
HYDRAULIC SUMMARY DATA	
DRAINAGE AREA (MI^2)	0.046
DESIGN FREQUENCY (YEAR)	50 YEAR
DESIGN DISCHARGE (CFS)	140
AVERAGE DAILY FLOW ELEVATION (FT)	0.9 (MHW)
DESIGN WATER SURFACE ELEVATIONS (FT)	4.84 (UP) 4.80 (DOWN)
MAXIMUM SCOUR ELEVATION (FT)	-4.1
FREQUENCY (YEAR)	100
DISCHARGE (CFS)	180
WORST CASE SUBSTRUCTURE UNIT	WEST

SHIPPING DATA FOR PRESTRESSED DECK UNIT (MAXIMUM ESTIMATED VALUE)				
MEMBER	SHIPPING LENGTH	SHIPPING HEIGHT	SHIPPING WIDTH	SHIPPING WEIGHT
SII-36	17'-2"	15"	35.5"	7,865 LB
SII-36K	18'-4"	15"	35.5"	8,400 LB
SII-48	17'-2"	15"	47.5"	10,180 LB
SII-48E	17'-2"	15"	47.75"	11,075 LB



ELEVATION

SCALE: 1"=10'-0"



LONGITUDINAL SECTION

SCALE: 1"=10'-0"

GENERAL NOTES:

SPECIFICATIONS: CONNECTICUT DEPARTMENT OF TRANSPORTATION FORM 817 AS SUPPLEMENTED BY XXXX.

DESIGN SPECIFICATIONS: AASHTO LRFD BRIDGE DESIGN SPECIFICATIONS 8TH EDITION - 2017, AS SUPPLEMENTED BY THE CONNECTICUT DEPARTMENT OF TRANSPORTATION BRIDGE DESIGN MANUAL (2003).

ALLOWABLE DESIGN STRESSES:
CLASS "F" CONCRETE .... BASED ON f'c = 4000 PSI
PRESTRESSED CONCRETE DECK UNITS.. BASED ON f'c = 6500 PSI
UHPC (KEYWAY JOINTS)..................... BASED ON f'c = 22,000 PSI
UHPC (FACING)................................ BASED ON f'c = 22,000 PSI

REINFORCEMENT
(ASTM A615 GRADE 60) .... Fy = 60000 PSI

FUTURE PAVING ALLOWANCE: NONE

BITUMINOUS CONCRETE OVERLAY: THIS SHALL CONSIST OF THREE COURSES OF TRAFFIC LEVEL 2 MIXES. THE BOTTOM COURSE SHALL BE HOT MIX ASPHALT (1" HMA S0.25). THE MIDDLE COURSE SHALL BE HOT MIX ASPHALT (1" MIN HMA S0.25) AND SHALL VARY IN THICKNESS OF 0 TO 1.5" MAX FOR EACH LIFT NEEDED TO ATTAIN CROSS SLOPES. THE TOP COURSE SHALL BE HOT MIX ASPHALT (2" HMA S0.5) OVER THE BRIDGE LIMITS ONLY.

DIMENSIONS: WHEN DIMENSIONS ARE GIVEN TO LESS THAN THREE DECIMAL PLACES, THE OMITTED DIGITS SHALL BE ASSUMED TO BE ZEROS

CONCRETE NOTES:

REMAIN-IN-PLACE FORMS: THE USE OF REMAIN-IN-PLACE FORMS ON THIS STRUCTURE IS NOT ALLOWED.

CLASS "F" CONCRETE: CLASS "F" CONCRETE SHALL BE USED FOR CONCRETE CURBS, BARRIER WALLS, AND ABUTMENT STEMS AND BRIDGE SEATS.

JOINT SEAL: SEE SPECIAL PROVISIONS.

EXPOSED EDGES: EXPOSED EDGES OF CONCRETE SHALL BE BEVELED 1" x 1" UNLESS DIMENSIONED OTHERWISE.

CONCRETE COVER: ALL REINFORCEMENT SHALL HAVE TWO INCHES COVER UNLESS DIMENSIONED OTHERWISE.

REINFORCEMENT: ALL REINFORCEMENT SHALL BE ASTM A615 GRADE 60.

EPOXY COATED REINFORCING BARS: THERE IS NO EPOXY COATED REINFORCING ON THIS STRUCTURE.

CONSTRUCTION JOINTS: CONSTRUCTION JOINTS, OTHER THAN THOSE SHOWN ON THE PLANS WILL NOT BE PERMITTED WITHOUT THE PRIOR APPROVAL OF THE ENGINEER.

THE SPECIFIED CONCRETE STRENGTH USED IN DESIGN, F'c, OF THE CONCRETE COMPONENTS IS NOTED ABOVE. THE MINIMUM COMPRESSIVE STRENGTH OF THE CONCRETE IN THE CONSTRUCTED COMPONENTS SHALL CONFORM TO THE REQUIREMENTS OF SECTION 6.01 CONCRETE FOR STRUCTURES.

PRECAST CONCRETE NOTES:

THE CONTRACTOR SHALL MANUFACTURE AND CONSTRUCT PRESTRESSED DECK UNITS IN ACCORDANCE WITH THE SPECIAL PROVISIONS FOR "PRESTRESSED DECK UNITS" TO THE INSIDE DIMENSIONS, LENGTH AND DETAILS SHOWN ON THESE PLANS.

ALL INSERTS OR HOLES CAST INTO THE DECK UNITS FOR THE SOLE PURPOSE OF HANDLING AND SETTING THE UNITS SHALL BE SEALED WITH UHPC CONCRETE TO A SMOOTH FINISH UPON COMPLETION OF THE WORK.

UHPC CONCRETE SHALL BE USED TO SEAL THE SHEAR KEYS

THE COST OF FURNISHING AND INSTALLING THE INSERTS SHALL BE INCLUDED IN THE ITEM "PRESTRESSED DECK" OF EACH SIZE. ALL INSERTS SHALL HAVE A CORROSIVE RESISTANT COATING.

ALL REINFORCEMENT TO HAVE 2" COVER UNLESS OTHERWISE NOTED.

NOTICE TO BRIDGE INSPECTORS

THE DEPARTMENT'S BRIDGE SAFETY PROCEDURES REQUIRE THIS BRIDGE TO BE INSPECTED FOR, BUT NOT LIMITED TO, ALL APPROPRIATE COMPONENTS INDICATED IN THE GOVERNING MANUALS FOR BRIDGE INSPECTION. ATTENTION MUST BE GIVEN TO INSPECTING THE FOLLOWING SPECIAL COMPONENTS AND DETAILS. (THE LISTING FOR COMPONENTS FOR SPECIFIC ATTENTION SHALL NOT BE CONSTRUED TO REDUCE THE IMPORTANCE OF INSPECTION OF ANY OTHER COMPONENT OF THE STRUCTURE.) THE FREQUENCY OF INSPECTION OF THIS STRUCTURE SHALL BE IN ACCORDANCE WITH THE GOVERNING MANUALS FOR BRIDGE INSPECTION, UNLESS OTHERWISE DIRECTED BY THE MANAGER OF BRIDGE SAFETY AND EVALUATION.

COMPONENT OR DETAIL	STRUCTURE SHEET REFERENCE
NONE	NONE

FINAL DESIGN REVIEW

REV.	DATE	REVISION DESCRIPTION	SHEET NO.

Plotted Date: 2/28/2019

DESIGNER/DRAFTER: DLW
CHECKED BY: SHH
SCALE AS NOTED

STATE OF CONNECTICUT
DEPARTMENT OF TRANSPORTATION

Filename: ...\04_SB_MSH_Br02931_GPE.dgn

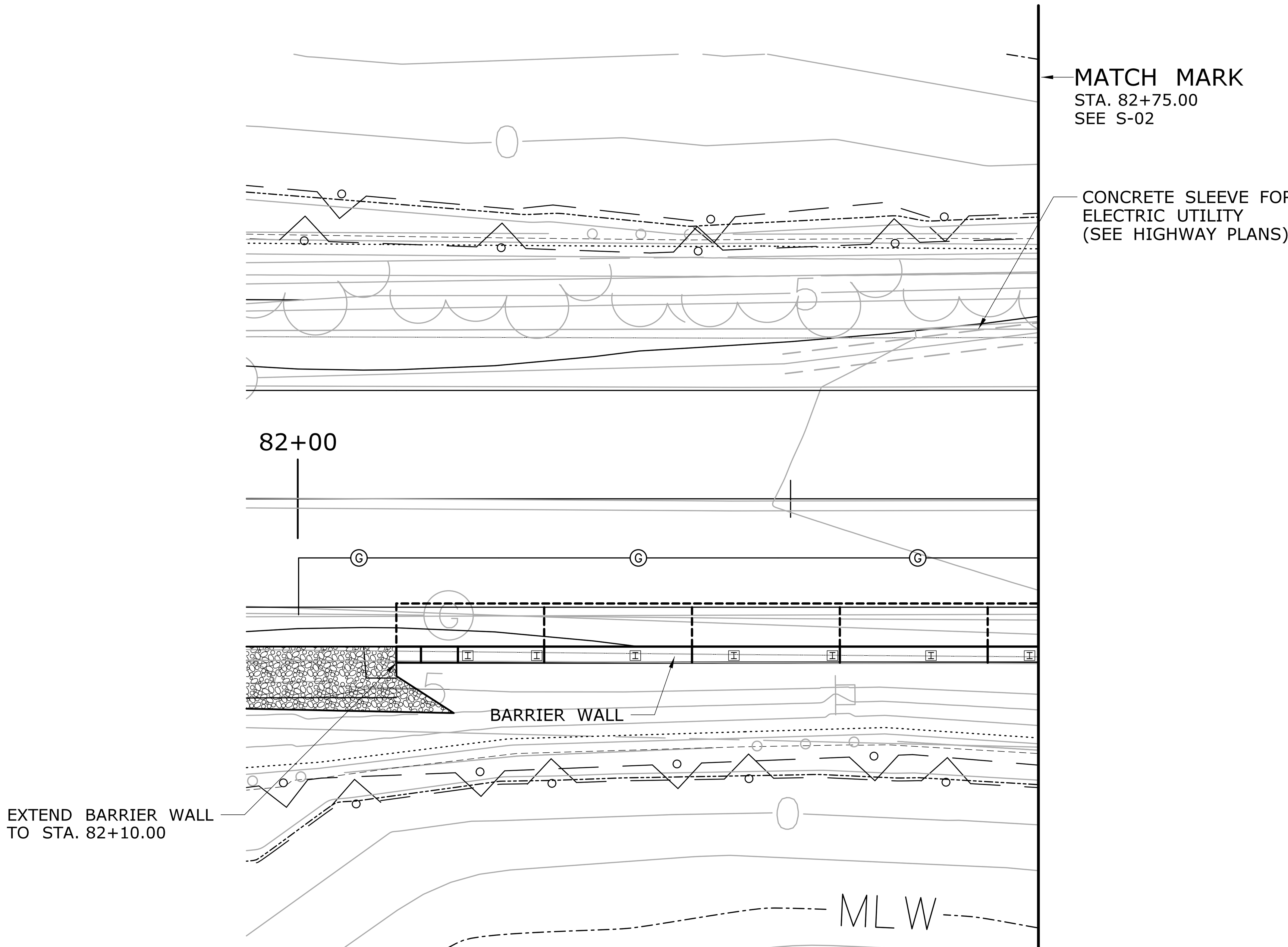
SIGNATURE/BLOCK:

PROJECT TITLE:
REHABILITATION OF BRIDGE NO. 02931
ROUTE 2A
OVER POQUETANUCK COVE

TOWN: PRESTON

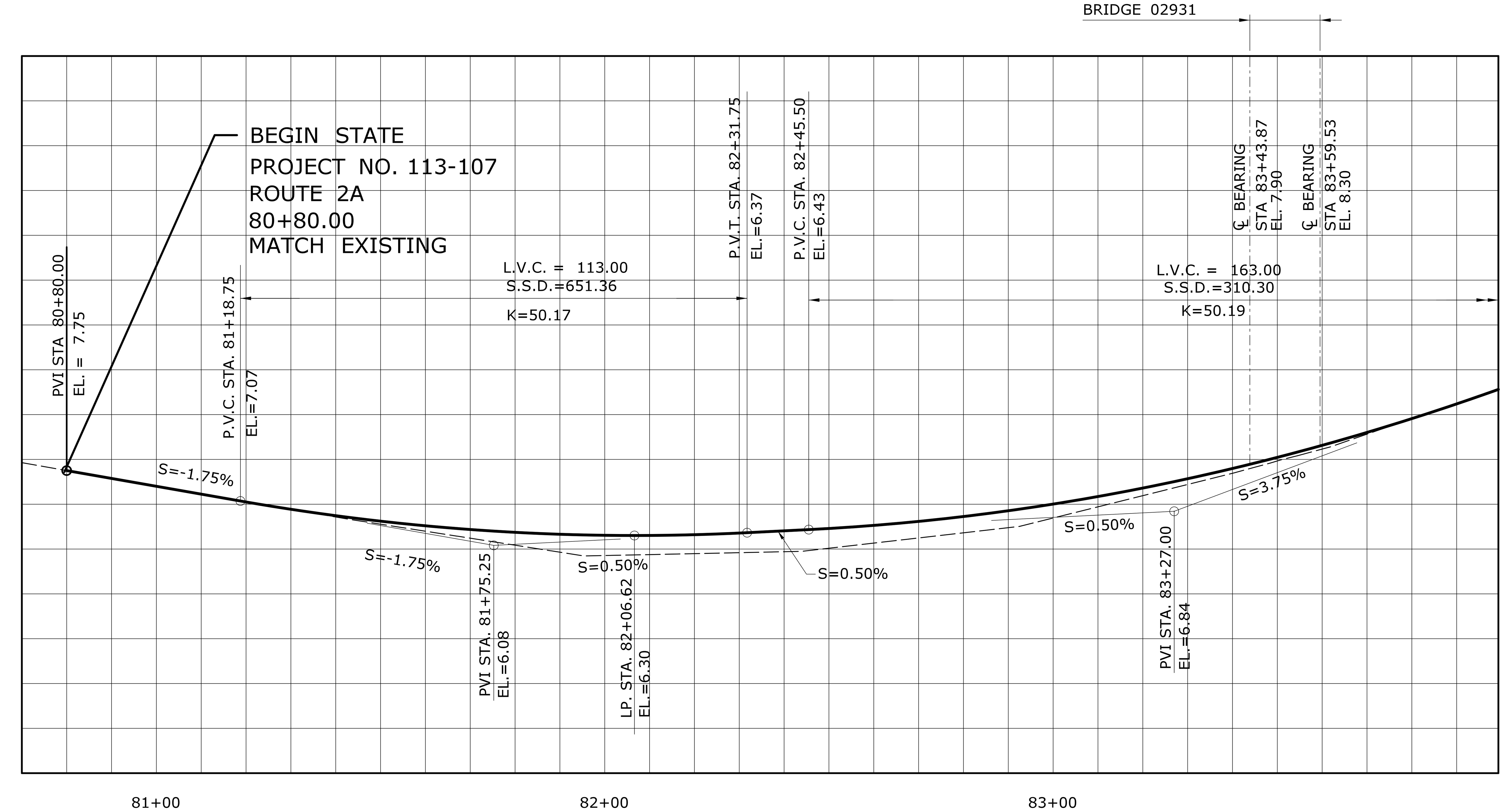
DRAWING TITLE: GENERAL PLAN ELEVATION AND SECTION

PROJECT NO. 113-107
DRAWING NO. S-02
SHEET NO.

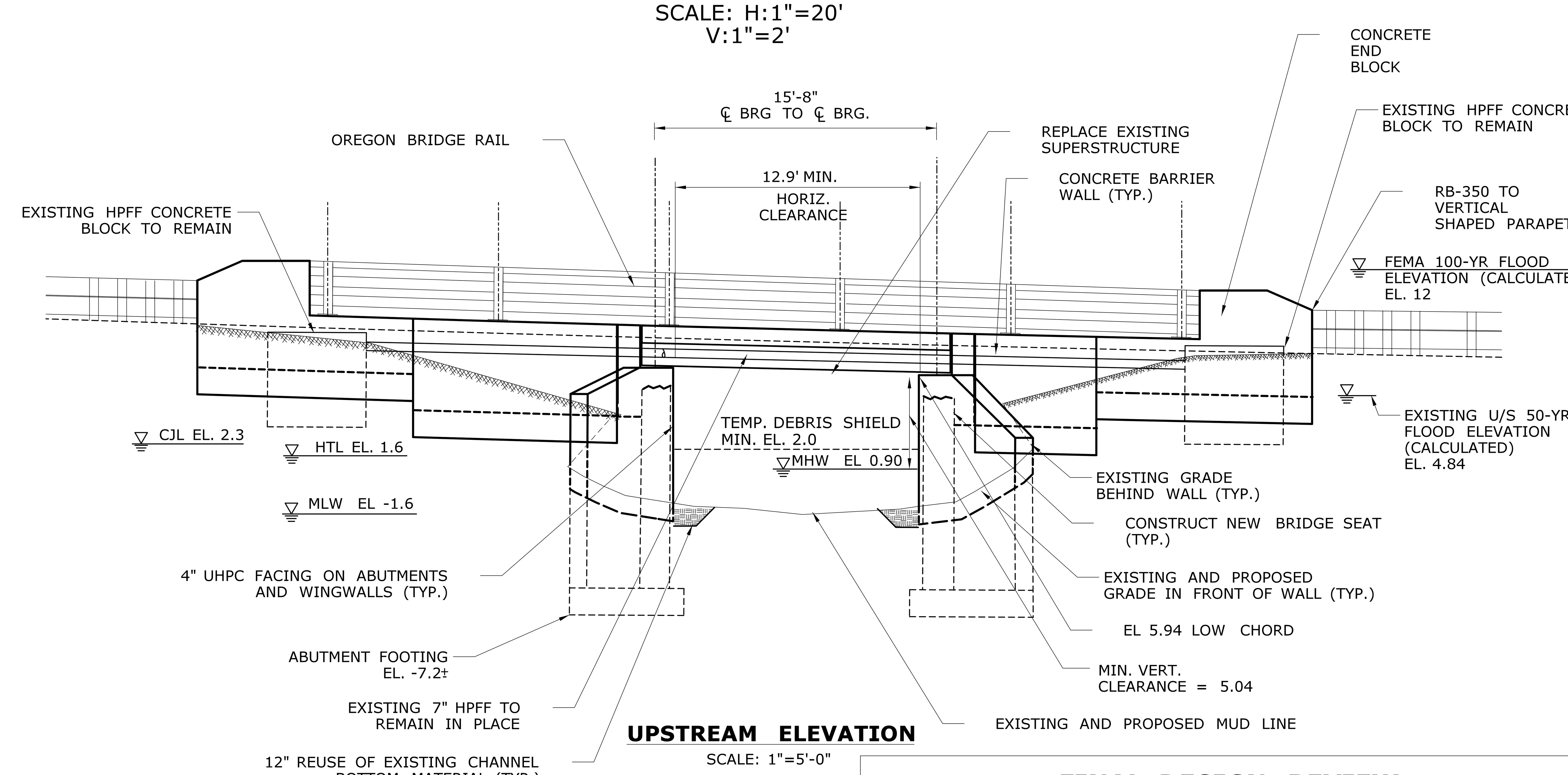


EXTENDED PLAN

SCALE: 1"=10'-0"



Route 2A - Profile View
SCALE: H:1"=20'
V:1"=2'



UPSTREAM ELEVATION

SCALE: 1"=5'-0"

QUANTITIES

ITEM	UNIT	QTY.
STRUCTURE EXCAVATION - EARTH (COMPLETE)	CY	
EXCAVATION AND REUSE OF EXISTING CHANNEL BOTTOM MATERIAL	CY	
HANDLING WATER (SITE NO. 1)	LS	
COMPACTED GRANULAR FILL	CY	
PERVIOUS STRUCTURE BACKFILL	CY	
HMA S0.5	TON	
HMA S0.25	TON	
REMOVAL OF SUPERSTRUCTURE (SITE NO. 1)	LS	
PRESTRESSED DECK UNIT (3'-0" X 1'-3")	LF	
PRESTRESSED DECK UNIT (4'-0" X 1'-3")	LF	
SAWING AND SEALING JOINTS IN BITUMINOUS CONCRETE PAVEMENT	LF	
ELASTOMERIC BEARING PADS	CI	
CLASS "F" CONCRETE	CY	
ULTRA HIGH PERFORMANCE CONCRETE KEYWAYS	CY	
ULTRA HIGH PERFORMANCE CONCRETE FACING	CY	
1" PREFORMED EXPANSION JOINT FILLER FOR BRIDGES	SF	
DEFORMED STEEL BARS	LB	
DRILLING HOLES AND GROUTING DOWELS	EA	
MEMBRANE WATERPROOFING (COLD LIQUID ELASTOMERIC)	SY	
DAMPPROOFING	SY	
TEMPORARY EARTH RETAINING SYSTEM	SF	
EARTH RETAINING SYSTEM LEFT IN PLACE	SF	
6" FOUNDATION UNDERDRAIN	LF	
PENETRATING SEALER PROTECTIVE COMPOUND	SY	
TEMPORARY PRECAST CONCRETE BARRIER CURB (STRUCTURE)	LF	
RELOCATED TEMPORARY PRECAST CONCRETE BARRIER CURB (STRUCTURE)	LF	
3 TUBE CURB MOUNTED BRIDGE RAIL	LF	
R-B 350 BRIDGE ATTACHMENT -VERTICAL SHAPE PARAPET	EA	
REMOVAL OF EXISTING MASONRY	CY	

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CHECKED BY: -

SCALE AS NOTED

STATE OF CONNECTICUT
DEPARTMENT OF TRANSPORTATION

Filename: ...\04_SB_MSH_Br02931_INFO.dgn

SIGNATURE/ BLOCK:

PROJECT TITLE:
REHABILITATION OF BRIDGE NO. 02931
ROUTE 2A
OVER POQUETANUCK COVE

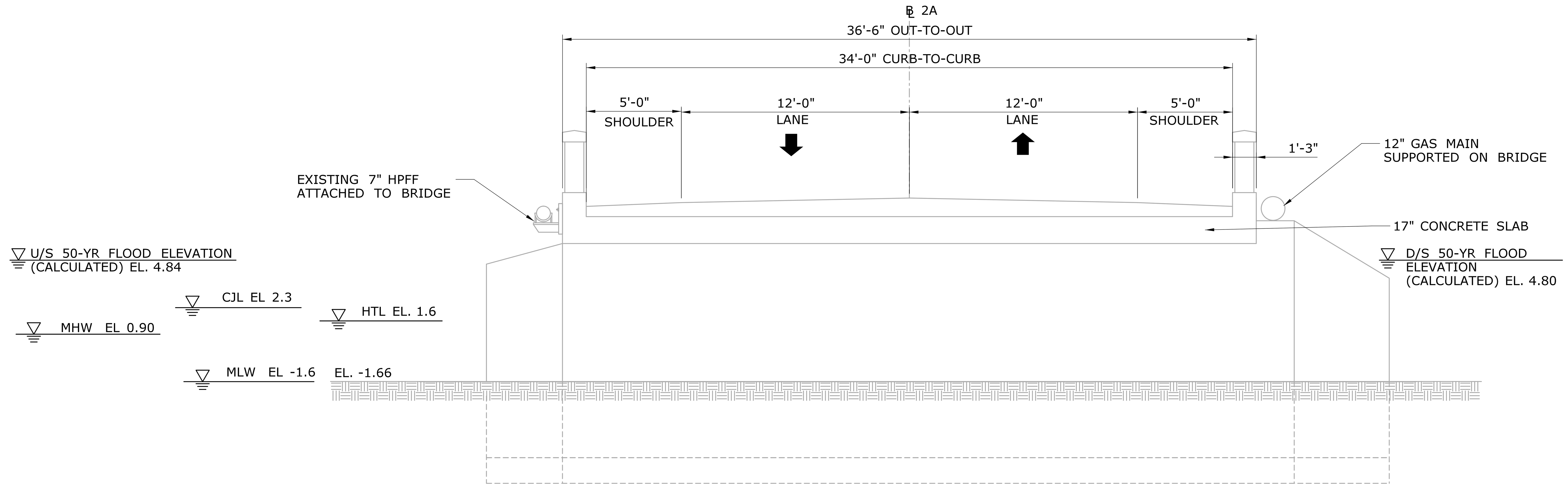
TOWN: **PRESTON**

DRAWING TITLE: **BRIDGE LAYOUT**

PROJECT NO. **113-107**

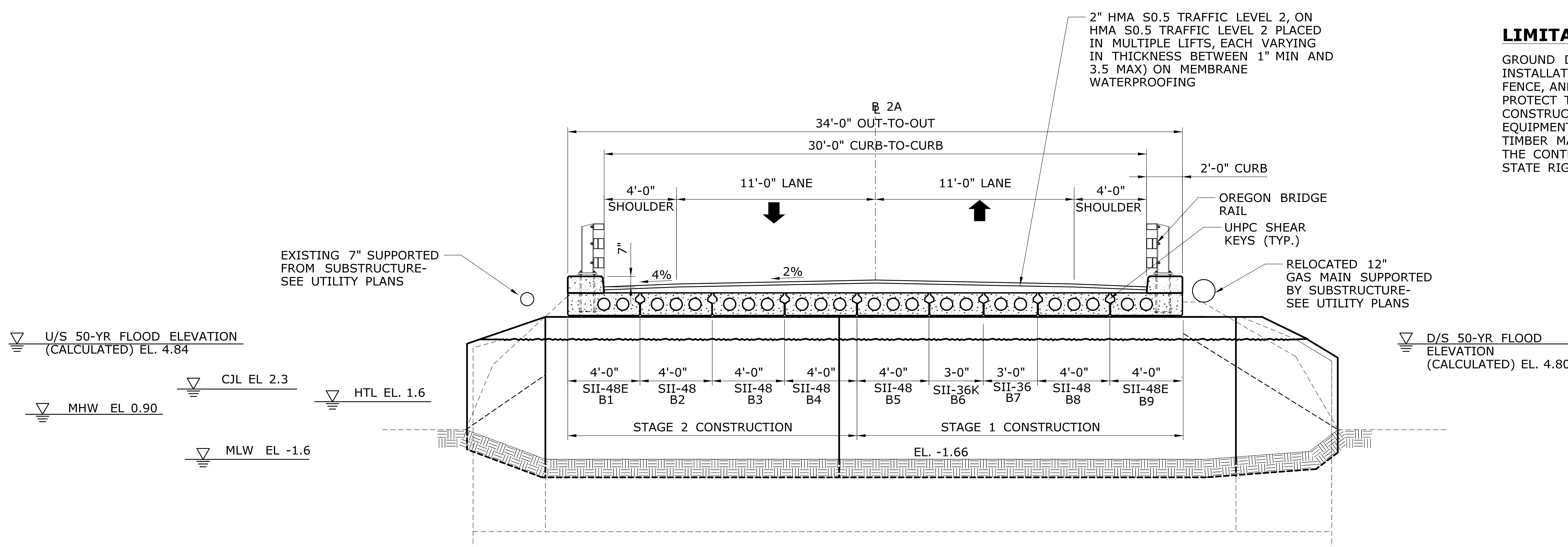
DRAWING NO. **S-03**

SHEET NO.



EXISTING STRUCTURE

SCALE: 1/4"=1'



PROPOSED SECTION

SCALE: 1/4"=1'

SUGGESTED CONSTRUCTION SEQUENCE

STAGE 1
1.INSTALL SEDIMENTATION CONTROL SYSTEM (SCS).
2.RELOCATE TEMPORARY OVERHEAD UTILITITIES ON NORTH SIDE
3.PLACE TEMPORARY BARRIER AND TRAFFIC SIGNALIZATION
4.INSTALL TEMPORARY GAS MAIN SUPPORTS ON SOUTH SIDE OF THE BRIDGE
5.INSTALL GAS MAIN ON SOUTH SIDE AND REMOVE EXISTING GAS MAIN ON BRIDGE
6.INSTALL TEMPORARY EARTH RETAINING SYSTEM (TERS) ALONG ROUTE 2A.
7.INSTALL TEMPORARY DEBRIS SHIELD UNDER EXISTING DECK EL 2.0 MIN.
8.REMOVE EXISTING SUPERSTRUCTURE AND ABUTMENT BRIDGE SEAT WITHIN STAGE 1 LIMITS.
9.RECONSTRUCT NORTH ABUTMENT SEATS WITHIN STAGE 1 LIMITS
10.ERECT NEW PRESTRESSED CONCRETE DECK UNITS WITHIN STAGE 1 LIMITS.
11.CONSTRUCT TEMPORARY DEWATERING BASIN. BASIN TO REMAIN THROUGH ALL STAGES.
12.INSTALL TEMPORARY WATER-HANDLING-COFFERDAM AND TEMPORARY 48" DIAMETER PIPE AFTER JUNE 30 TO CHANNELIZE THE BROOK WITHIN THE BYPASS PIPE. THE AREA WITHIN THE COFFERDAMS SHALL BE DEWATERED BY PUMPING TO THE DEWATERING BASIN.
13.RELOCATE EXISTING WETLANDS PLANTS AS SHOWN ON PLANTING PLAN.
14.PERFORM SUBSTRUCTURE REPAIRS.
15.INSTALL PERMANENT GAS MAIN SUPPORTS ON WINGWALL
16.CONSTRUCT BARRIER WALLS
17.PERFORM FULL DEPTH ROADWAY RECONSTRUCTION (FIRST LIFT OF HMA S0.5 ONLY) WITH TEMPORARY TRANSITIONS BEHIND TPCBC.
18.ARMOR SLOPES BEHIND SOUTH WINGWALLS
19.INSTALL PENETRATING SEALER PROTECTIVE COMPOUND, MEMBRANE WATERPROOFING AND FIRST OVERLAY COURSE
20.ADJUST TRAFFIC SIGNALS, BARRIERS AND TERS FOR STAGE 2 CONSTRUCTION.

STAGE 2
1.INSTALL PERMANENT HPFF SUPPORTS
2.REMOVE EXISTING SUPERSTRUCTURE AND ABUTMENT BRIDGE SEAT WITHIN STAGE 2 LIMITS.
3.PERFORM SUBSTRUCTURE REPAIRS AND INSTALL ULTRA HIGH PERFORMANCE CONCRETE FACING ON EXISTING ABUTMENTS AND WINGWALLS.
4.CONSTRUCT ABUTMENT SEATS WITHIN STAGE 2 LIMITS.
5.ERECT NEW PRESTRESSED CONCRETE DECK UNITS WITHIN STAGE 2 LIMITS .
6.CONSTRUCT BARRIER WALLS
7.PERFORM FULL DEPTH ROADWAY RECONSTRUCTION (FIRST LIST OF HMA S0.5 ONLY) WITH TEMPORARY TRANSITIONS BEHIND TPCBC
8.ARMOR SLOPES BEHIND NORTH WINGWALLS
9.REMOVE TEMPORARY WATER HANDLING SYSTEM AND TERS
10.INSTALL PENETRATING SEALER PROTECTIVE COMPOUND, MEMBRANE WATERPROOFING AND FIRST OVERLAY COURSE.
11.REMOVE TEMPORARY BARRIER AND TEMPORARY TRAFFIC SIGNALS TO RESTORE TWO-WAY TRAFFIC ON THE BRIDGE AT ROUTE 2A (ONE LANE IN EACH DIRECTION).

STAGE 3
1.REMOVE TEMPORARY UTILITY POLES AND OVERHEAD WIRES AND INSTALL PERMANENT OVERHEAD WIRES.
2.PERFORM REMAINING ROADWAY PAVING AND STRIPING USING TEMPORARY OVERNIGHT LANE CLOSURES.
3. INSTALL NEW PLANTS AS SHOWN ON PLANTING PLAN.
4.LOAM AND SEED SLOPES AS SHOWN ON PLANS.
5.REMOVE SCS UPON PERMANENT STABILIZATION.

LIMITATIONS ON GROUND DISTURBANCE

GROUND DISTURBANCE OUTSIDE OF THE STATE RIGHT-OF-WAY IS TO BE LIMITED TO INSTALLATION OF TEMPORARY OVERHEAD UTILITY POLES, INSTALLATION OF ENTRENCHED SILT FENCE, AND STAKING FOR SEDIMENTATION AND EROSION CONTROL. THE CONTRACTOR SHALL PROTECT THE GROUND OUTSIDE OF THE STATE RIGHT-OF-WAY, INCLUDING THE AREAS WITHIN CONSTRUCTION EASEMENTS, FROM DISTURBANCE CAUSED BY THE USE OF MOTORIZED EQUIPMENT, DEWATERING FILTER BAGS AND OTHER CONSTRUCTION OPERATION, BY THE USE OF TIMBER MATTING OR OTHER GROUND PROTECTION MEASURES, AS APPROVED BY THE ENGINEER. THE CONTRACTOR SHALL NOT LOCATE CRANES OR SIMILAR LARGE EQUIPMENT OUTSIDE OF THE STATE RIGHT-OF-WAY AND IN AREAS WITHIN THE CONSTRUCTION EASEMENTS.

EXCLUSION OF DRIVEN PILES AND SHEET PILES

THE CONTRACTOR IS ALERTED TO THE PRESENCE OF ORGANIC AND COMPRESSIBLE SOILS IN THE PROJECT AREA AND ALONG ROUTE 2A. THE INSTALLATION OF THE COFFERDAMS OR TEMPORARY EARTH RETAINING SYSTEM (TERS) SHALL NOT DISTURB THE ORGANIC SOILS. THE USE OF DRIVEN PILES OR SHEET PILES AS COFFERDAMS OR TERS WITHIN THE PROJECT AREA IS NOT PERMITTED. THE CONTRACTOR SHALL USE ALTERNATE METHODS SUCH AS DRILLED SOLDIER PILES AND LAGGING FOR THIS PROJECT. THE SOLDIER PILES, IF UTILIZED, ARE ANTICIPATED TO BE OF SMALL SIZE IN ANTICIPATION OF SHALLOW EXCAVATIONS REQUIRED FOR THIS PROJECT. SOLDIER PILES, IF USED, WILL NEED TO BE DRILLED BY SUITABLE MEANS TO AVOID DISTURBING THE ORGANIC SOILS. AFTER CONSTRUCTION IS COMPLETE, THE PILES SHALL BE EITHER BE REMOVED OR LEFT IN PLACE OR CUT TO APPROXIMATELY TWO FEET BELOW THE ROADWAY.

THE ABOVE DETERMINATION IS BASED ON LIMITED SOILS INVESTIGATION PERFORMED BY THE DEPARTMENT DURING THE PROJECT DEVELOPMENT PHASE. THE RESULTS AND FINDINGS OF THIS INVESTIGATION WILL BE MADE AVAILABLE TO THE CONTRACTOR UPON AWARD OF THE CONTRACT. THE CONTRACTOR MAY ENGAGE THE SERVICES OF AN INDEPENDENT GEOTECHNICAL ENGINEER LICENSED IN THE STATE OF CONNECTICUT TO DESIGN SUITABLE WATER-HANDLING COFFERDAMS AND TERS FOR USE WITHIN THE PROJECT AREA.

FINAL DESIGN REVIEW

REV.	DATE	REVISION DESCRIPTION	SHEET NO.

Plotted Date: 2/28/2019

DESIGNER/DRAFTER: DLW
CHECKED BY: -
SCALE AS NOTED

STATE OF CONNECTICUT
DEPARTMENT OF TRANSPORTATION

Filename: ...\04_SB_MST_Br02931_XSC.dgn

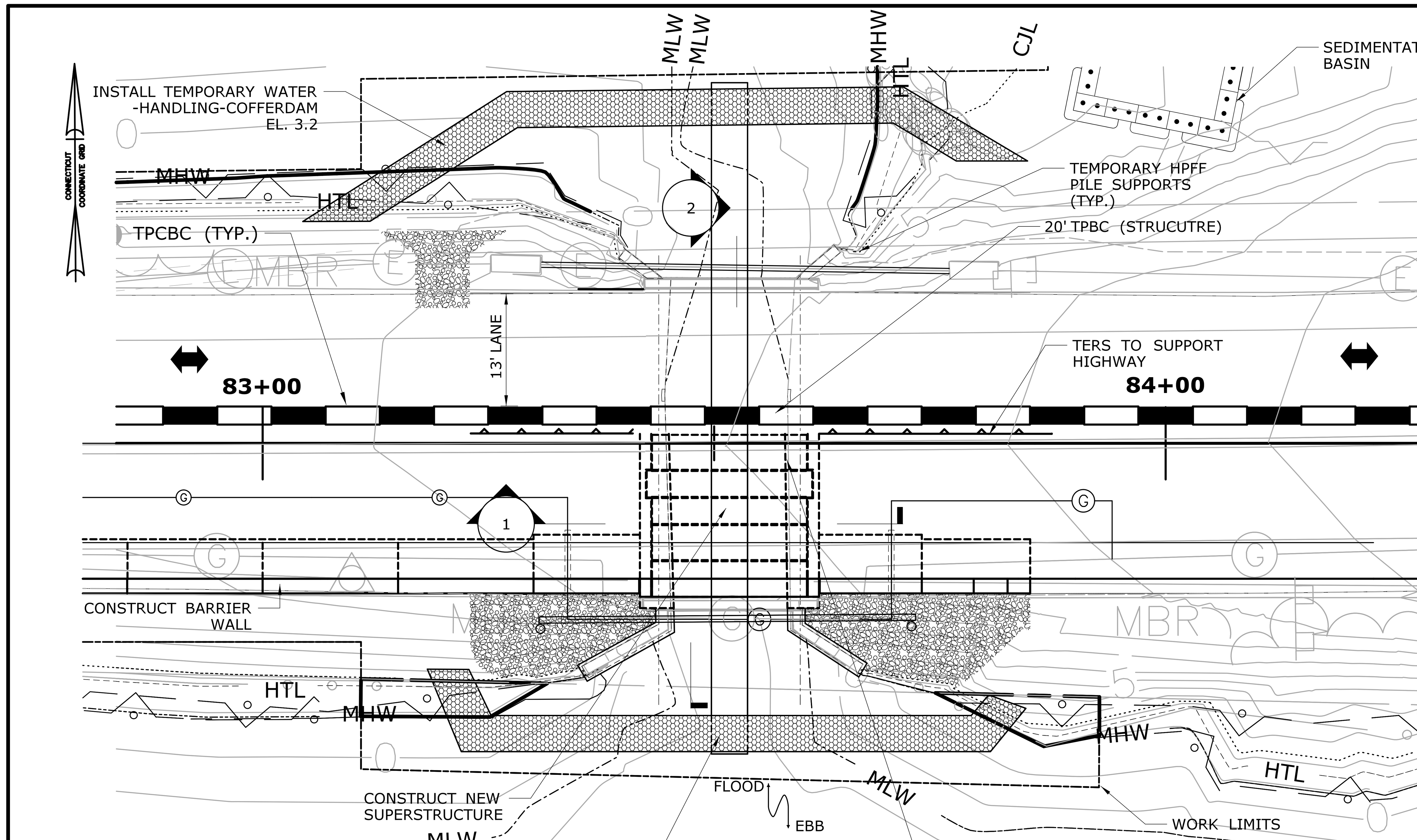
SIGNATURE/BLOCK:

PROJECT TITLE:
REHABILITATION OF BRIDGE NO. 02931
ROUTE 2A
OVER POQUETANUCK COVE

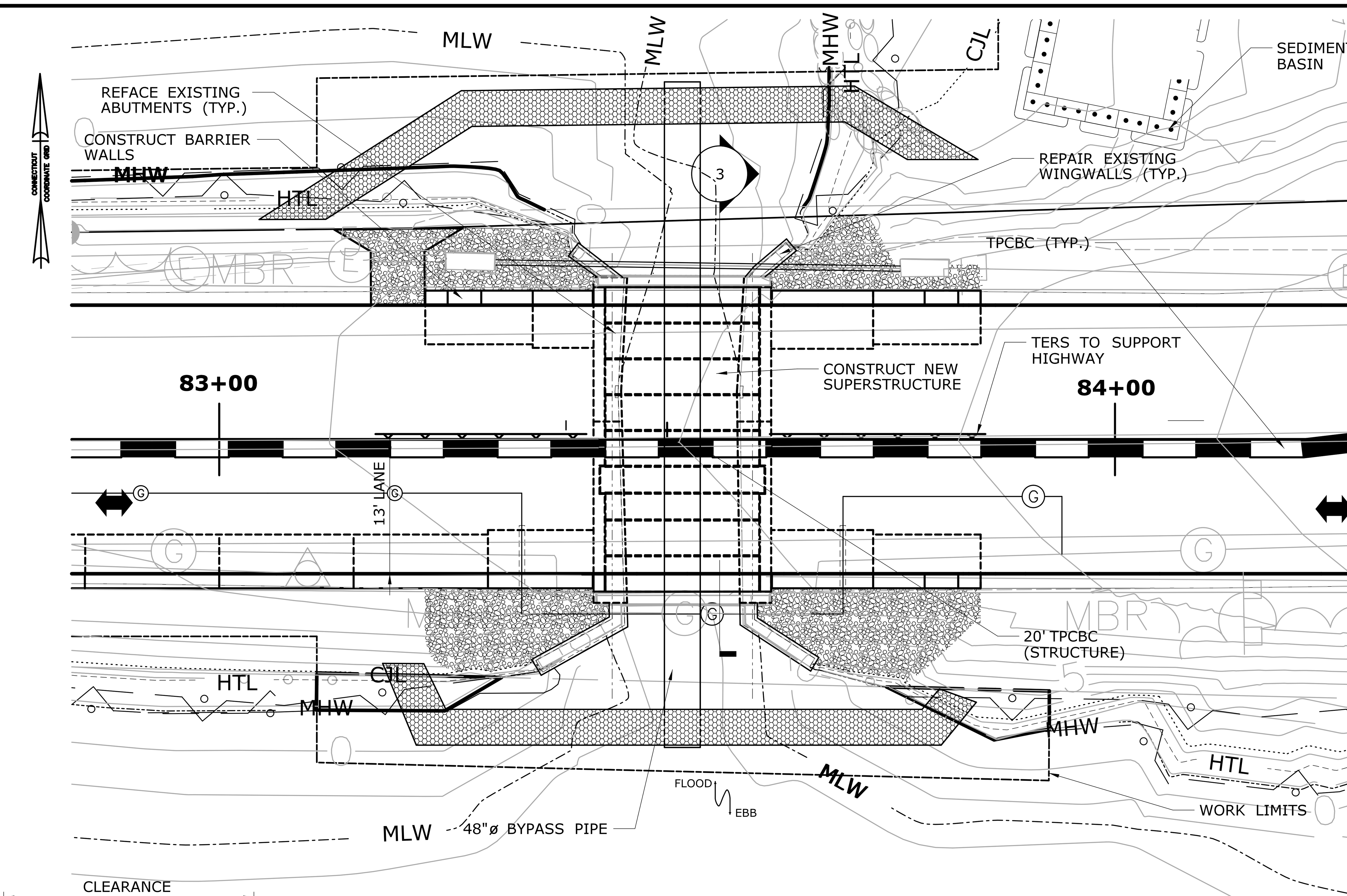
TOWN: **PRESTON**

DRAWING TITLE: **CROSS SECTIONS**

PROJECT NO. **113-107**
DRAWING NO. **S-04**
SHEET NO.



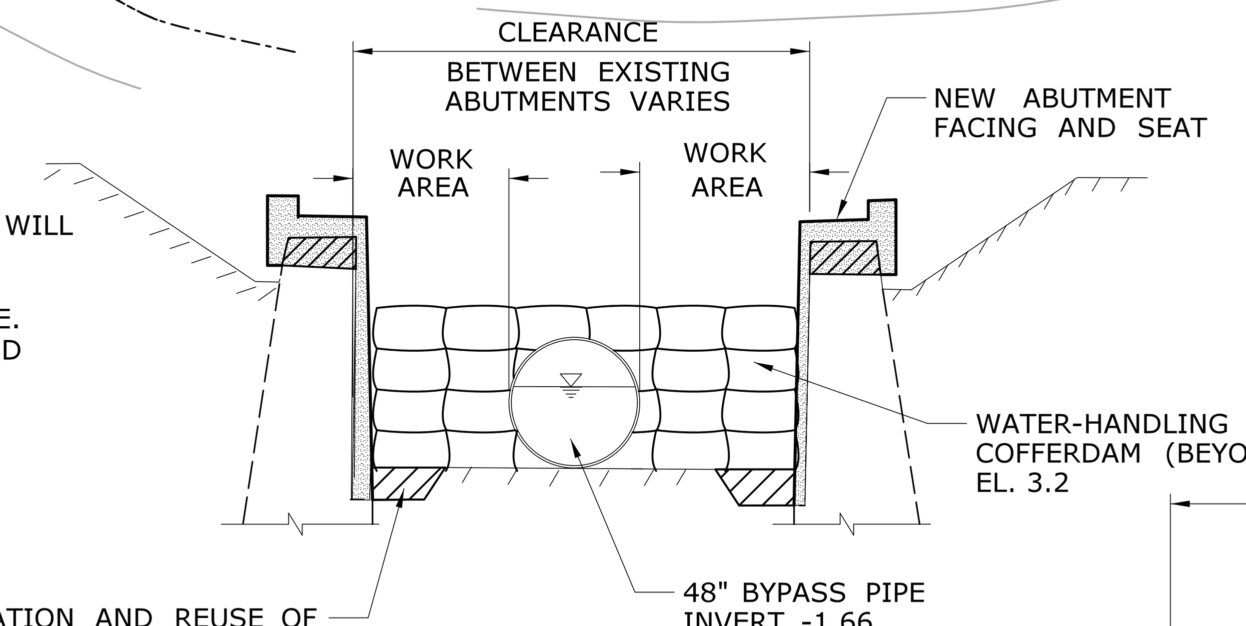
STAGE 1
SCALE: 1"=10'



STAGE 2
SCALE: 1"=10'

WATER HANDLING NOTES:

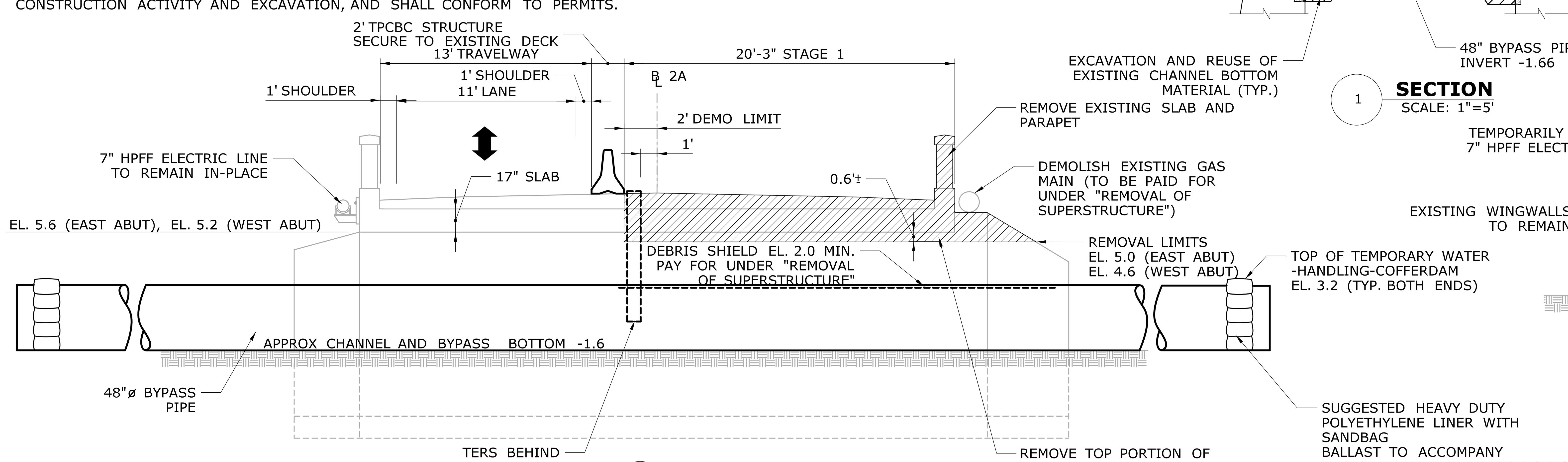
1. THE CONTRACTOR SHALL MAINTAIN WATER THROUGH TEMPORARY BYPASS PIPE AS SHOWN DURING CONSTRUCTION OF THE NEW STRUCTURE.
2. EQUIPMENT SHALL NOT BE PERMITTED IN THE WATERCOURSE WHEN TEMPORARY BYPASS IS NOT IN PLACE WITHOUT APPROVAL FROM THE ENGINEER.
3. DEBRIS SHIELD SHALL BE INSTALLED BY WORKERS ON LADDERS AND SHALL SPAN FROM ABUTMENT TO ABUTMENT. NO IN-WATER SUPPORTS WILL BE ALLOWED.
4. A PUMP DISCHARGE BASIN/SILT BAG SHALL BE ESTABLISHED OUTSIDE OF THE WETLAND LIMITS AND WITHIN THE RIGHT OF WAY IF POSSIBLE. THE LOCATION OF THE DEWATERING BASIN IS APPROXIMATE. THE EXACT POSITION MAY VARY BASED ON THE PUMPING DESIGN SUBMISSION AND APPROVED BY THE ENGINEER. DEWATER WORK AREAS BY PUMPING TO DEWATERING BASIN.
5. TEMPORARY WATER-HANDLING-COFFERDAM SHALL CONSIST OF PLASTIC LINER, SANDBAGS, OR ANY OTHER APPROVED SYSTEM THAT THE CONTRACTOR ELECTS TO USE WHICH WILL SAFELY CONVEY WATER FLOWS THROUGH THE CONSTRUCTION AREA, SHALL BE ABLE TO SUPPORT CONSTRUCTION ACTIVITY AND EXCAVATION, AND SHALL CONFORM TO PERMITS.



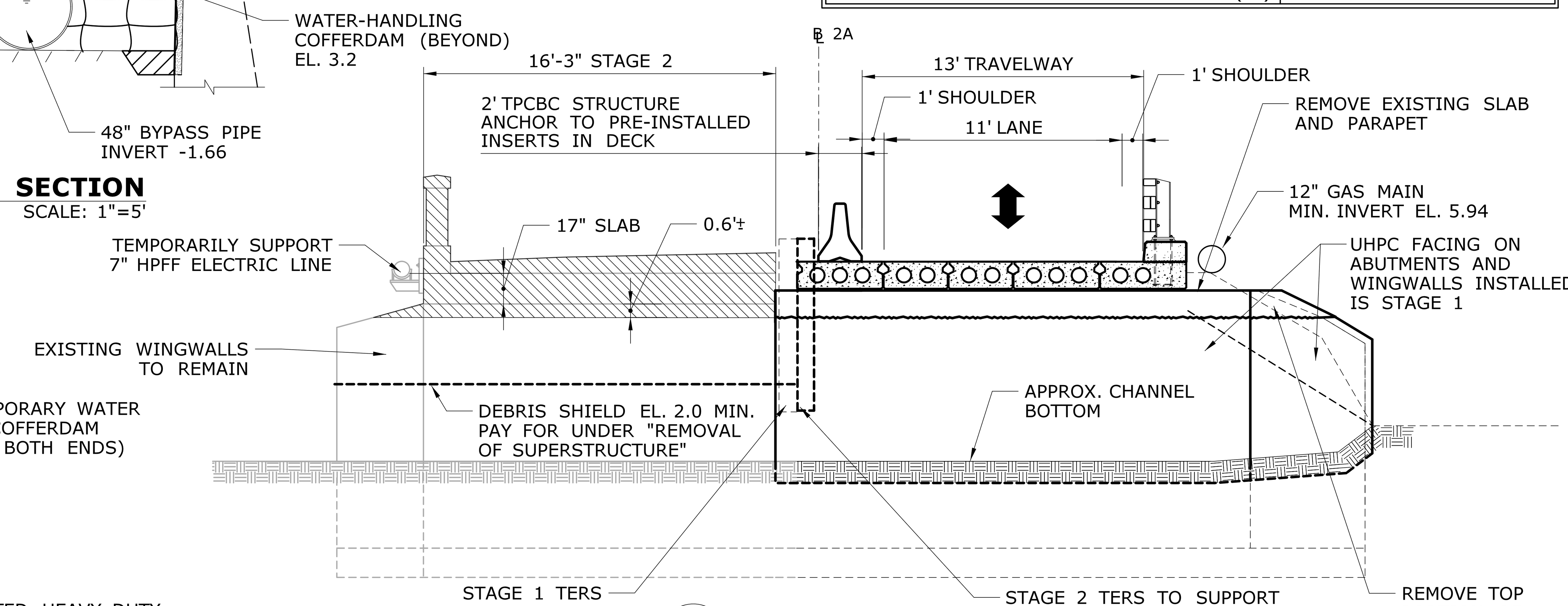
1 SECTION
SCALE: 1"=5'

TEMPORARY HYDRAULICS SUMMARY DATA

AVERAGE DAILY FLOW (CFS)	12
AVERAGE SPRING FLOW (CFS)	14
2-YEAR FREQUENCY DISCHARGE (CFS)	45
TEMPORARY DESIGN DISCHARGE (CFS)	45
TEMPORARY DESIGN FREQUENCY	2-YEAR (ADJUSTED)
TEMPORARY WATER SURFACE ELEVATION (FT)	2.2 (UP) 1.6 (DOWN)



2 SECTION
SCALE: 1"=5'



3 SECTION
SCALE: 1"=5'

NOTE: BYPASS PIPE NOT SHOWN FOR CLARITY

FINAL DESIGN REVIEW

REV.	DATE	REVISION DESCRIPTION	SHEET NO.

Plotted Date: 2/28/2019

DESIGNER/DRAFTER: DLW
CHECKED BY: SHH
SCALE AS NOTED

STATE OF CONNECTICUT
DEPARTMENT OF TRANSPORTATION

Filename: ...\04_SB_MSH_Br02931_WHD.dgn

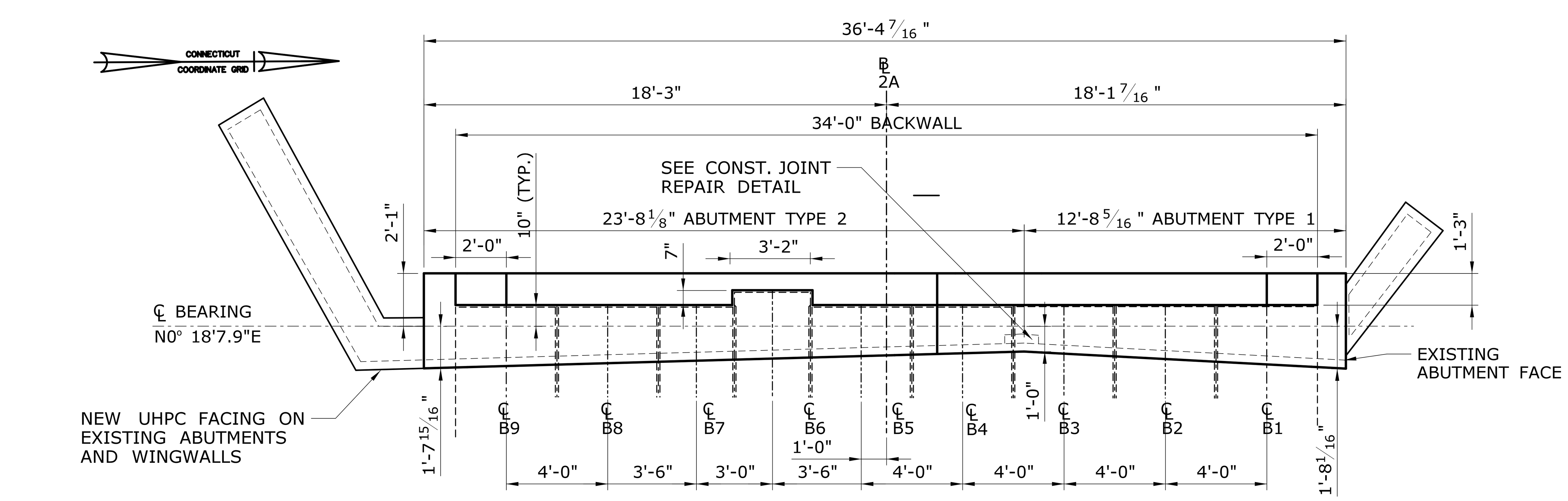
SIGNATURE/BLOCK:

PROJECT TITLE:
REHABILITATION OF BRIDGE NO. 02931
ROUTE 2A
OVER POQUETANUCK COVE

TOWN: PRESTON

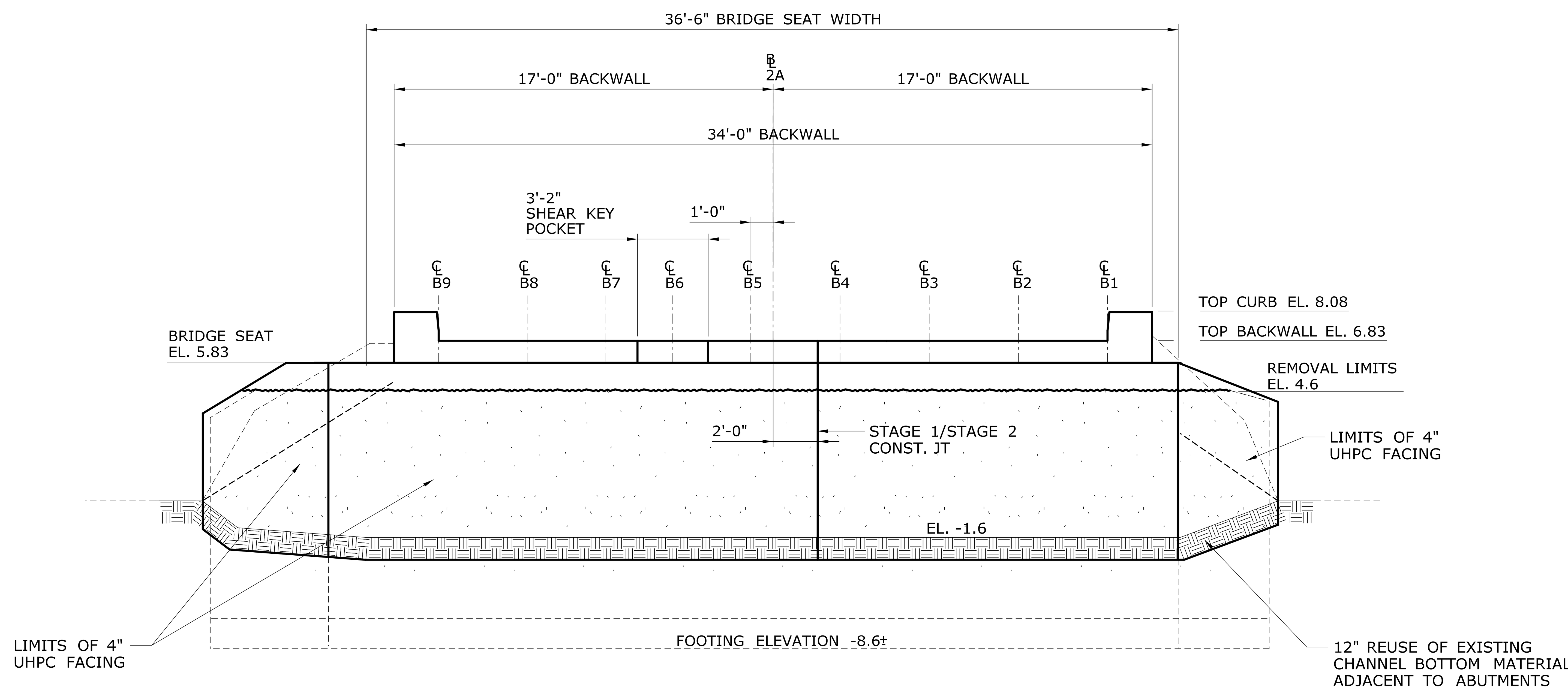
DRAWING TITLE: WATER HANDLING

PROJECT NO. 113-107
DRAWING NO. S-05
SHEET NO.



WEST ABUTMENT PLAN

SCALE: 1/4"=1'



WEST ABUTMENT ELEVATION

SCALE: 1/4"=1'

FINAL DESIGN REVIEW

REV.	DATE	REVISION DESCRIPTION	SHEET NO.

Plotted Date: 2/28/2019

DESIGNER/DRAFTER: DLW

CHECKED BY: -

SCALE AS NOTED

STATE OF CONNECTICUT
DEPARTMENT OF TRANSPORTATION

Filename: ...\04_SB_MSH_Br02931_ABT.dgn

SIGNATURE/BLOCK:

PROJECT TITLE: REHABILITATION OF BRIDGE NO. 02931 ROUTE 2A OVER POQUETANUCK COVE

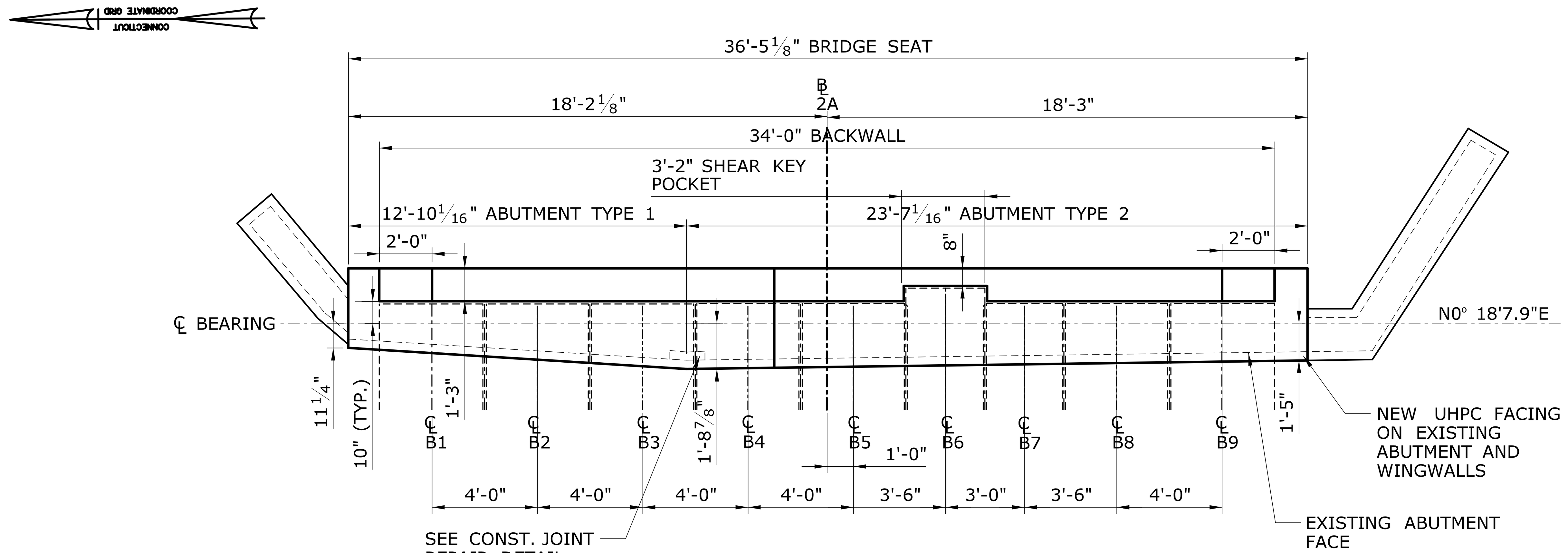
TOWN: PRESTON

DRAWING TITLE: WEST ABUTMENT PLAN AND ELEVATION

PROJECT NO. 113-107

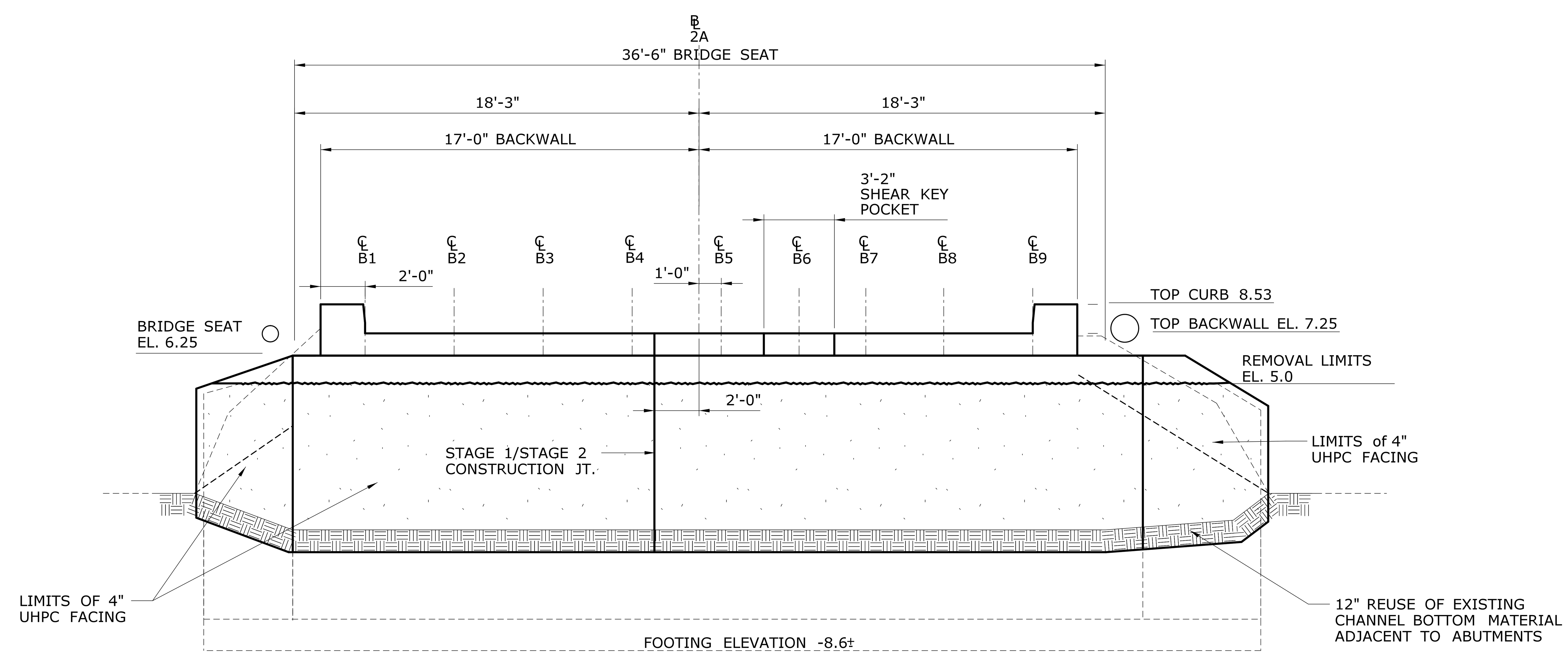
DRAWING NO. S-06

SHEET NO.



EAST ABUTMENT PLAN

SCALE: 1/4"=1'



EAST ABUTMENT ELEVATION

SCALE: 1/4"=1'

FINAL DESIGN REVIEW

REV.	DATE	REVISION DESCRIPTION	SHEET NO.

Plotted Date: 2/28/2019

DESIGNER/DRAFTER: DLW
CHECKED BY: -
SCALE AS NOTED

STATE OF CONNECTICUT
DEPARTMENT OF TRANSPORTATION

Filename: ...\04_SB_MSH_Br02931_ABT2.dgn

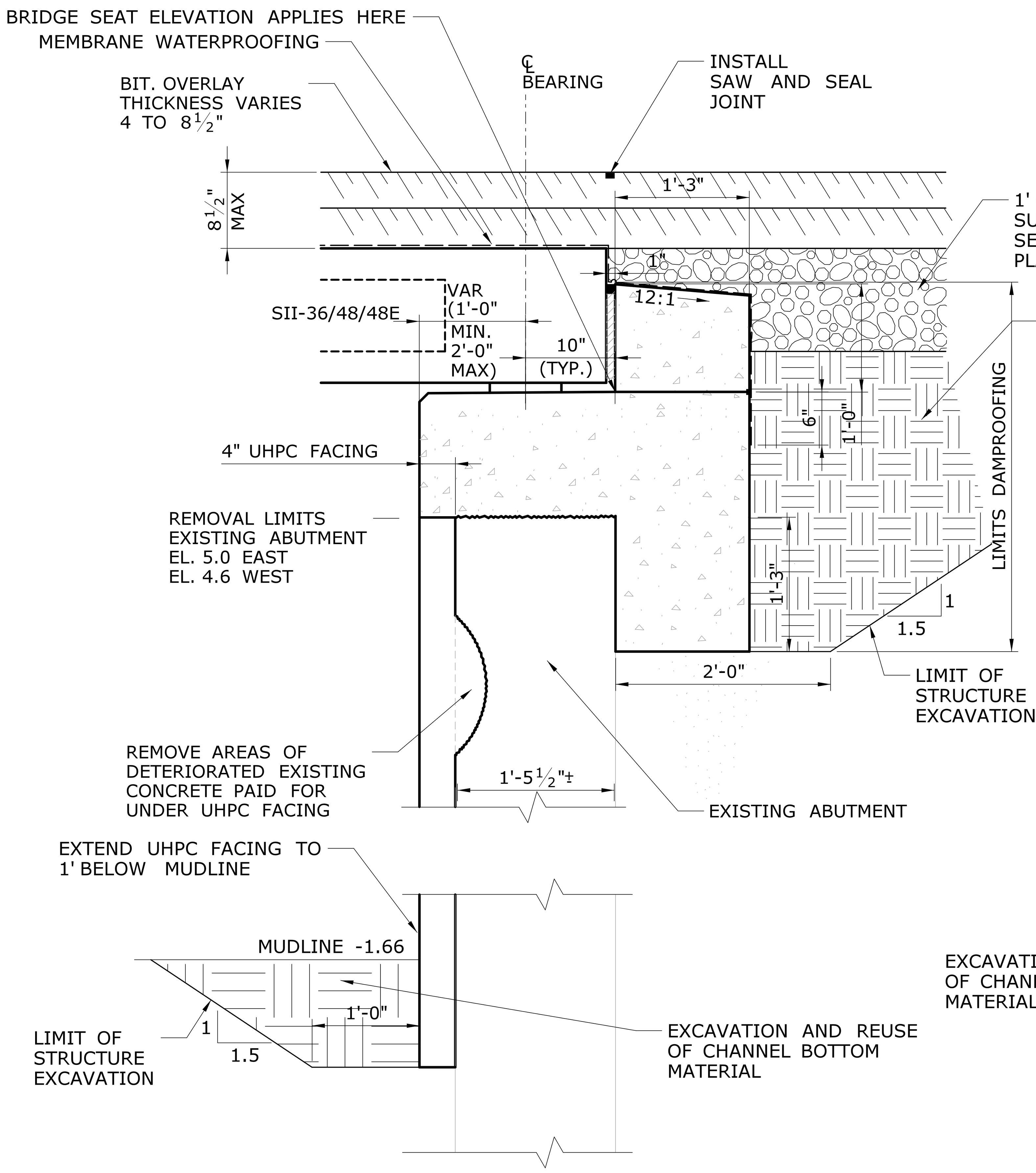
SIGNATURE/ BLOCK:

PROJECT TITLE: REHABILITATION OF BRIDGE NO. 02931 ROUTE 2A OVER POQUETANUCK COVE

TOWN: PRESTON

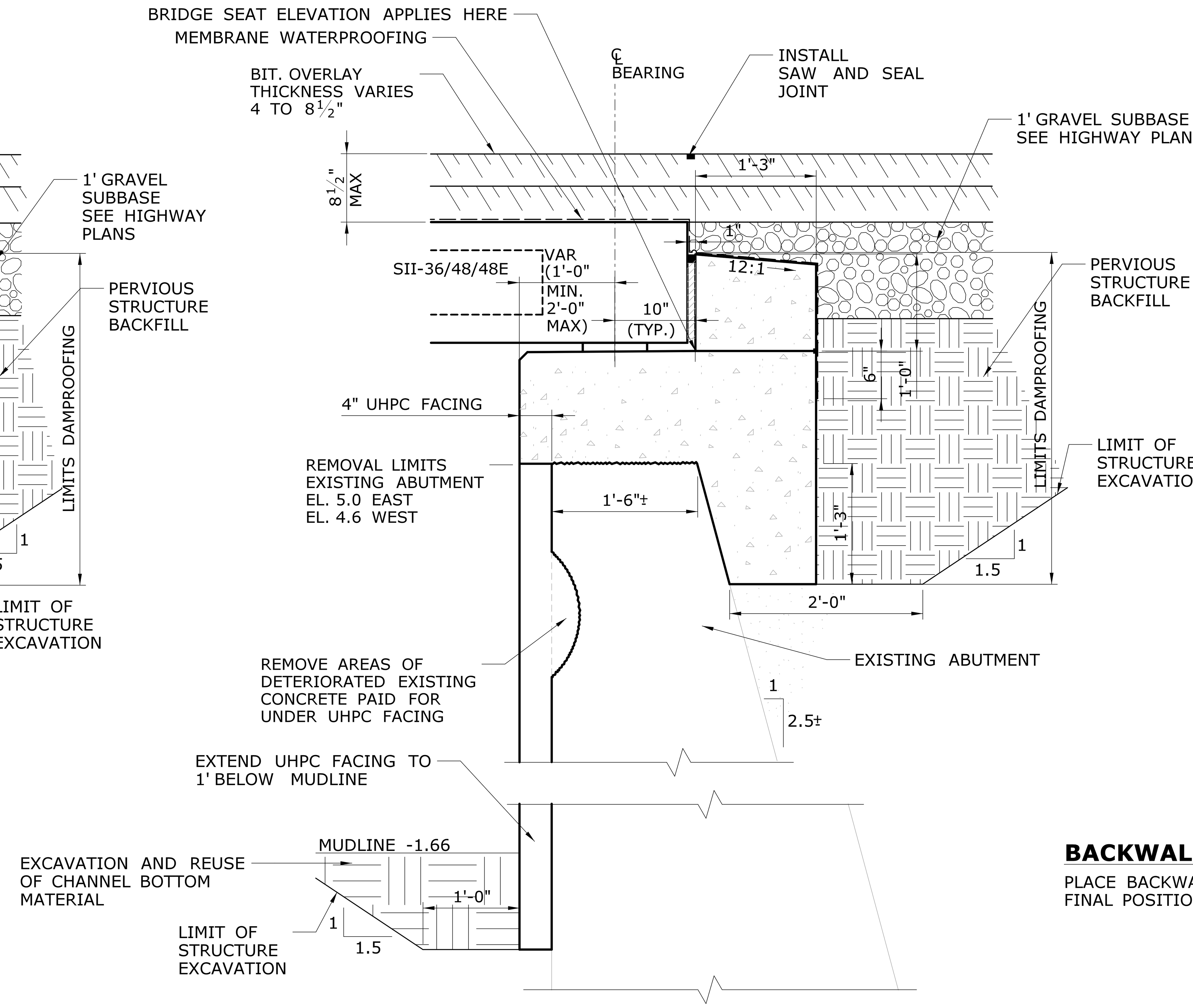
DRAWING TITLE: EAST ABUTMENT PLAN AND ELEVATION

PROJECT NO. 113-107
DRAWING NO. S-07
SHEET NO.



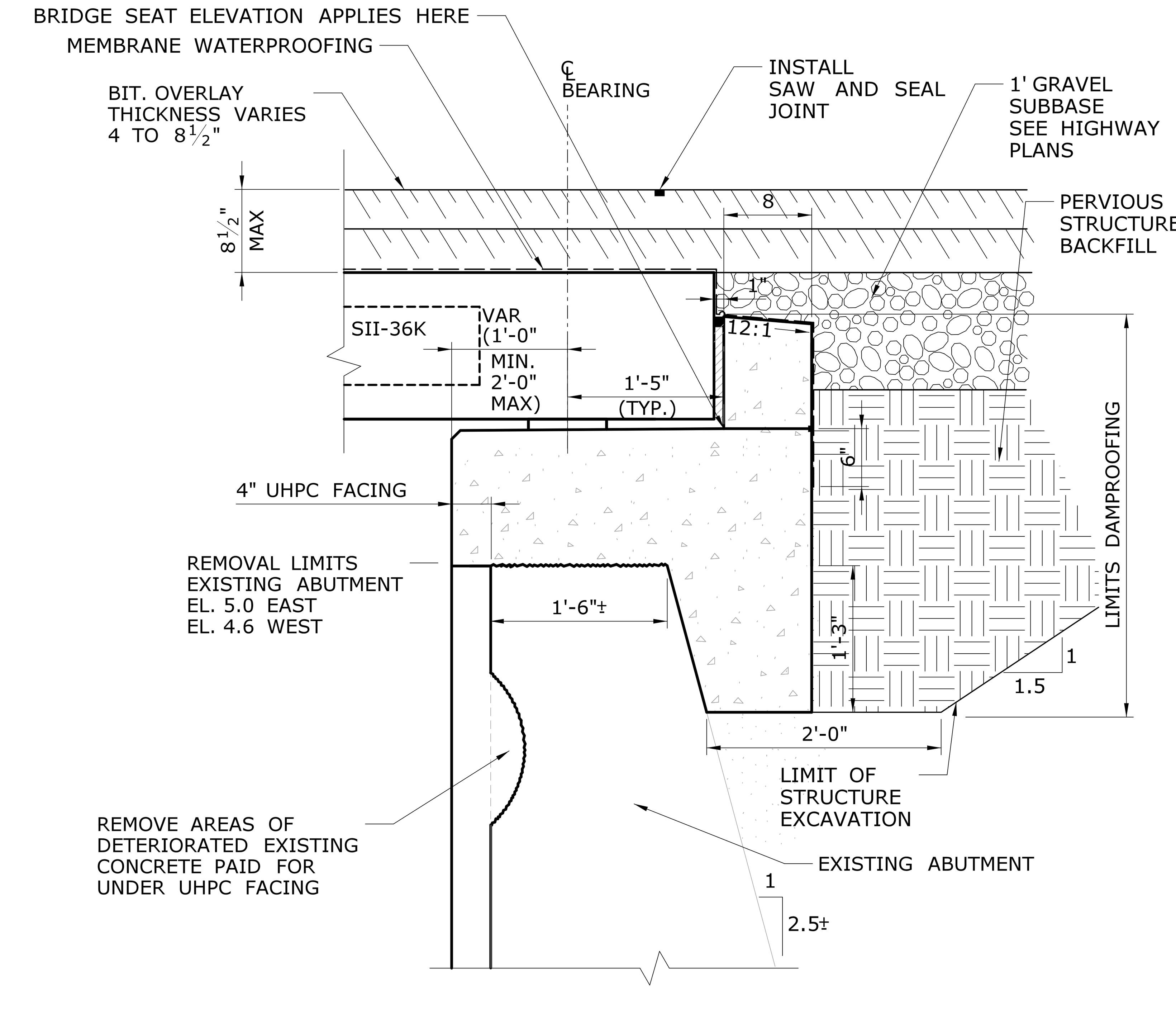
ABUTMENT TYPE 1 SECTION

SCALE: 1"=1'



ABUTMENT TYPE 2 SECTION

SCALE: 1"=1'



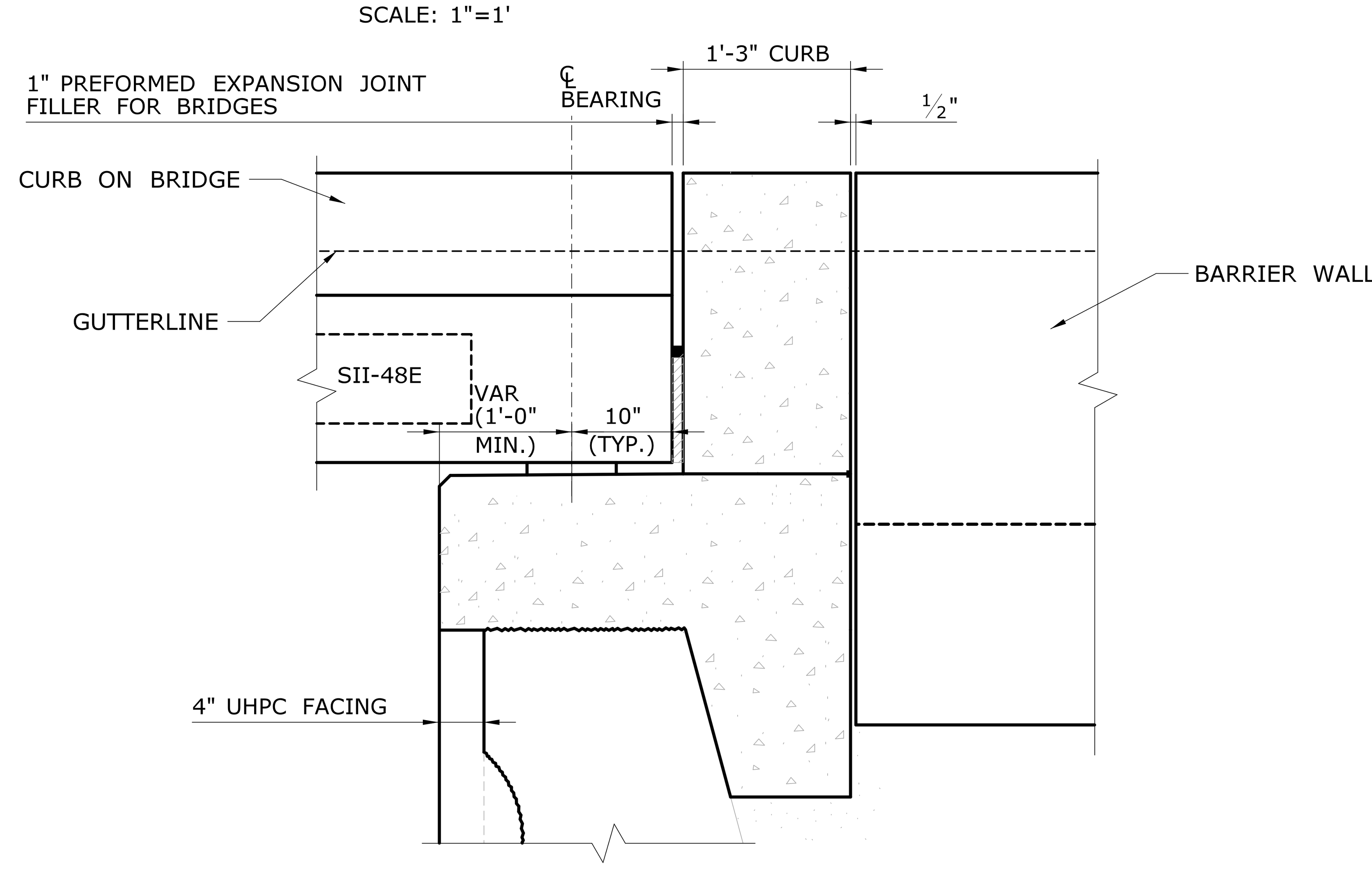
BACKWALL NOTE:

PLACE BACKWALL AFTER DECK UNITS ARE IN FINAL POSITION

ABUTMENT TYPE 2 AT SHEAR KEY

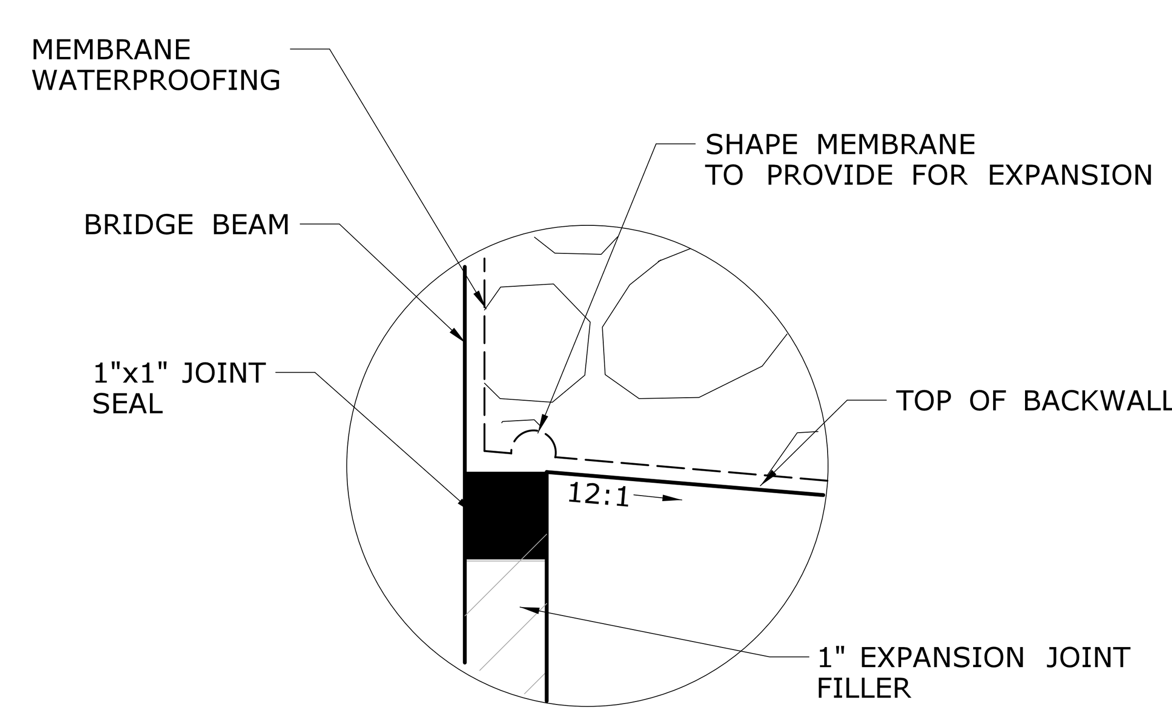
SCALE: 1"=1'

NOTE: LOWER FACING DETAIL IDENTICAL TO TYPICAL SECTION



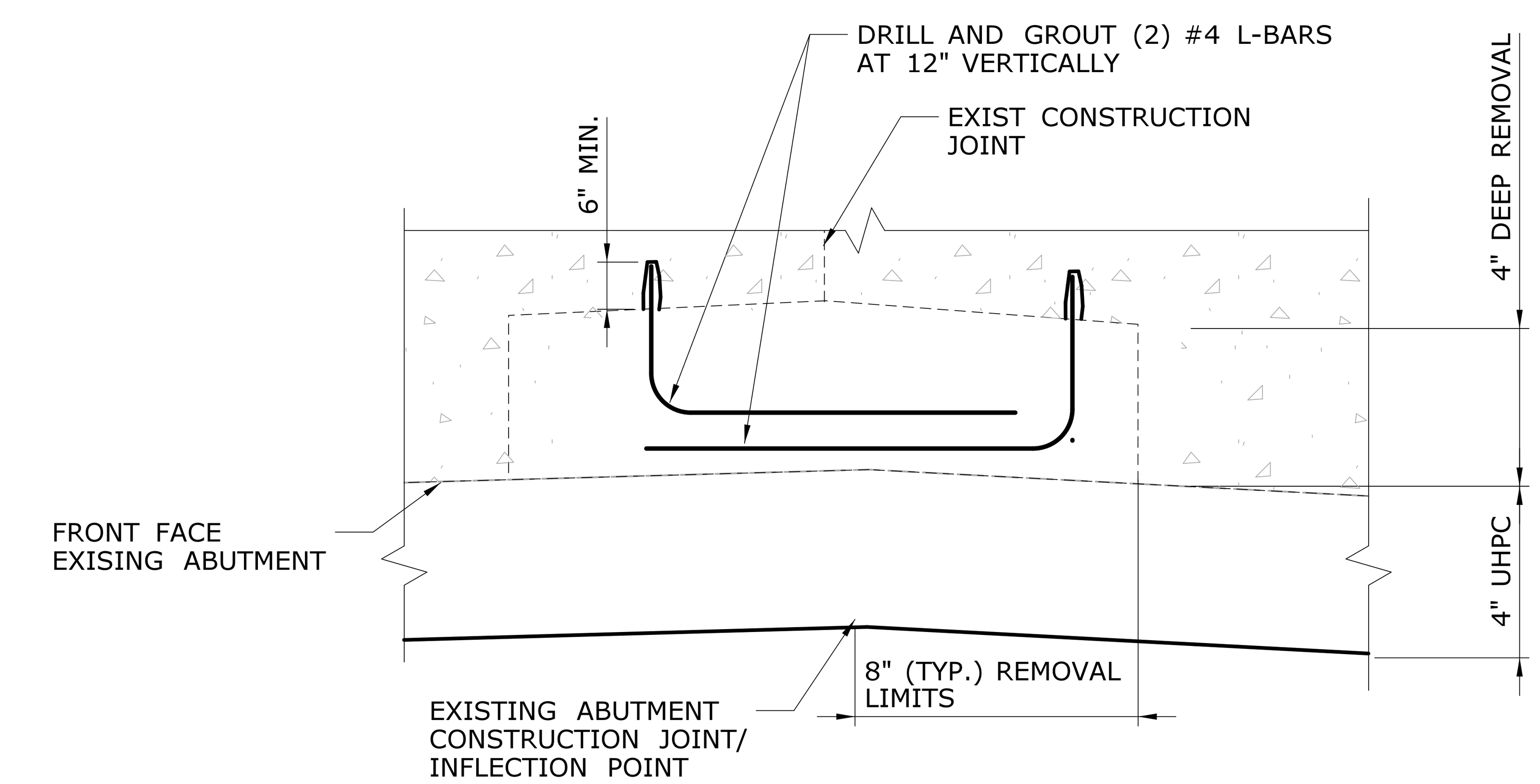
ABUTMENT TYPE 2 SECTION AT CURB

SCALE: 1"=1'



BACKWALL DETAIL

SCALE: 6"=1'



PLAN VIEW CONSTRUCTION JOINT REPAIR DETAIL

SCALE: 3"=1'

FINAL DESIGN REVIEW

REV.	DATE	REVISION DESCRIPTION	SHEET NO.

Plotted Date: 2/28/2019

DESIGNER/DRAFTER: DLW
CHECKED BY: -
SCALE AS NOTED

STATE OF CONNECTICUT
DEPARTMENT OF TRANSPORTATION

Filename: ...\04_SB_MSH_Br02931_ADTL.dgn

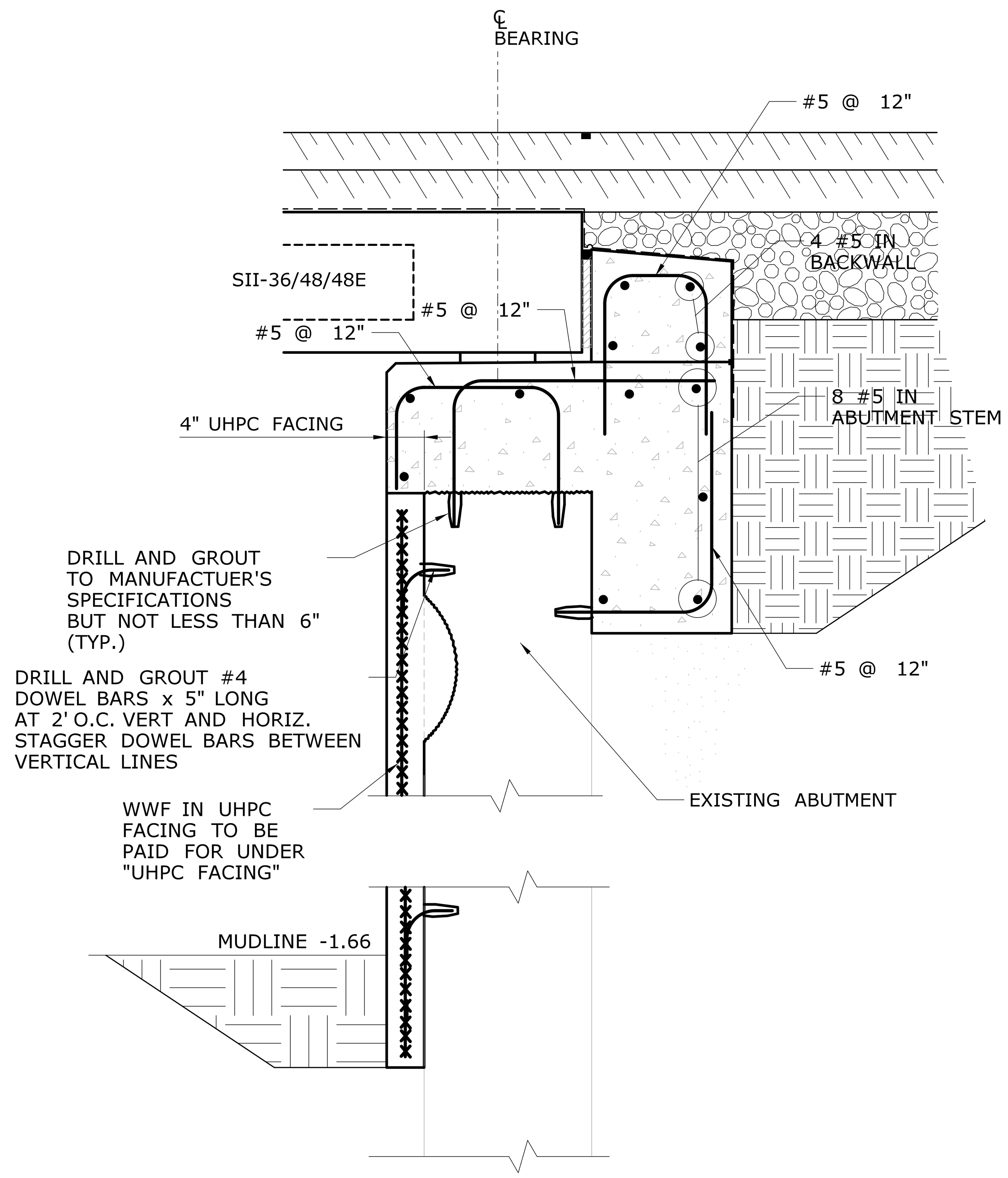
SIGNATURE/ BLOCK:

PROJECT TITLE:
REHABILITATION OF BRIDGE NO. 02931
ROUTE 2A
OVER POQUETANUCK COVE

TOWN: PRESTON

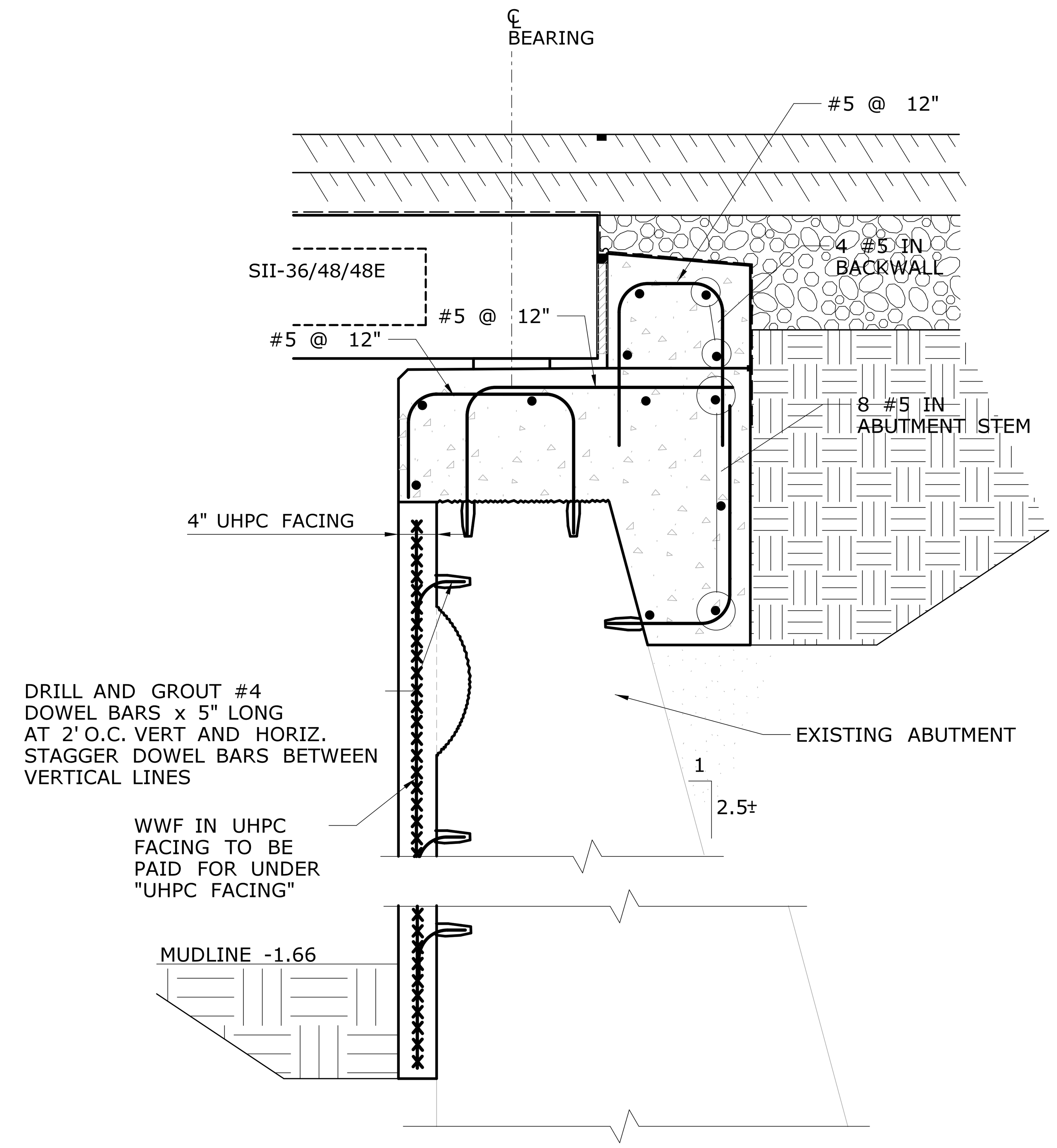
DRAWING TITLE: ABUTMENT DETAILS

PROJECT NO. 113-107
DRAWING NO. S-08
SHEET NO.



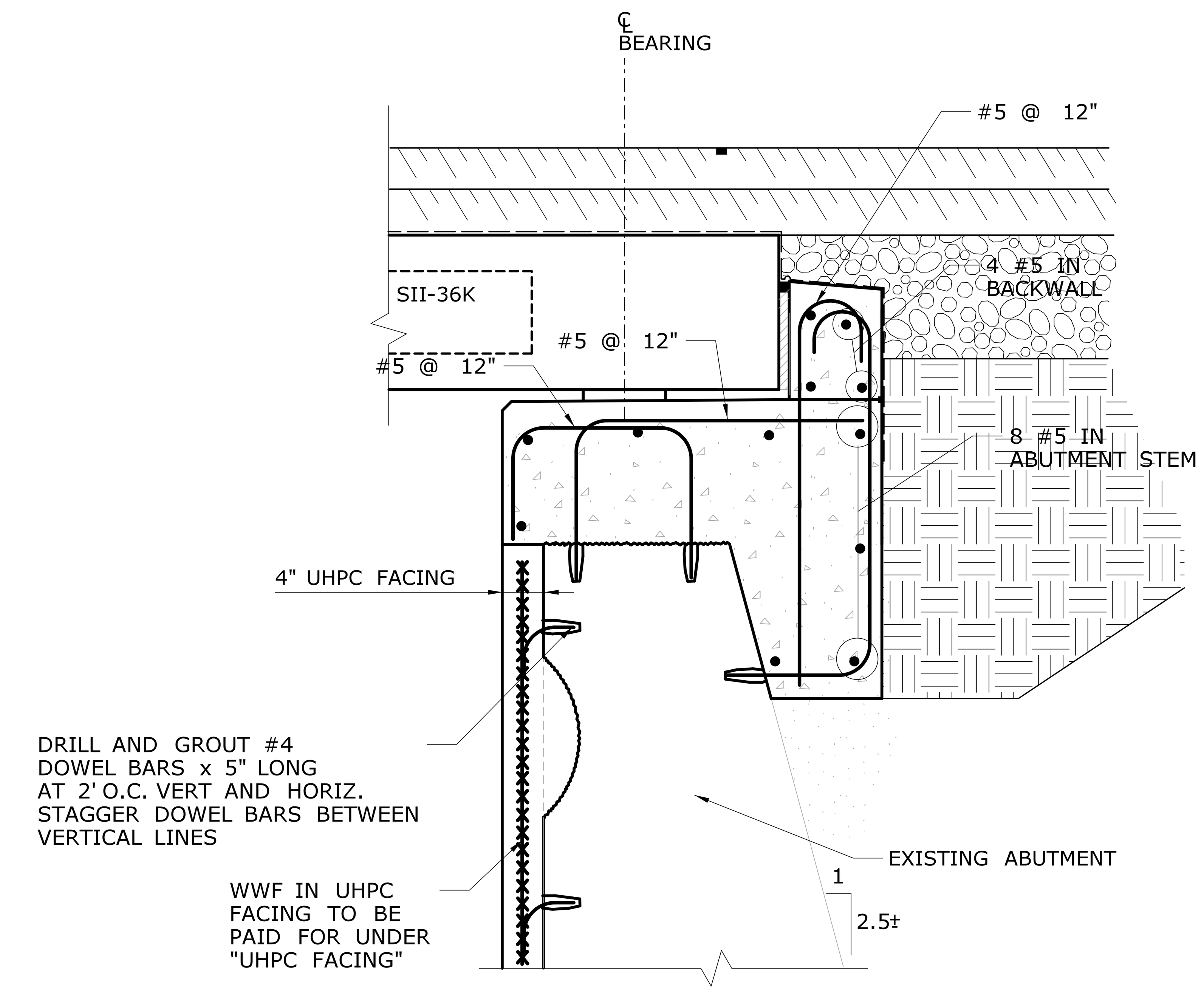
ABUTMENT TYPE 1 SECTION

SCALE: 1"=1'



ABUTMENT TYPE 2 SECTION

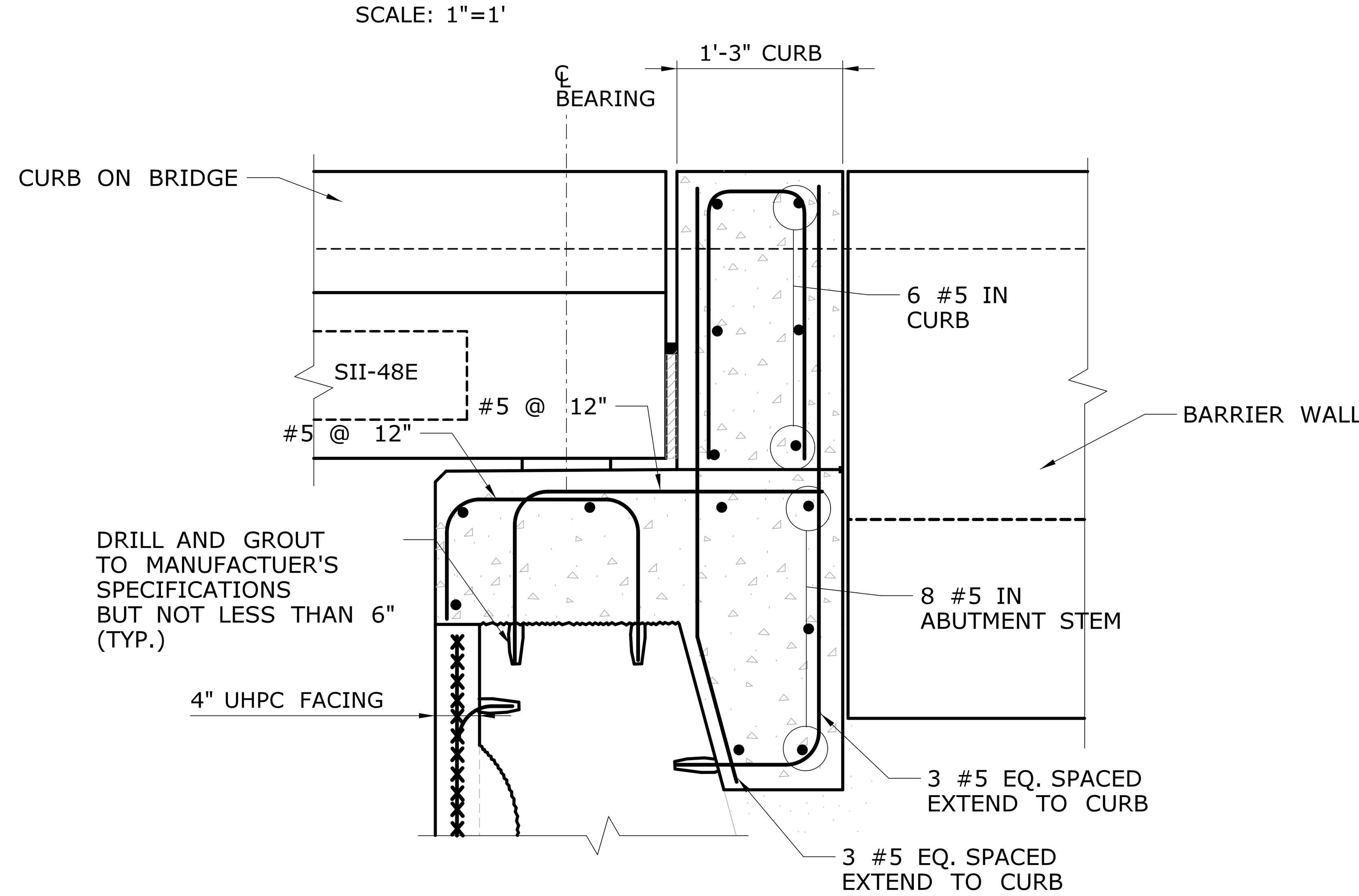
SCALE: 1"=1'



ABUTMENT TYPE 2 AT SHEAR KEY

SCALE: 1"=1'

NOTE: LOWER FACING DETAIL IDENTICAL TO TYPICAL SECTION



ABUTMENT TYPE 2 SECTION AT CURB

SCALE: 1"=1'

FINAL DESIGN REVIEW

REV.	DATE	REVISION DESCRIPTION	SHEET NO.

Plotted Date: 2/28/2019

DESIGNER/DRAFTER: DLW

CHECKED BY: -

SCALE AS NOTED

STATE OF CONNECTICUT
DEPARTMENT OF TRANSPORTATION

Filename: ...\04_SB_MSH_Br02931_ADTL2.dgn

SIGNATURE/ BLOCK:

PROJECT TITLE: REHABILITATION OF BRIDGE NO. 02931 ROUTE 2A OVER POQUETANUCK COVE

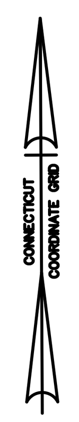
TOWN: PRESTON

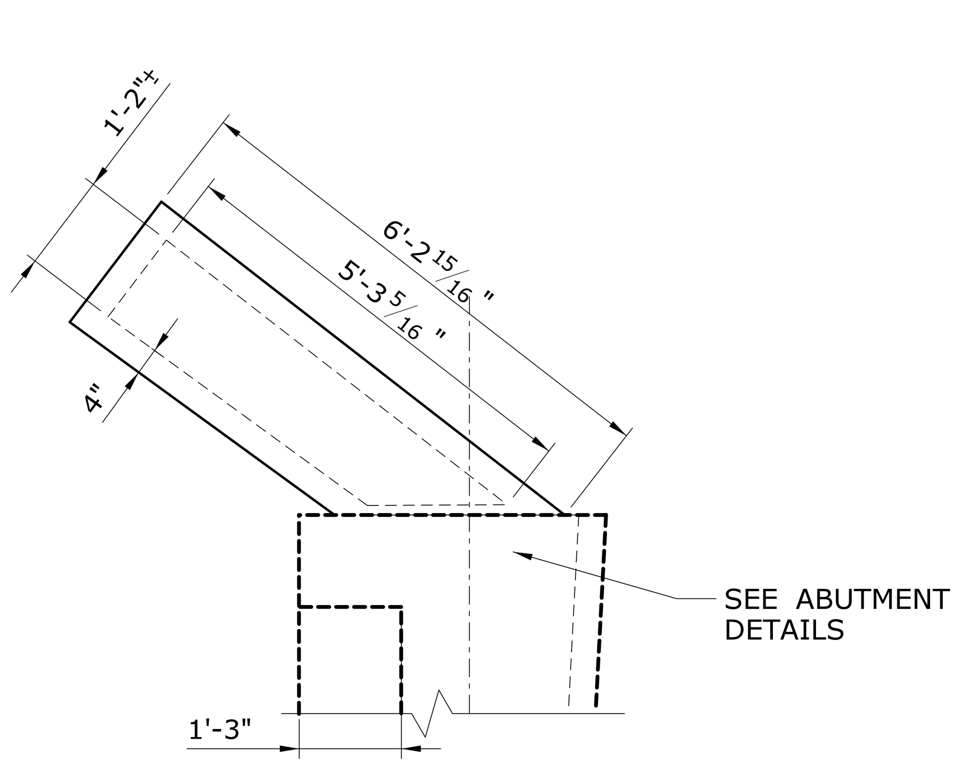
DRAWING TITLE: ABUTMENT REINFORCING

PROJECT NO. 113-107

DRAWING NO. S-09

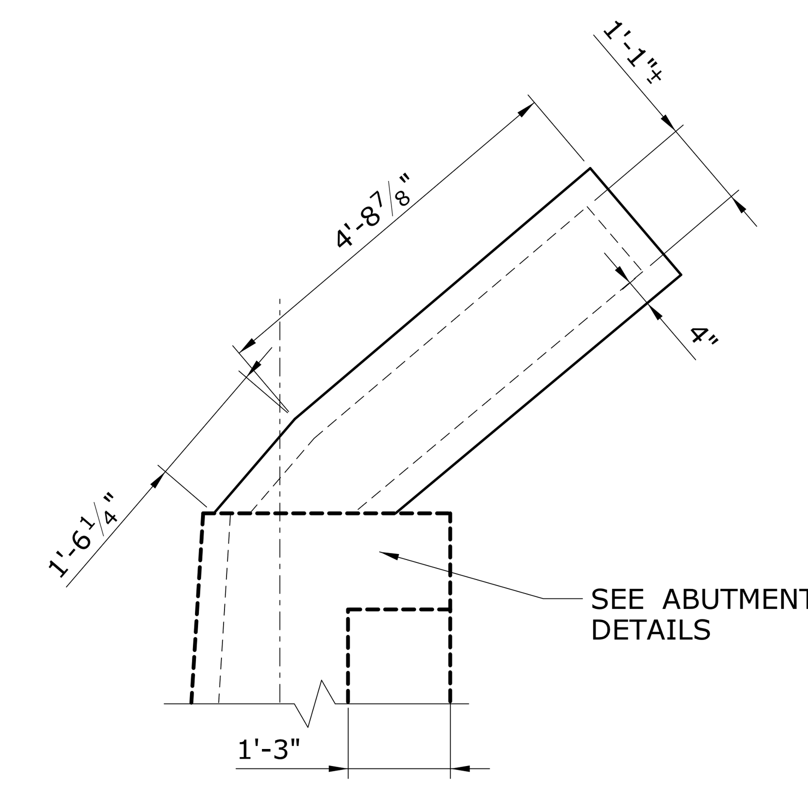
SHEET NO.





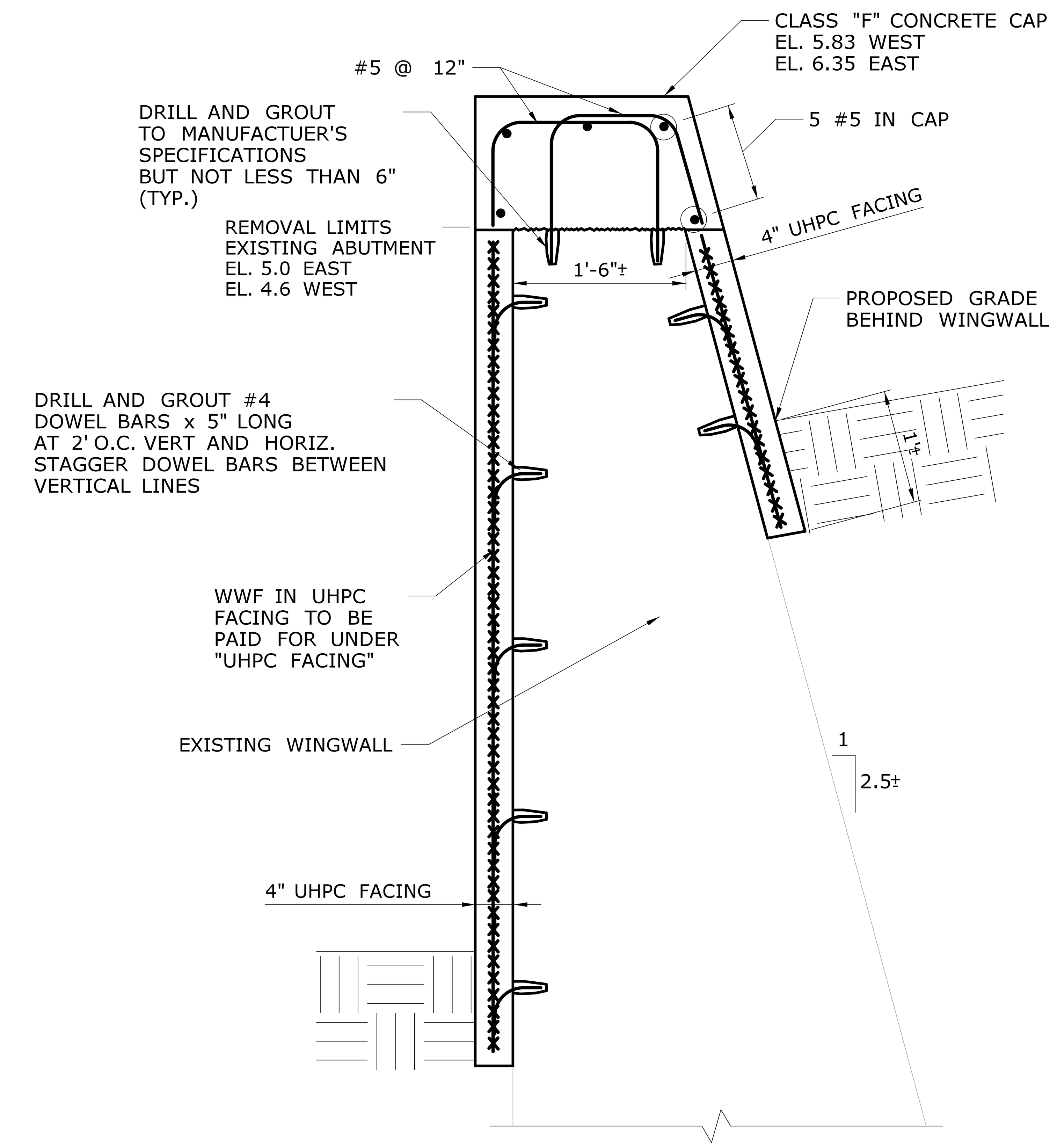
NORTHWEST WINGWALL PLAN

SCALE: 1/2"=1'



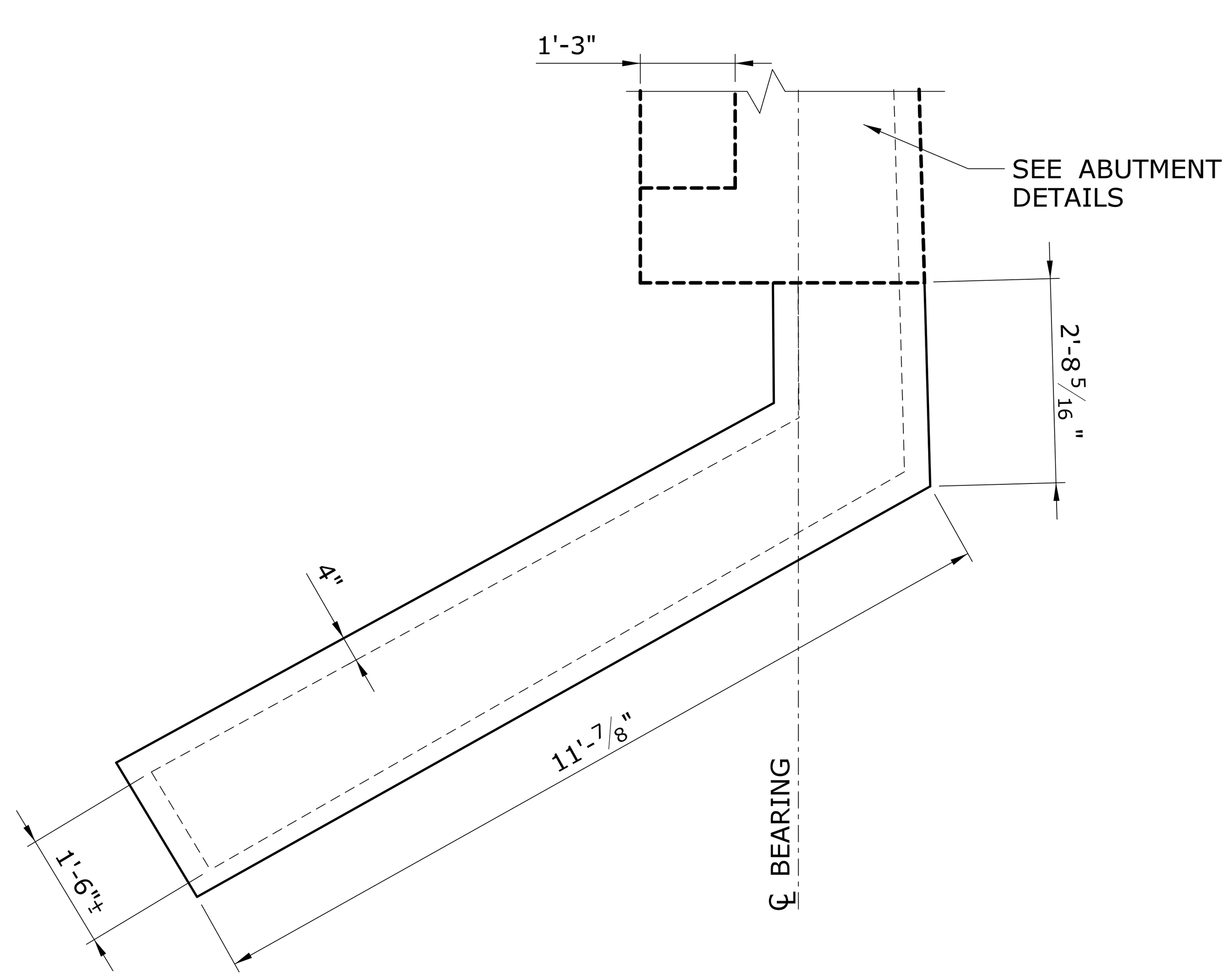
NORTHEAST WINGWALL PLAN

SCALE: 1/2"=1'



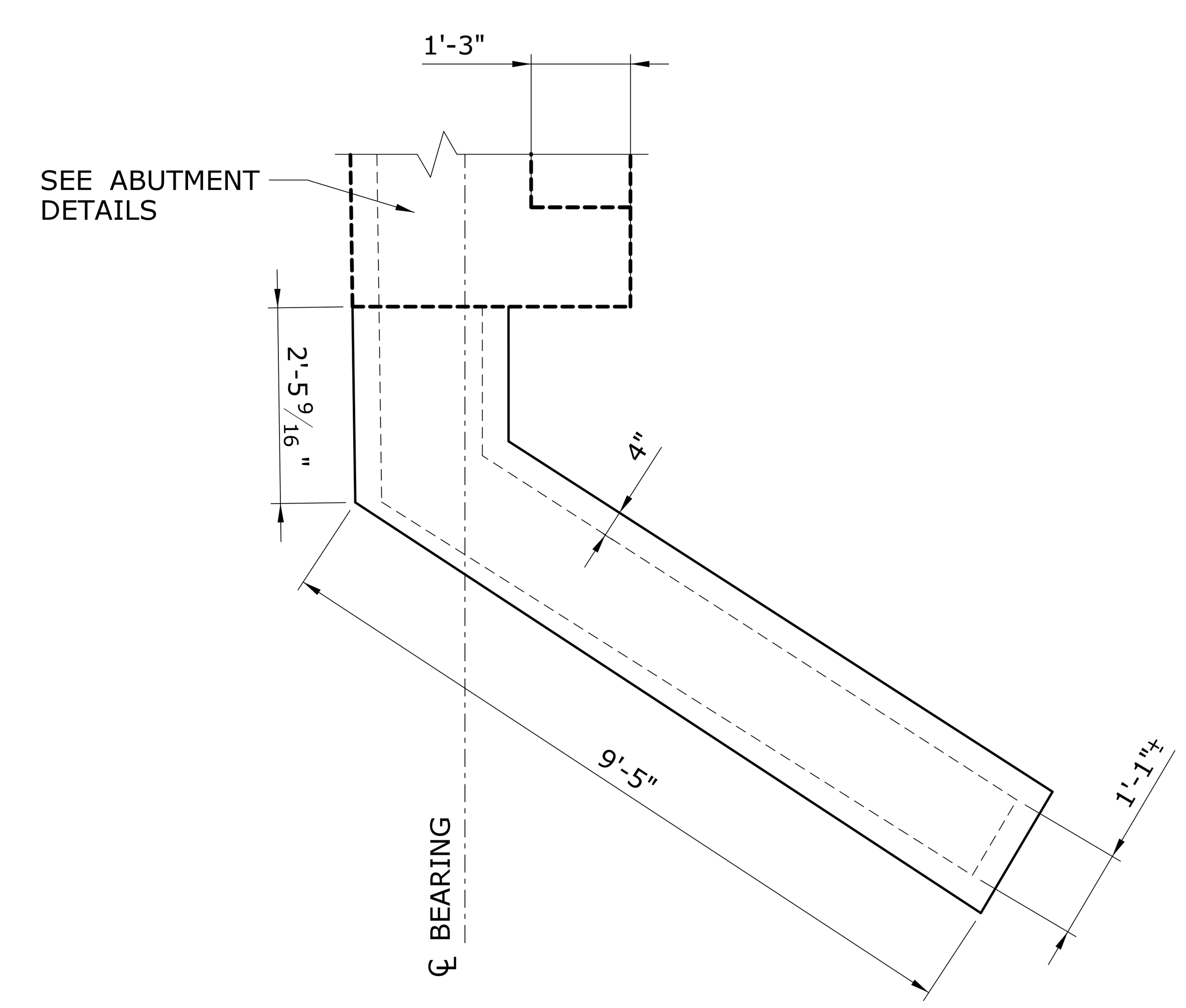
TYPICAL WINGWALL SECTION WITH CAP

SCALE: 1"=1'



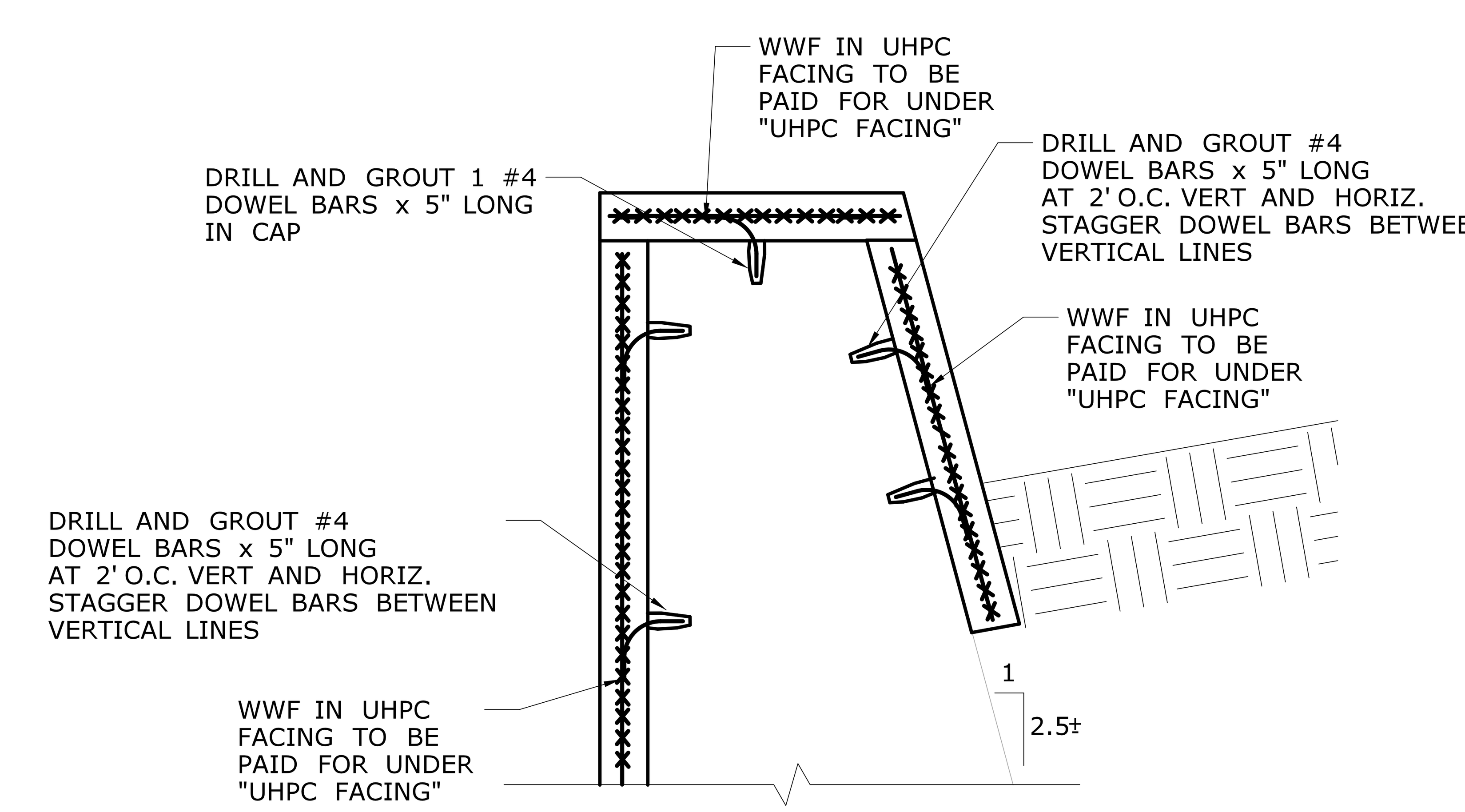
SOUTHWEST WINGWALL PLAN

SCALE: 1/2"=1'



SOUTHEAST WINGWALL PLAN

SCALE: 1/2"=1'



TYPICAL WINGWALL SECTION BEYOND CAP

SCALE: 1"=1'

NOTE: FOOTING DETAIL SIMILAR

FINAL DESIGN REVIEW

REV.	DATE	REVISION DESCRIPTION	SHEET NO.

Plotted Date: 2/28/2019

DESIGNER/DRAFTER: DLW

CHECKED BY: -

SCALE AS NOTED

STATE OF CONNECTICUT
DEPARTMENT OF TRANSPORTATION

Filename: ...\04_SB_MSH_Br02931_WW.dgn

SIGNATURE/BLOCK:

PROJECT TITLE:
REHABILITATION OF BRIDGE NO. 02931
ROUTE 2A
OVER POQUETANUCK COVE

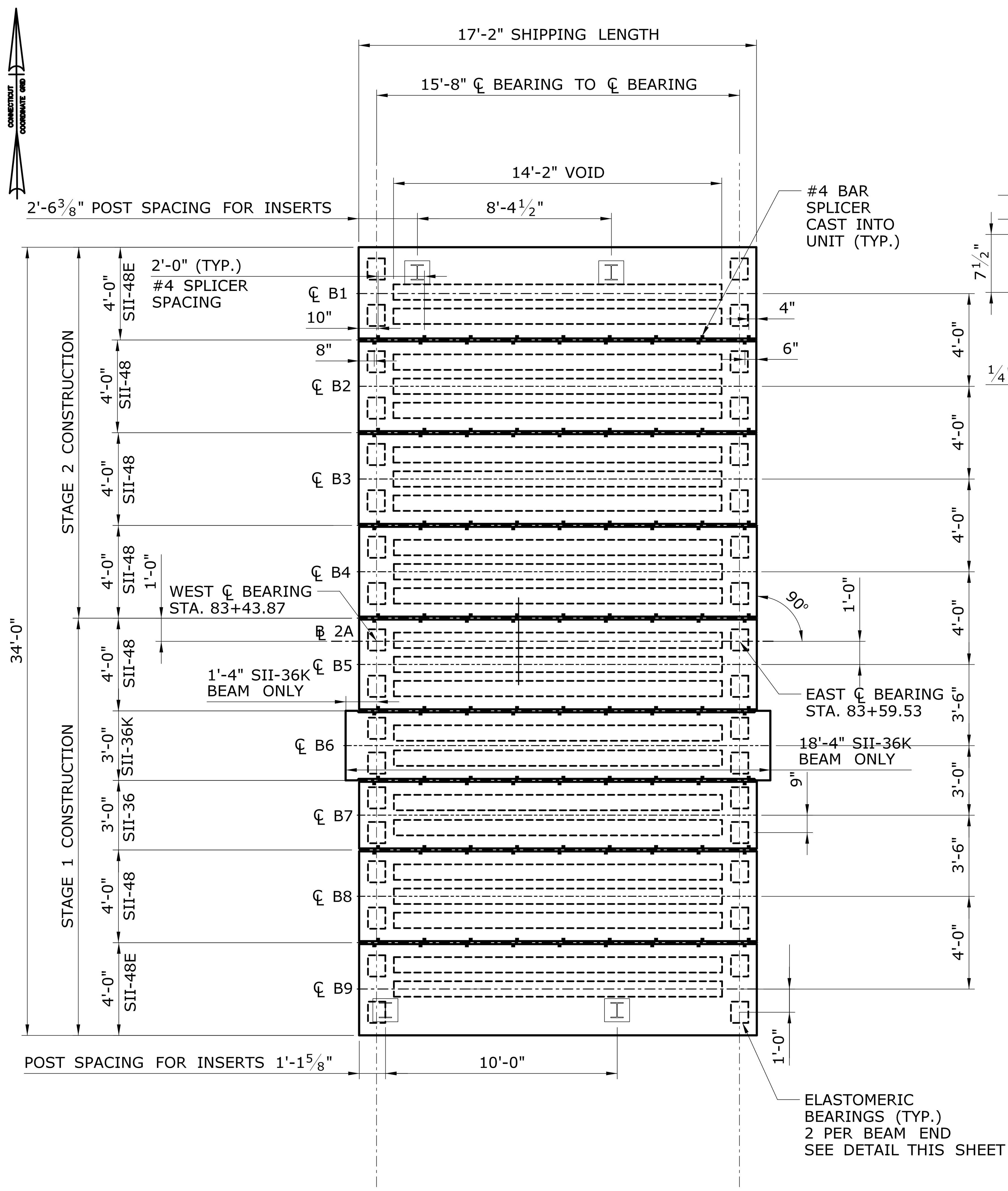
TOWN: PRESTON

DRAWING TITLE: WINGWALL PLANS AND SECTIONS

PROJECT NO. 113-107

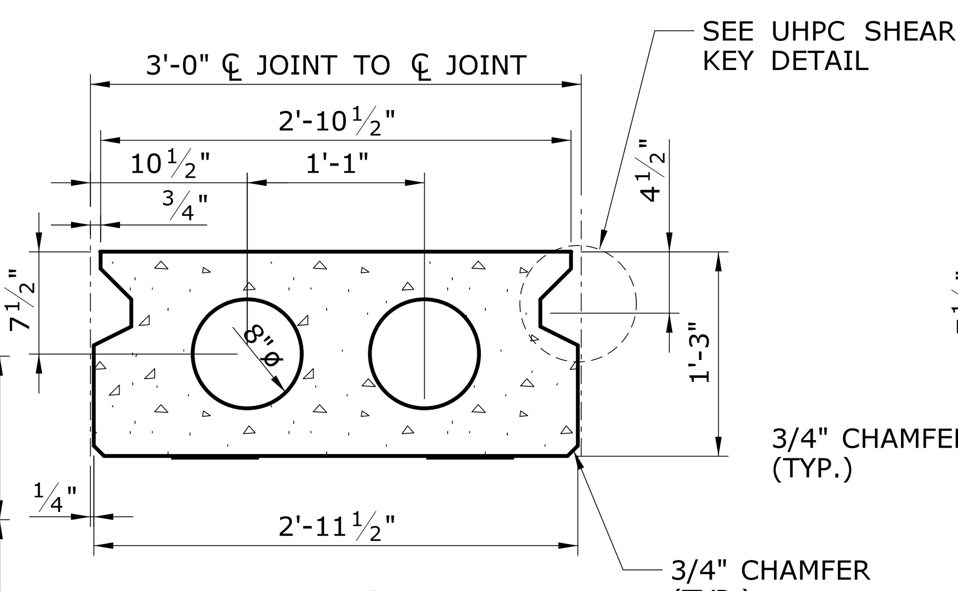
DRAWING NO. S-10

SHEET NO.



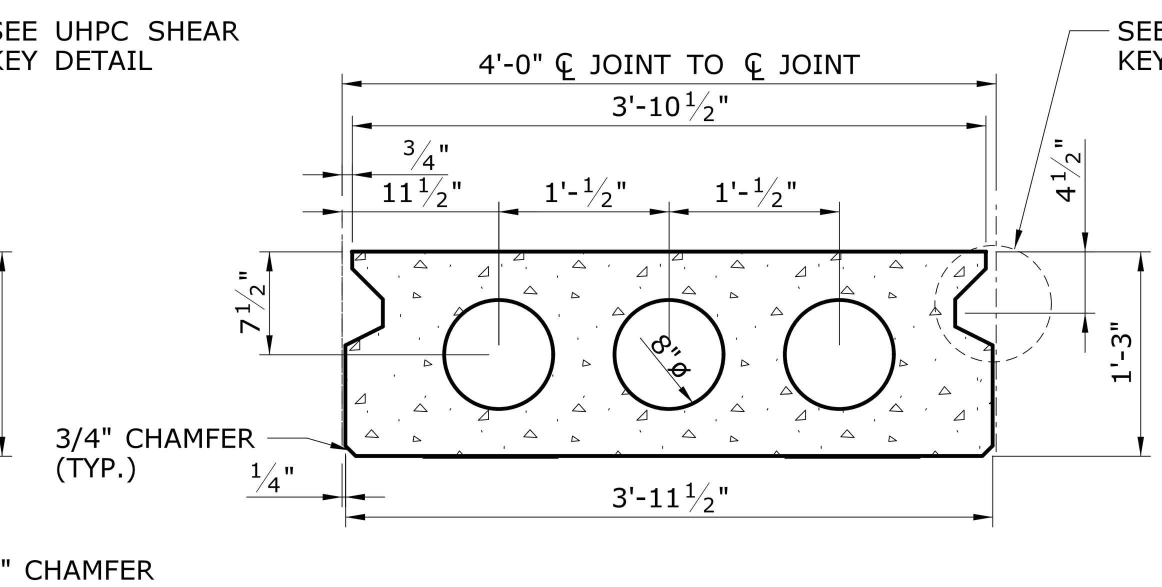
FRAMING PLAN

SCALE: 1/4"=1'



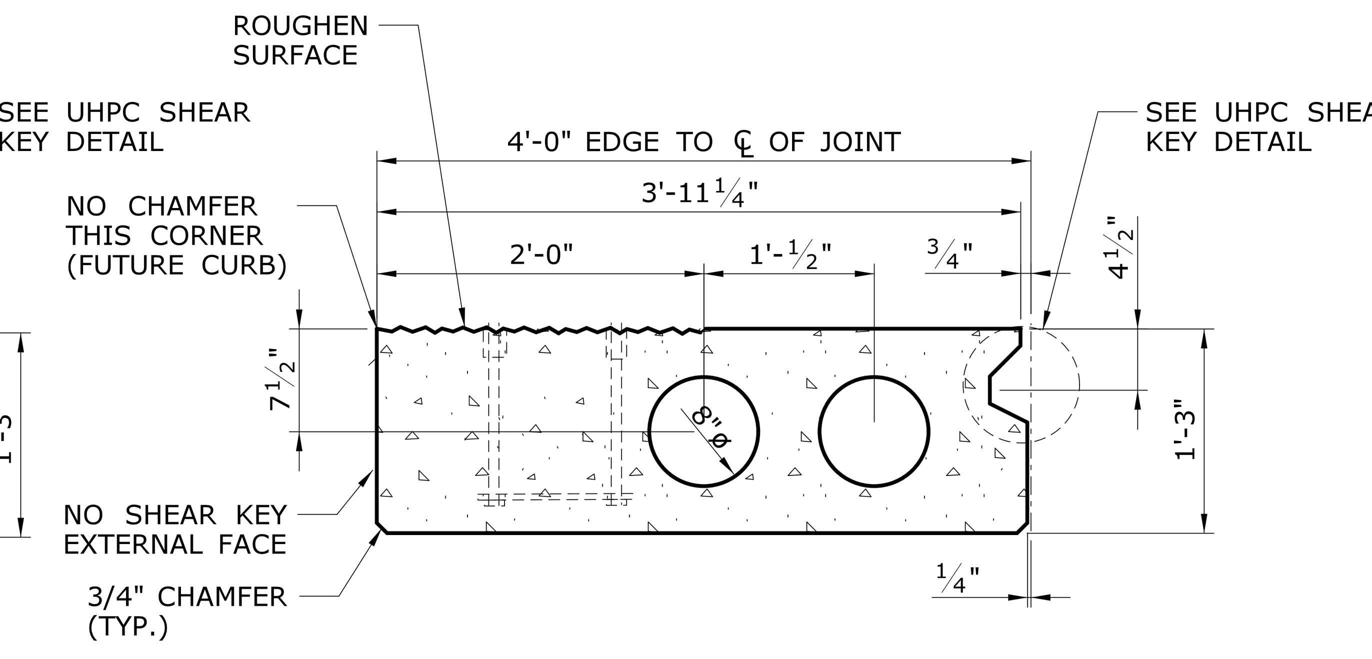
SII-36/36K

SCALE: 1"=1'



SII-48

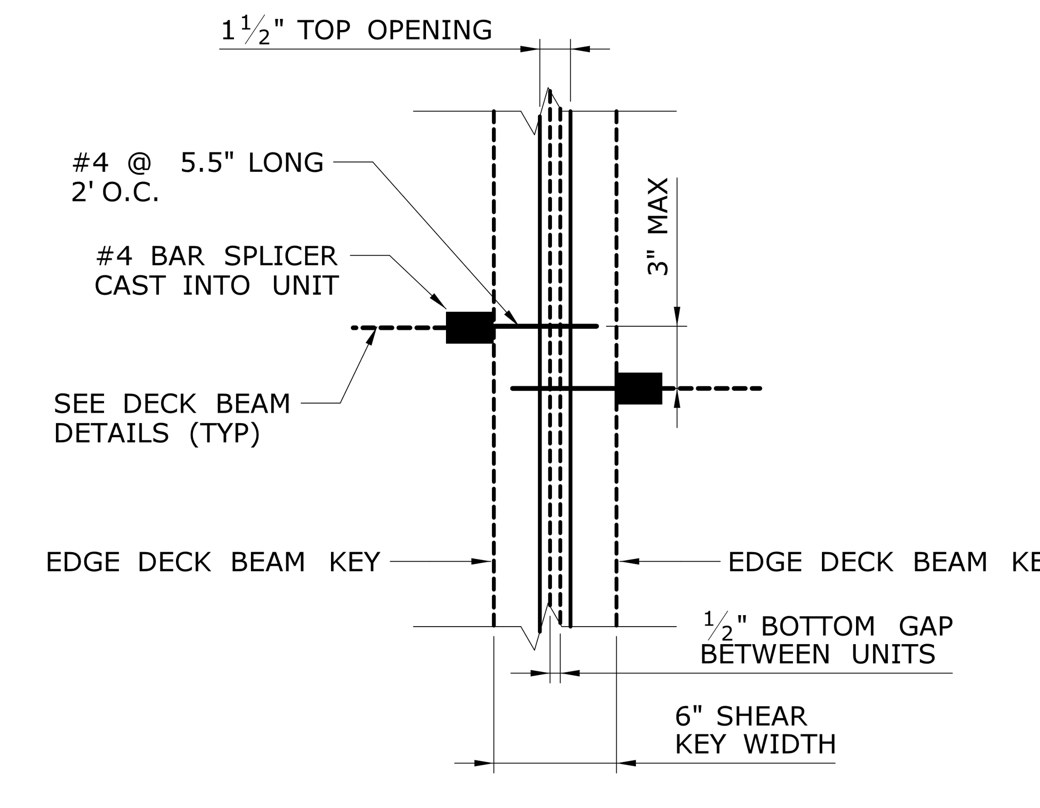
SCALE: 1"=1'



SII-48E

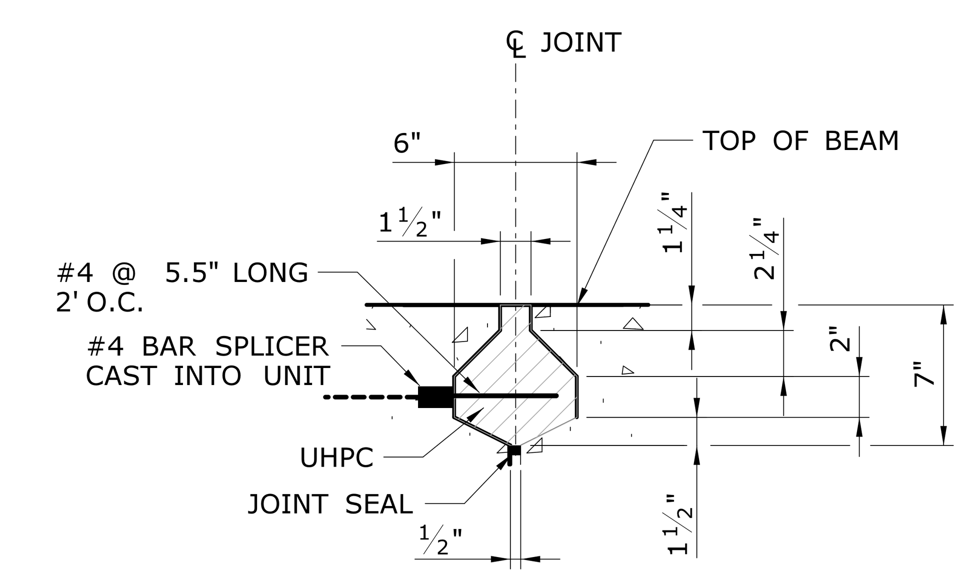
SCALE: 1"=1'

NOTE: 2 REQUIRED. 1 MIRROR IMAGE OF SHOWN



UHPC SHEAR KEY PLAN

SCALE: 1½"=1'



UHPC SHEAR KEY TYPICAL SECTION

SCALE: 1½"=1'

UHPC SHEAR KEY NOTES

1) SHEAR KEYS TO BE FILLED WITH UHPC SHALL BY ROUGHENED AND CLEANED PRIOR TO BEAM PLACEMENT

2) SECURE #4 SPLICE BARS TO BEAM AFTER ROUGHENING CONCRETE BUT PRIOR TO BEAM PLACEMENT

3) AFTER FINAL BEAM PLACEMENT, SHEAR KEYS SHALL BE FILLED WITH ULTRA HIGH PERFORMANCE CONCRETE (UHPC) IN ONE CONTINUOUS POUR PER KEY.

4) A NOMINAL OVERFILL IS ANTICPATED AT CROWN OF SHEAR KEY LOCATIONS. THE COST OF GRINDING THE EXCESS MATERIAL SHALL BE INCLUDED IN THE COST OF THE UHPC CONCRETE.

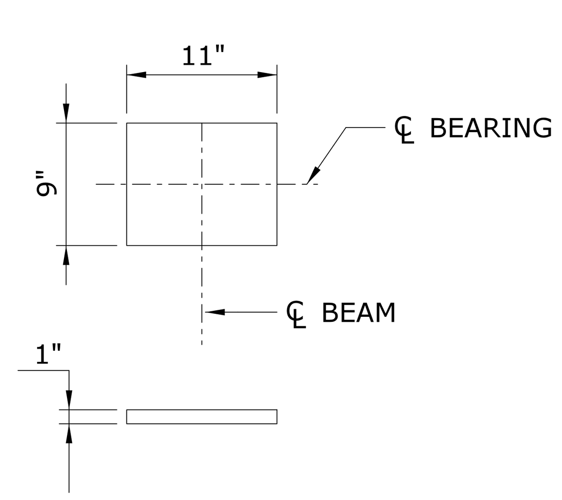
BEARING ASSEMBLY NOTES:

1. THE ELASTOMER SHALL BE TYPE CR, GRADE 3 AS DEFINED BY ASTM D4014 AND SHALL HAVE A SHORE A DUROMETER HARDNESS OF 70+/-5 POINTS AND A SHEAR MODULUS WITHIN LIMITS OF 200 TO 250 PSI.

2. THE ELASTOMERIC BEARINGS SHALL BE INSTALLED WHEN THE AMBIENT AIR TEMPERATURE IS BETWEEN 41° F AND 77° F AND HAS BEEN WITHIN THIS RANGE FOR MORE THAN TWO HOURS.

3. THE CONCRETE ABUTMENT SEATS SHALL BE CAREFULLY FINISHED SMOOTH TO AN EVEN, LEVEL SURFACE AND SHALL SHOW NO VARIATIONS FROM A TRUE PLANE GREATER THAN 1/16".

4. MULTIPOLYMER SHIMS MAY NEED TO BE USED AT THE ELASTOMERIC BEARING PADS TO ALLOW FOR BEAM ADJUSTMENT DUE TO CAMBER. SEE PRESTRESSED DECK UNITS SPECIAL PROVISION.



TYPICAL ELASTOMERIC BEARING PAD DETAIL

SCALE: 1" = 1'-0"

PRESTRESSED CONCRETE NOTES:

1) PRESTRESSING STEEL SHALL BE ½" DIAMETER, LOW RELAXATION STRANDS CONFORMING TO THE REQUIREMENTS OF AASHTO M203, GRADE 270.

2) JACKING FORCE PER STRAND IS 31 KIPS.

3) THE NUMBER AND CENTER OF GRAVITY OF STRANDS ARE LISTED IN THE FOLLOWING STRANDS SUMMARY TABLE.

4) CONCRETE STRENGTH:
F'ci = 4 KSI
F'c = 6.5 KSI

STRANDS SUMMARY

SLAB TYPE	STRAND NUMBER	STRAND ECCENTRICITY *
SII-36/36K	12	3.836 IN.
SII-48	14	4.077 IN.
SII-48E	12	3.835 IN.

* ECCENTRICITIES ARE BASED ON THE GROSS NON-COMPOSITE SECTION. POSITIVE VALUES INDICATE STRANDS ARE BELOW THE CENTROID.

FINAL DESIGN REVIEW

REV.	DATE	REVISION DESCRIPTION	SHEET NO.

Plotted Date: 3/4/2019

DESIGNER/DRAFTER: DLW

CHECKED BY: -

SCALE AS NOTED

STATE OF CONNECTICUT
DEPARTMENT OF TRANSPORTATION

Filename: ...\04_SB_MST_Br02931_FRM.dgn

SIGNATURE/BLOCK:

PROJECT TITLE: REHABILITATION OF BRIDGE NO. 02931 ROUTE 2A OVER POQUETANUCK COVE

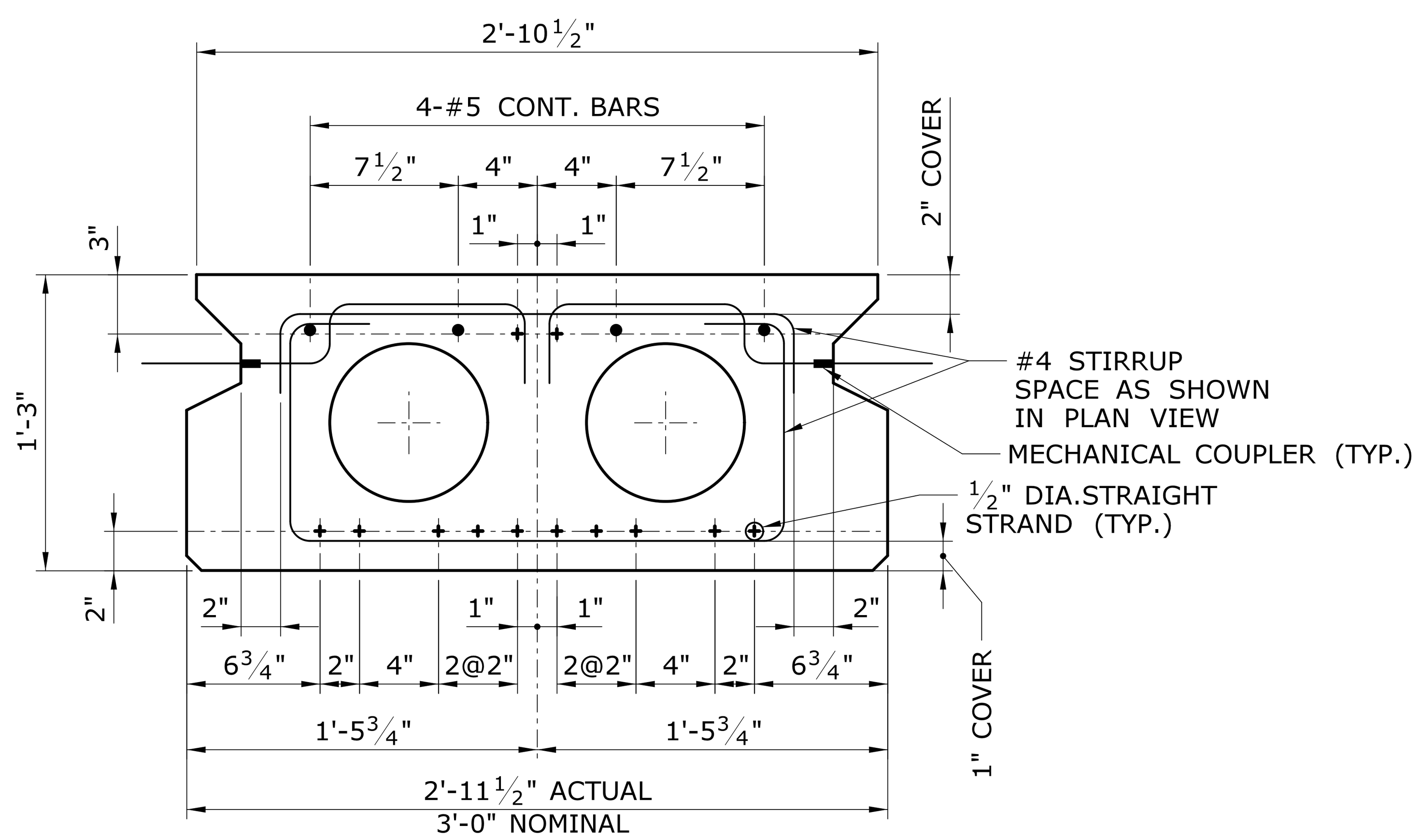
TOWN: PRESTON

DRAWING TITLE: FRAMING PLAN AND DETAILS

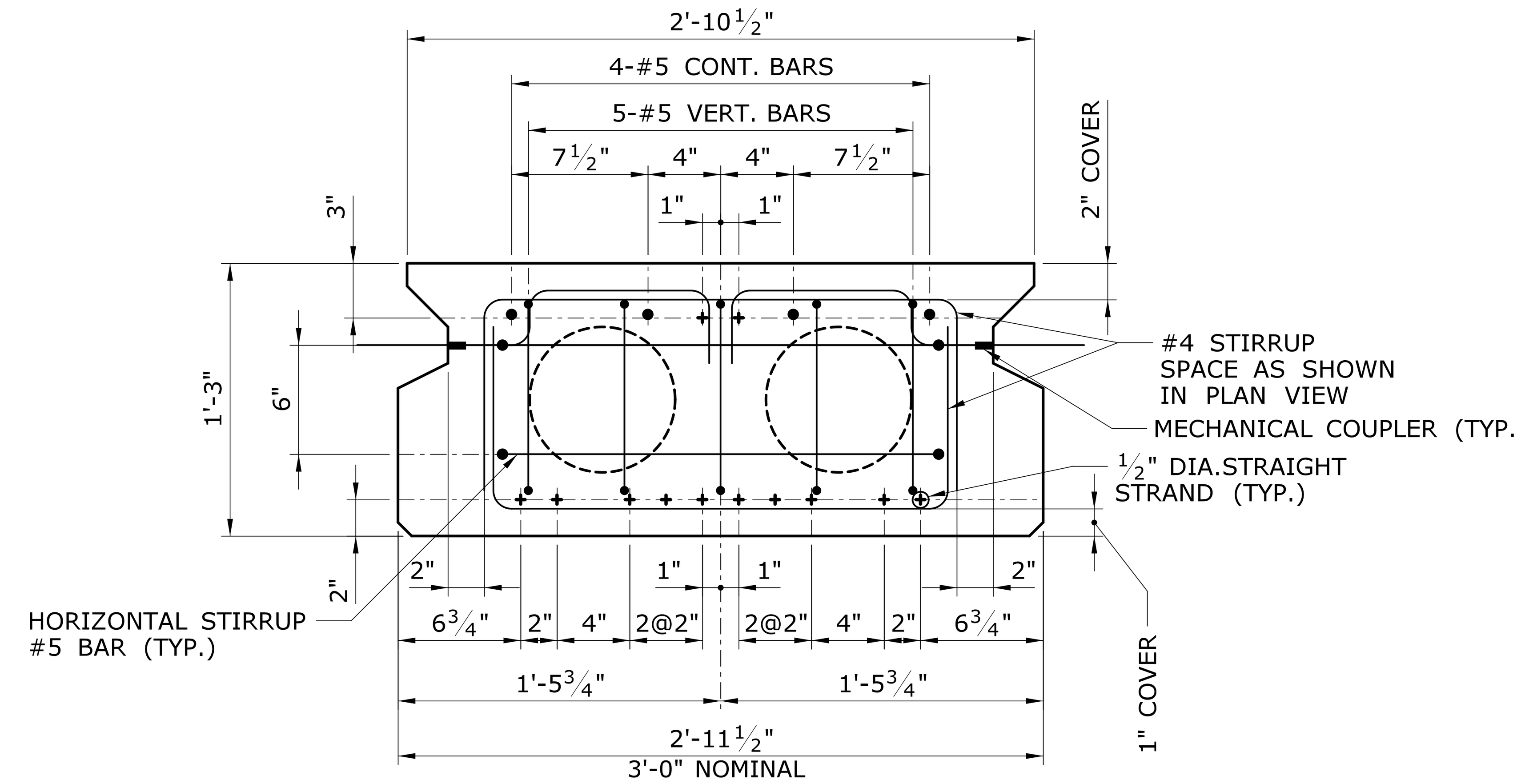
PROJECT NO. 113-107

DRAWING NO. S-11

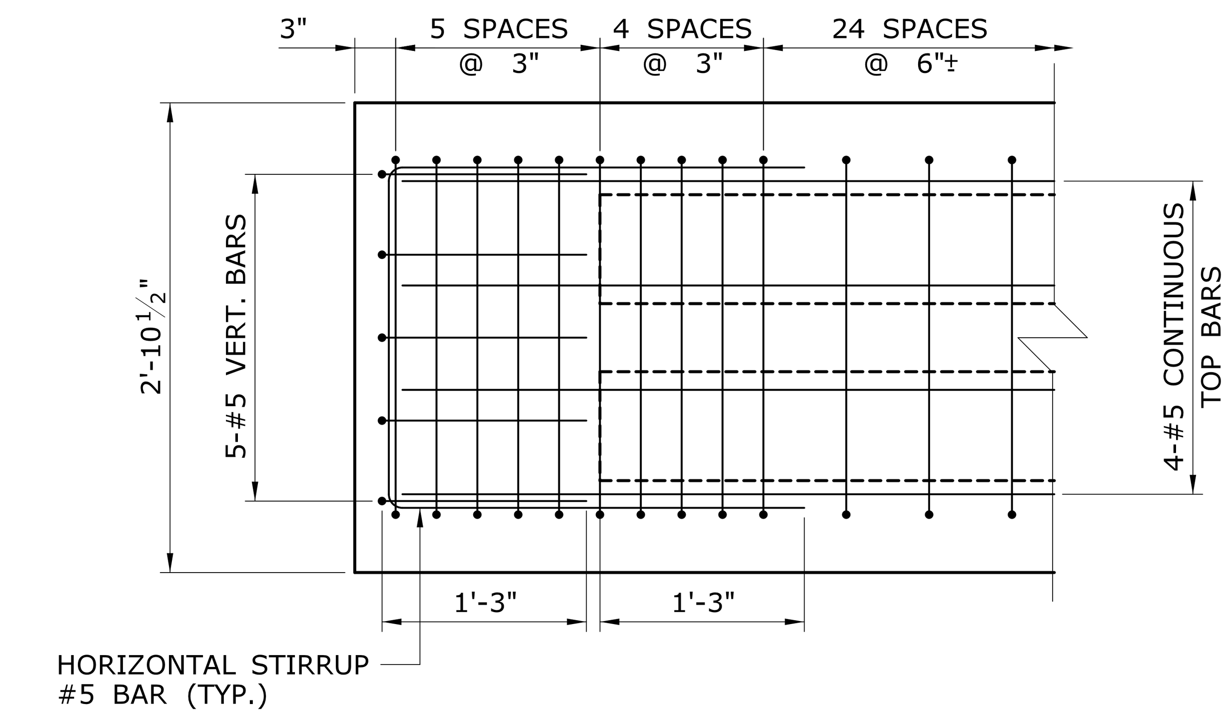
SHEET NO.



SECTION THRU VOIDS
SCALE: 1½"=1'

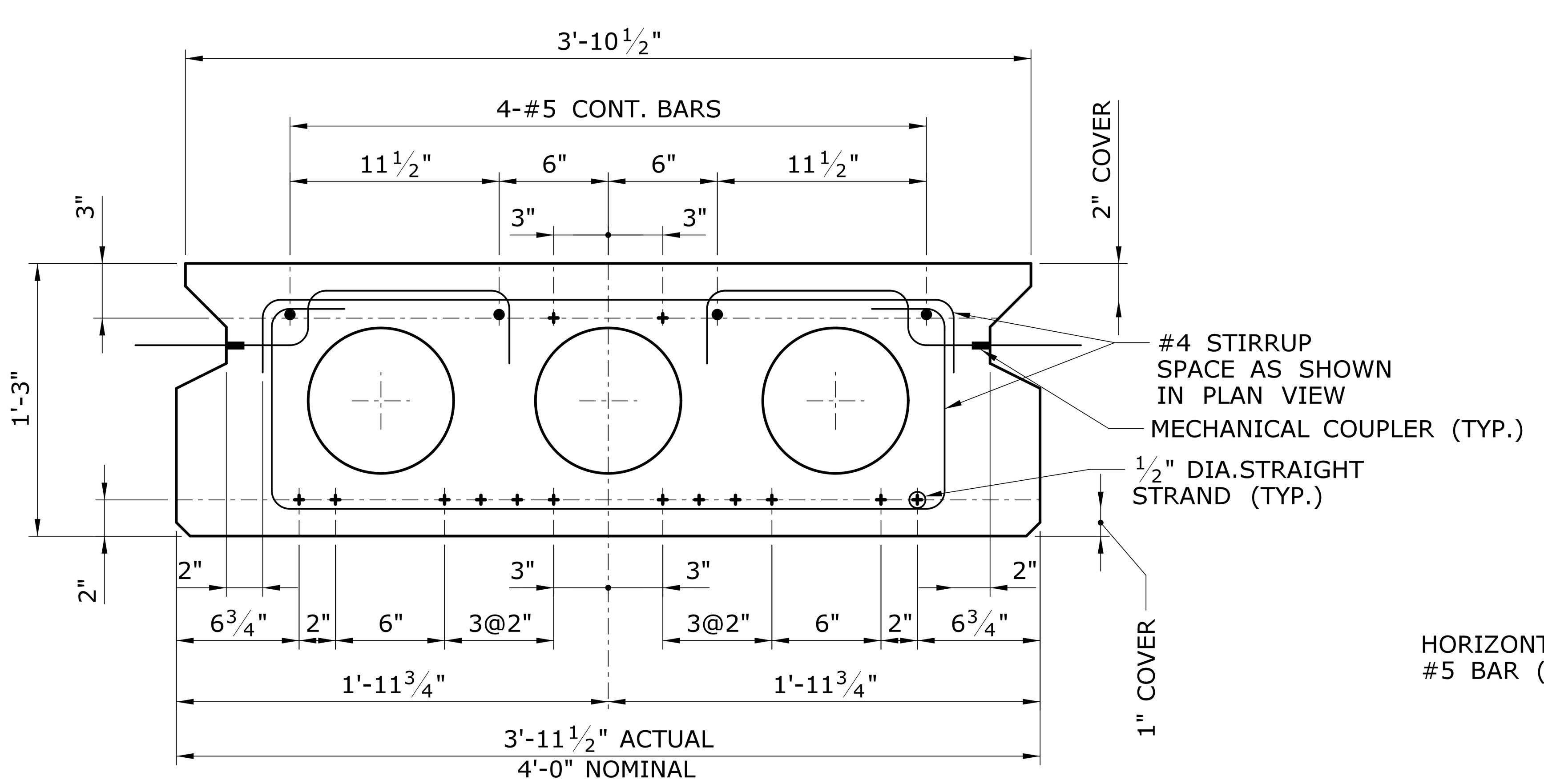


SECTION AT BEAM END
SCALE: 1½"=1'

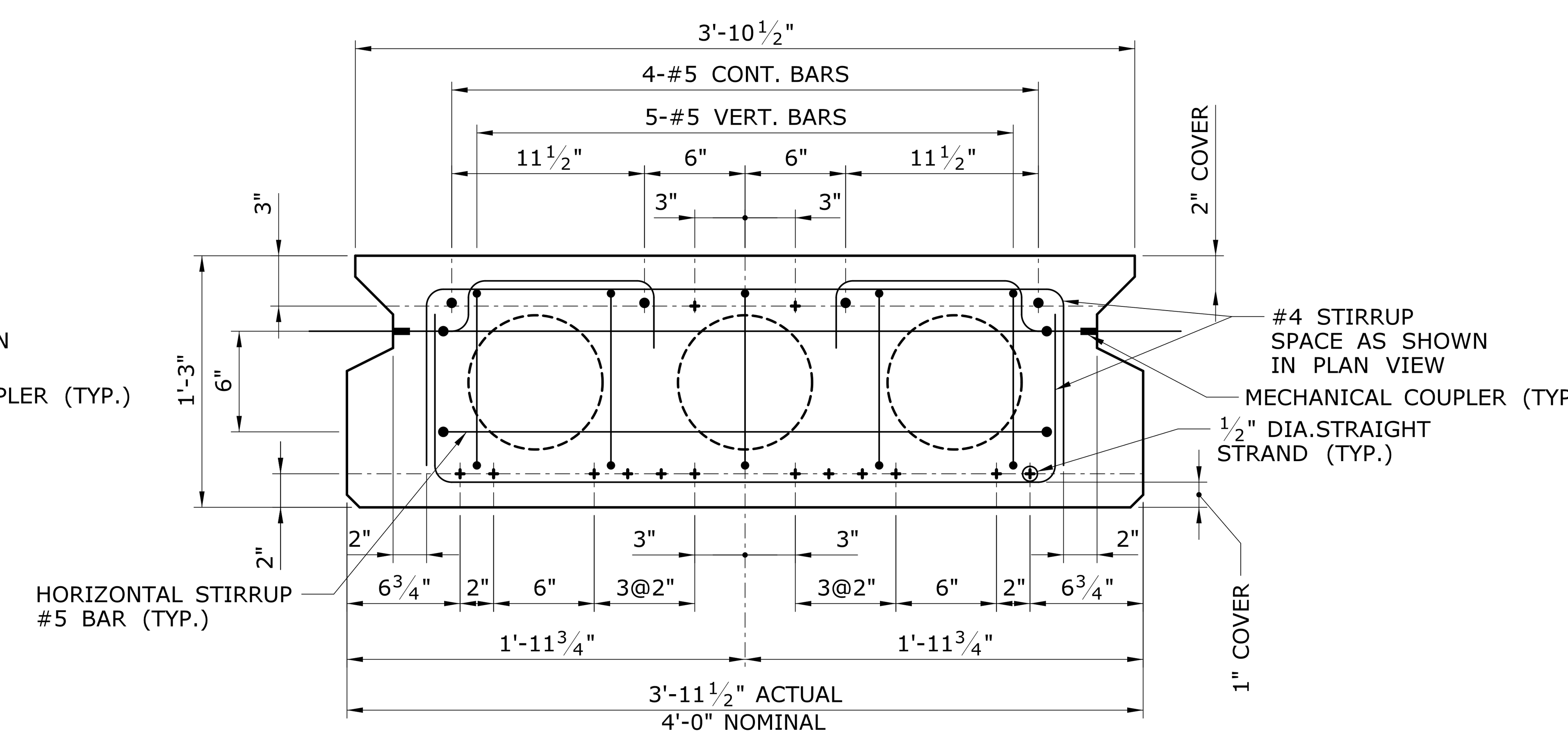


PLAN VIEW
SCALE: 1"=1'

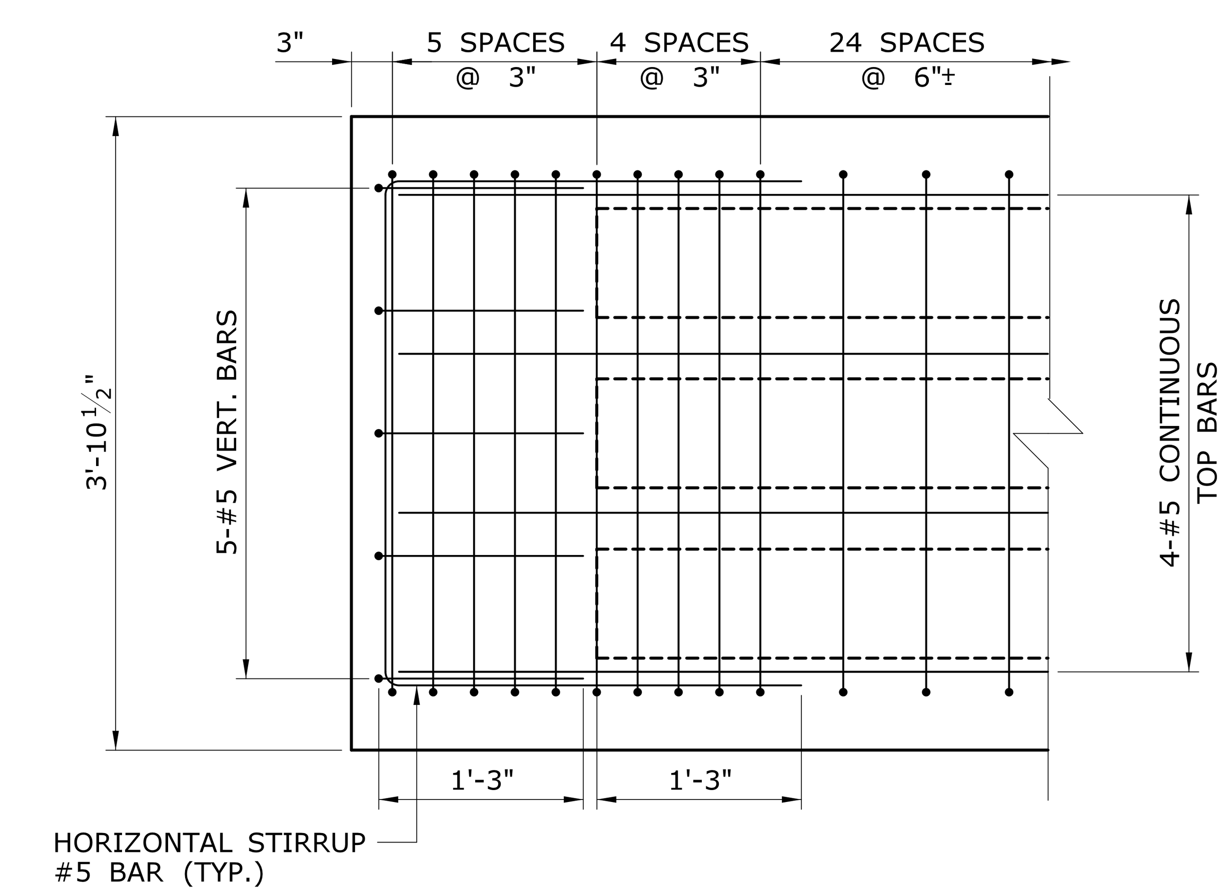
PRESTRESSED DECK UNIT (3'-0" X 1'-3")
BEAMS NO. B3 THRU B6



SECTION THRU VOIDS
SCALE: 1½"=1'



SECTION AT BEAM END
SCALE: 1½"=1'



PLAN VIEW
SCALE: 1"=1'

PRESTRESSED DECK UNIT (3'-0" X 1'-3")
BEAMS NO. B2, B7 & B8

FINAL DESIGN REVIEW

REV.	DATE	REVISION DESCRIPTION	SHEET NO.

Plotted Date: 2/28/2019

DESIGNER/DRAFTER: RH
CHECKED BY: -
SCALE AS NOTED

STATE OF CONNECTICUT
DEPARTMENT OF TRANSPORTATION

Filename: ...\04_SB_MST_Br02931_SLAB1.dgn

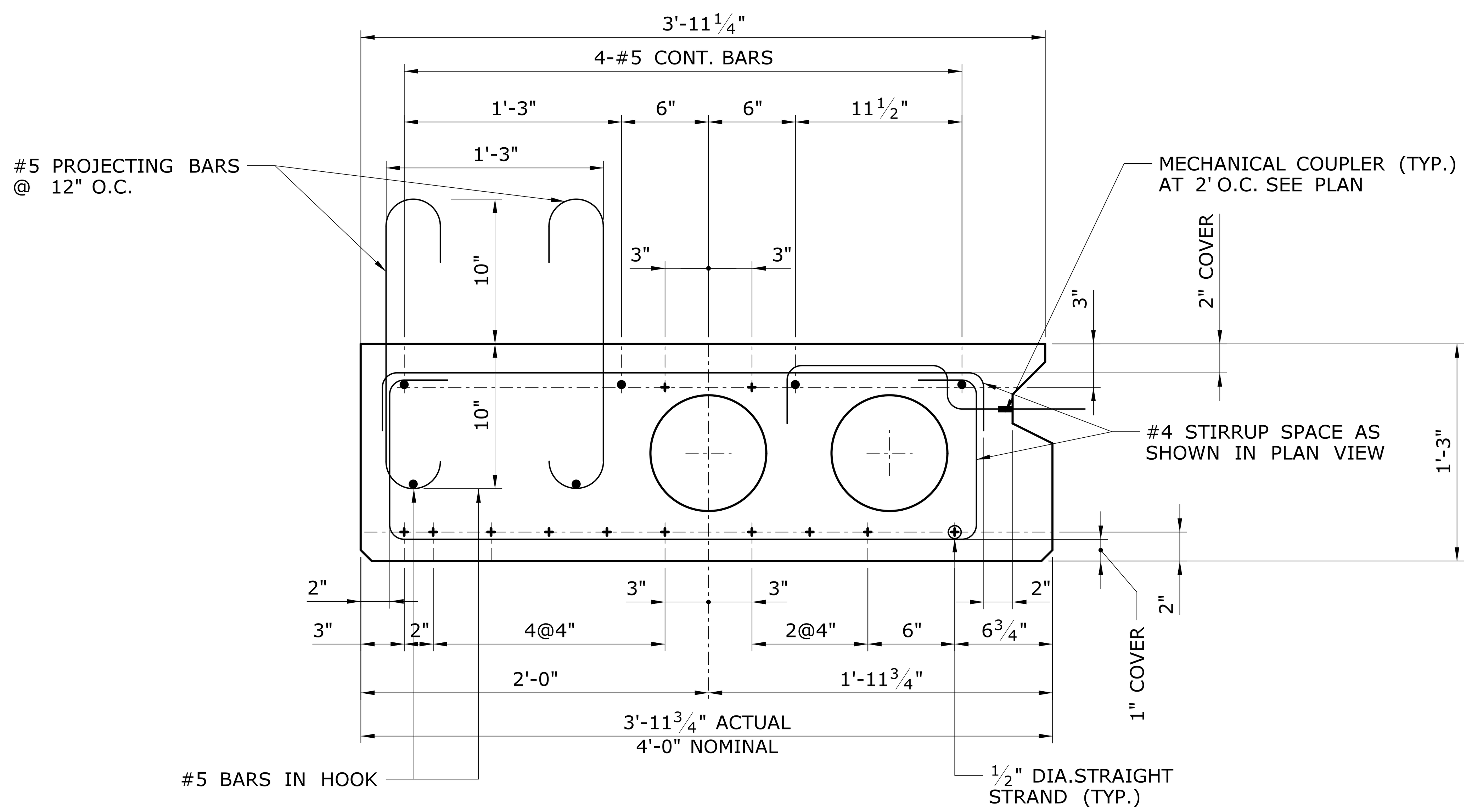
SIGNATURE/BLOCK:

PROJECT TITLE:
REHABILITATION OF BRIDGE NO. 02931
ROUTE 2A
OVER POQUETANUCK COVE

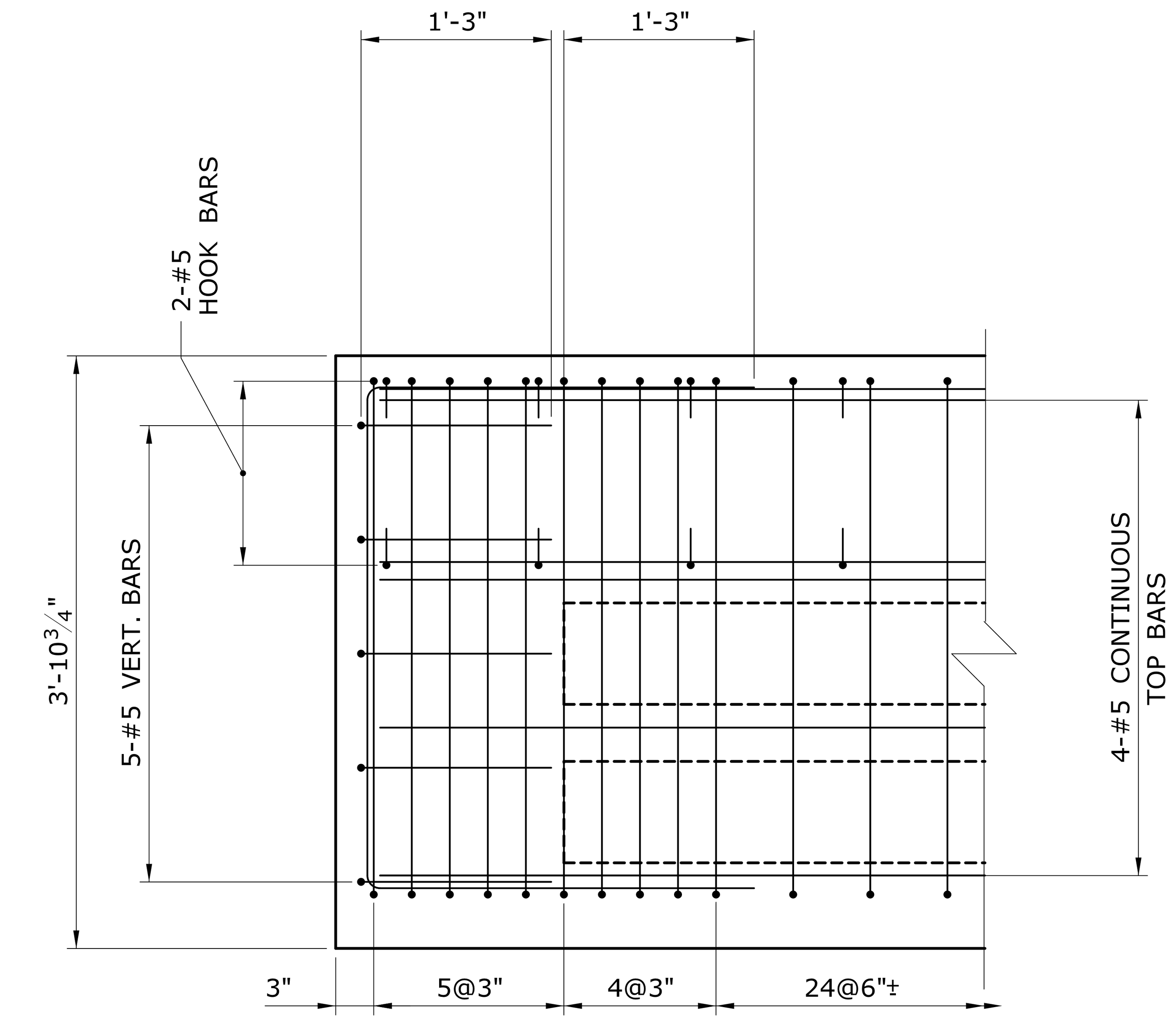
TOWN: **PRESTON**

DRAWING TITLE:
PRESTRESSED DECK UNIT DETAILS - 1

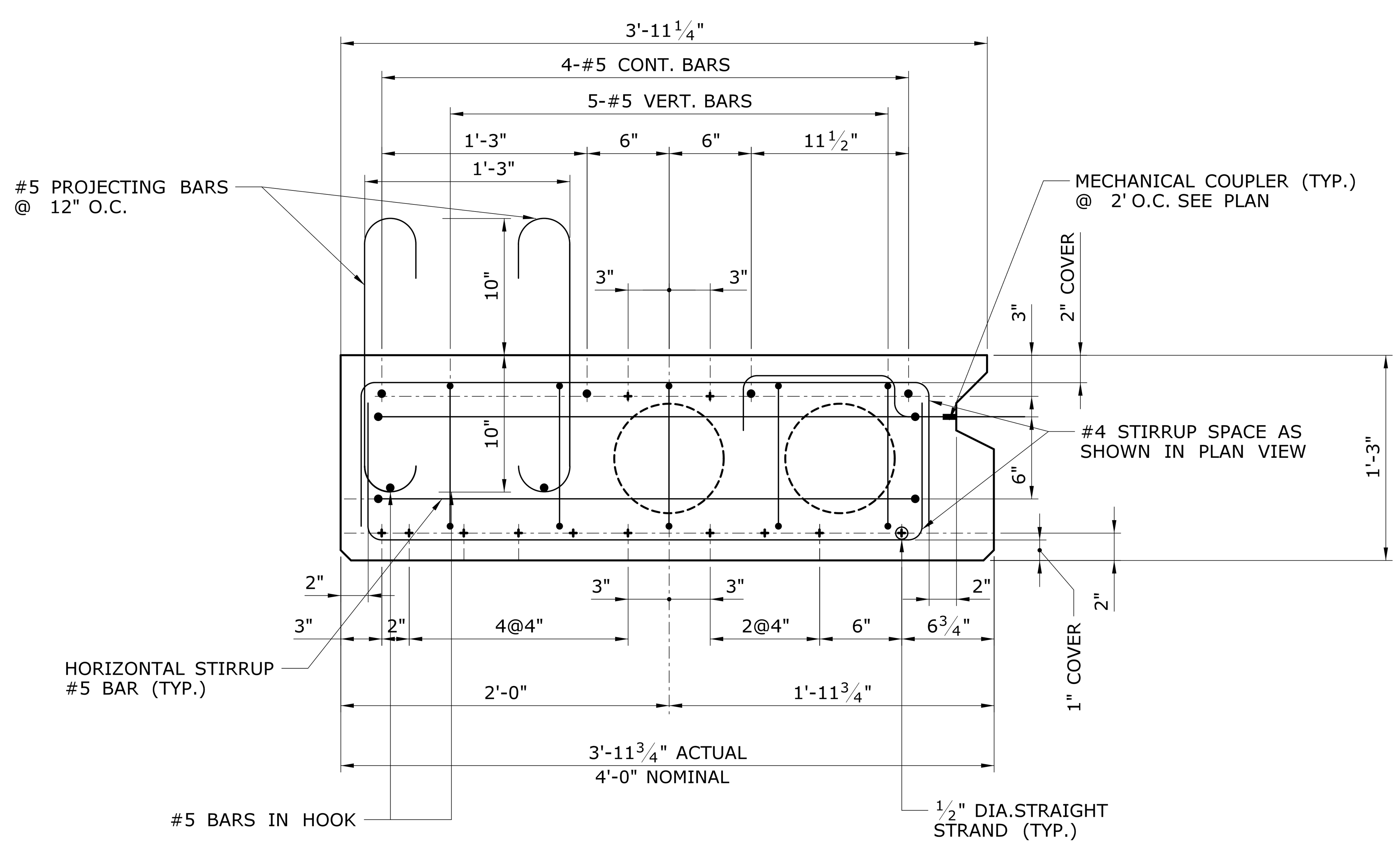
PROJECT NO. **113-107**
DRAWING NO. **S-12**
SHEET NO.



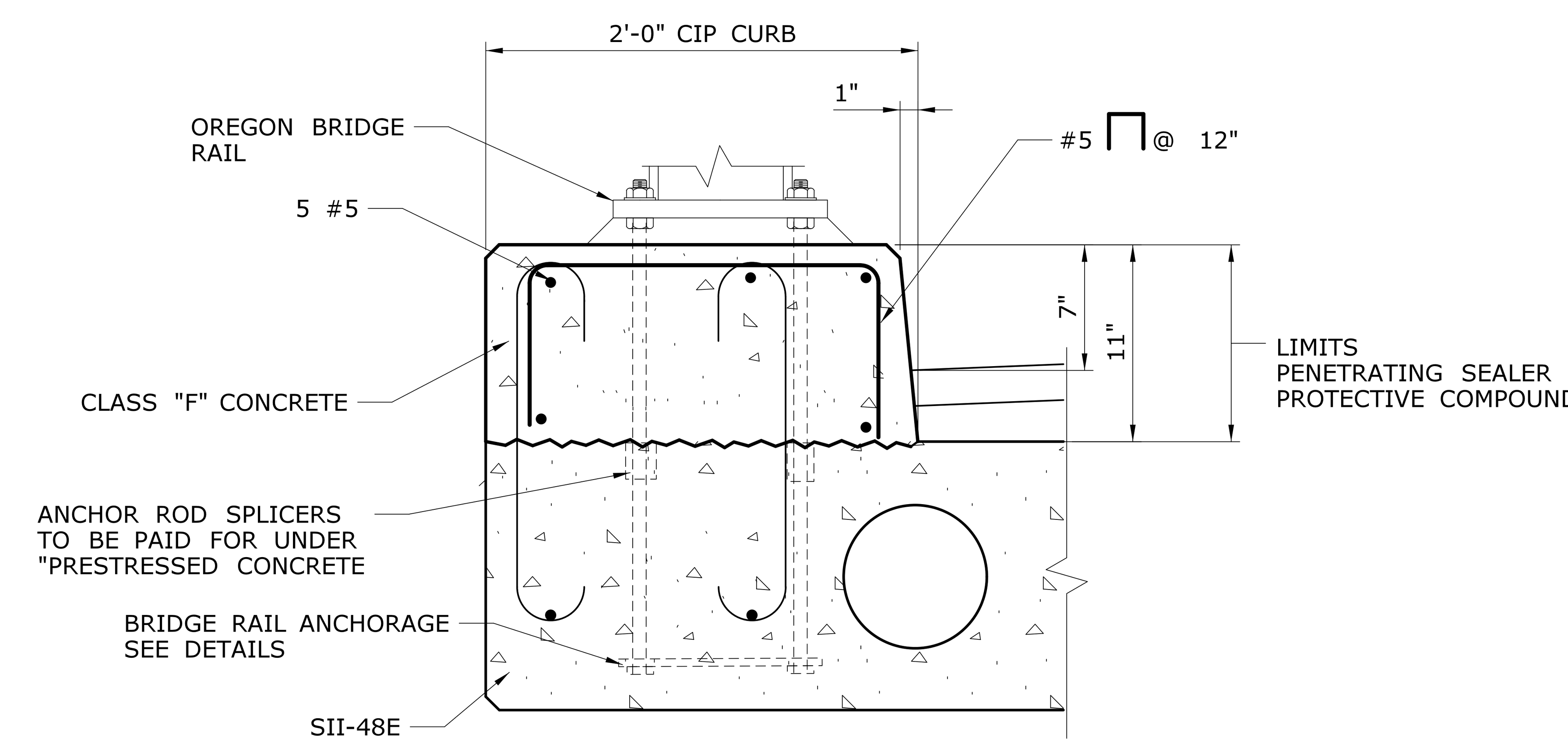
SECTION THRU VOIDS
SCALE: 1½"=1'



PLAN VIEW
SCALE: 1"=1'



SECTION AT BEAM END
SCALE: 1½"=1'



BRIDGE CURB DETAIL
SCALE: 1 1/2"=1'

PRESTRESSED DECK UNIT (4'-0" X 1'-3")
BEAMS NO. B1 & B9

FINAL DESIGN REVIEW

REV.	DATE	REVISION DESCRIPTION	SHEET NO.

Plotted Date: 2/28/2019

DESIGNER/DRAFTER: RH
CHECKED BY: -
SCALE AS NOTED

STATE OF CONNECTICUT
DEPARTMENT OF TRANSPORTATION

Filename: ...\04_SB_MST_Br02931_SLAB2.dgn

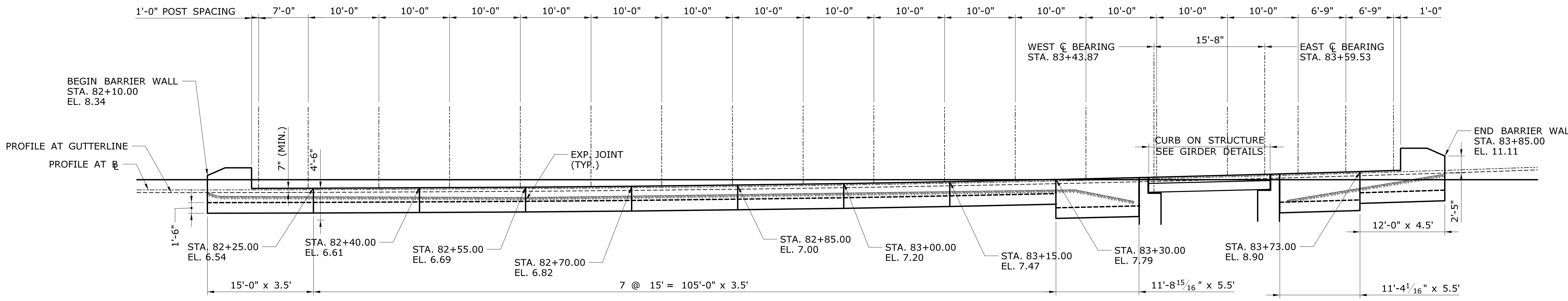
SIGNATURE/ BLOCK:

PROJECT TITLE:
REHABILITATION OF BRIDGE NO. 02931
ROUTE 2A
OVER POQUETANUCK COVE

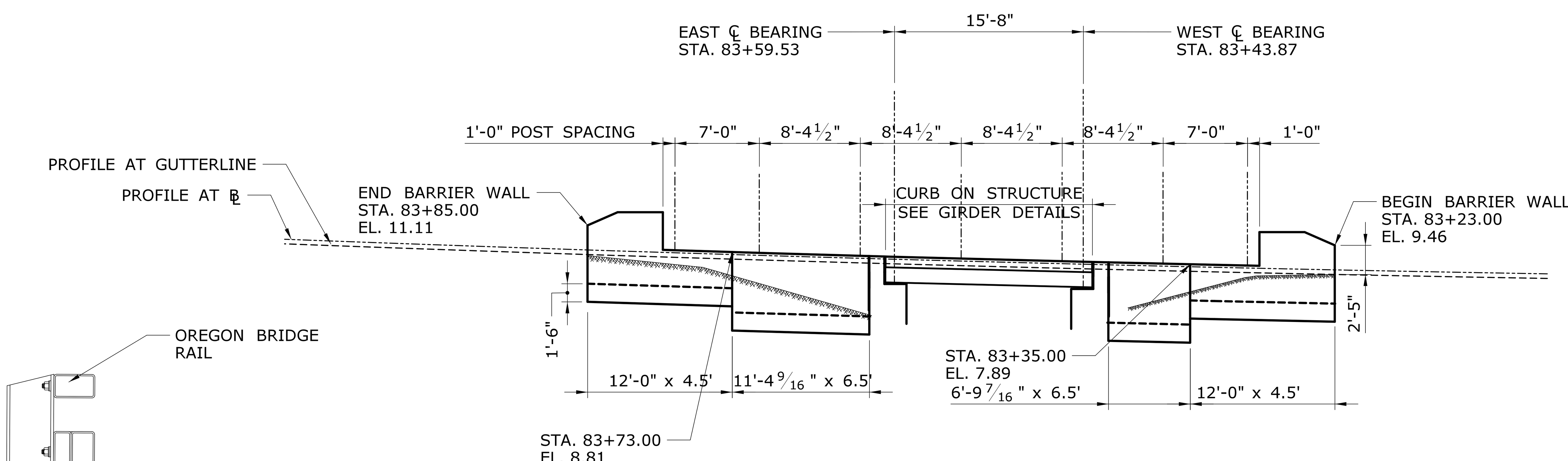
TOWN: PRESTON

DRAWING TITLE: PRESTRESSED DECK UNIT DETAILS - 2

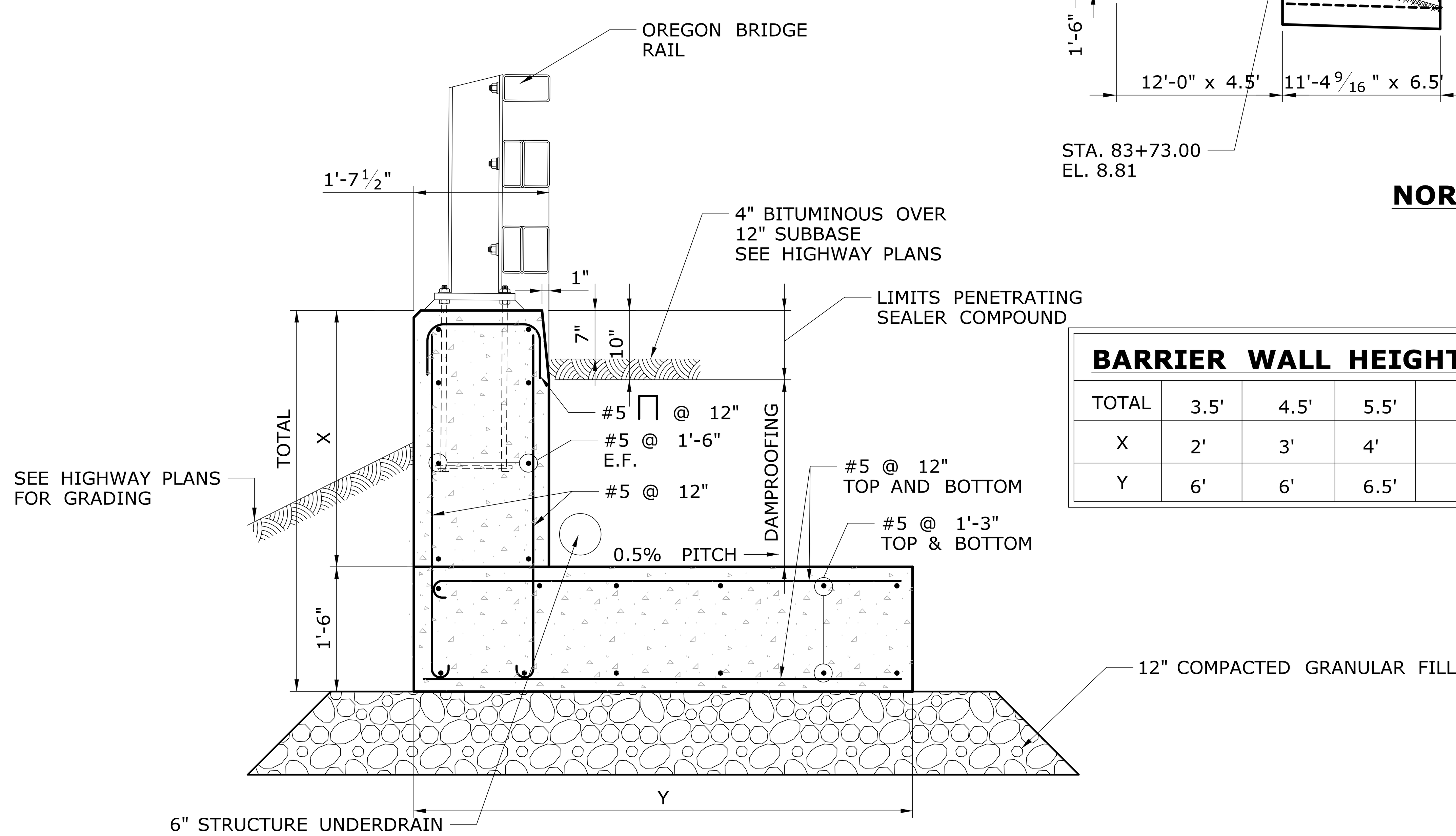
PROJECT NO. 113-107
DRAWING NO. S-13
SHEET NO.



SOUTHERN ELEVATION
LOOKING NORTH
SCALE: 1/8"=1'



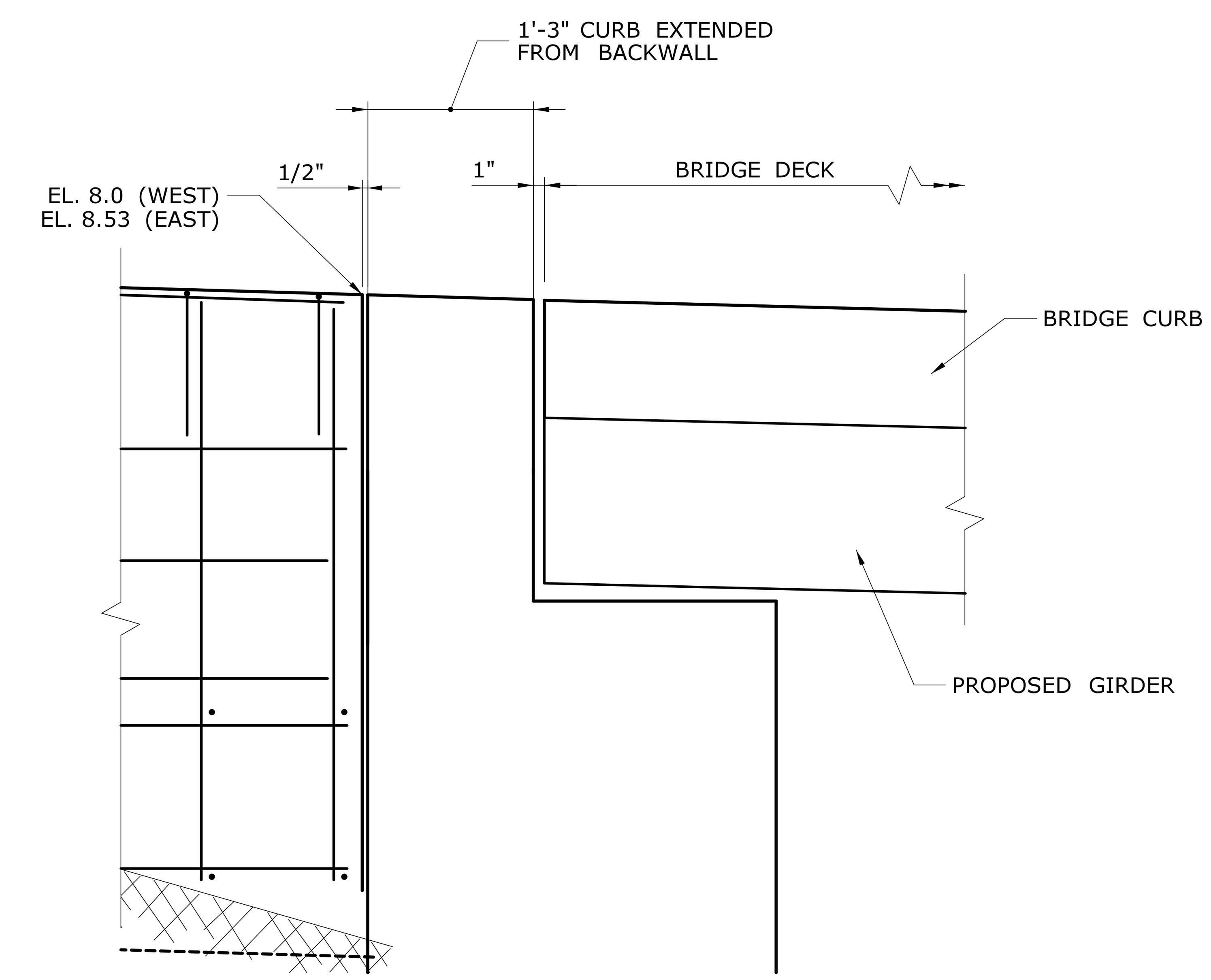
NORTHERN ELEVATION
LOOKING SOUTH
SCALE: 1/8"=1'



BARRIER WALL HEIGHTS

TOTAL	3.5'	4.5'	5.5'	6.5'
X	2'	3'	4'	5'
Y	6'	6'	6.5'	6.5'

BARRIER WALL SECTION
SCALE: 3/4"=1'



BARRIER WALL/BRIDGE CONNECTION
SCALE: 3/4"=1'

FINAL DESIGN REVIEW

REV.	DATE	REVISION DESCRIPTION	SHEET NO.

Plotted Date: 3/4/2019

DESIGNER/DRAFTER: DLW
CHECKED BY: -
SCALE AS NOTED

STATE OF CONNECTICUT
DEPARTMENT OF TRANSPORTATION
Filename: ...\04_SB_MST_Br02931_BAR.dgn

SIGNATURE/
BLOCK:

PROJECT TITLE:
REHABILITATION OF BRIDGE NO. 02931
ROUTE 2A
OVER POQUETANUCK COVE

TOWN: **PRESTON**

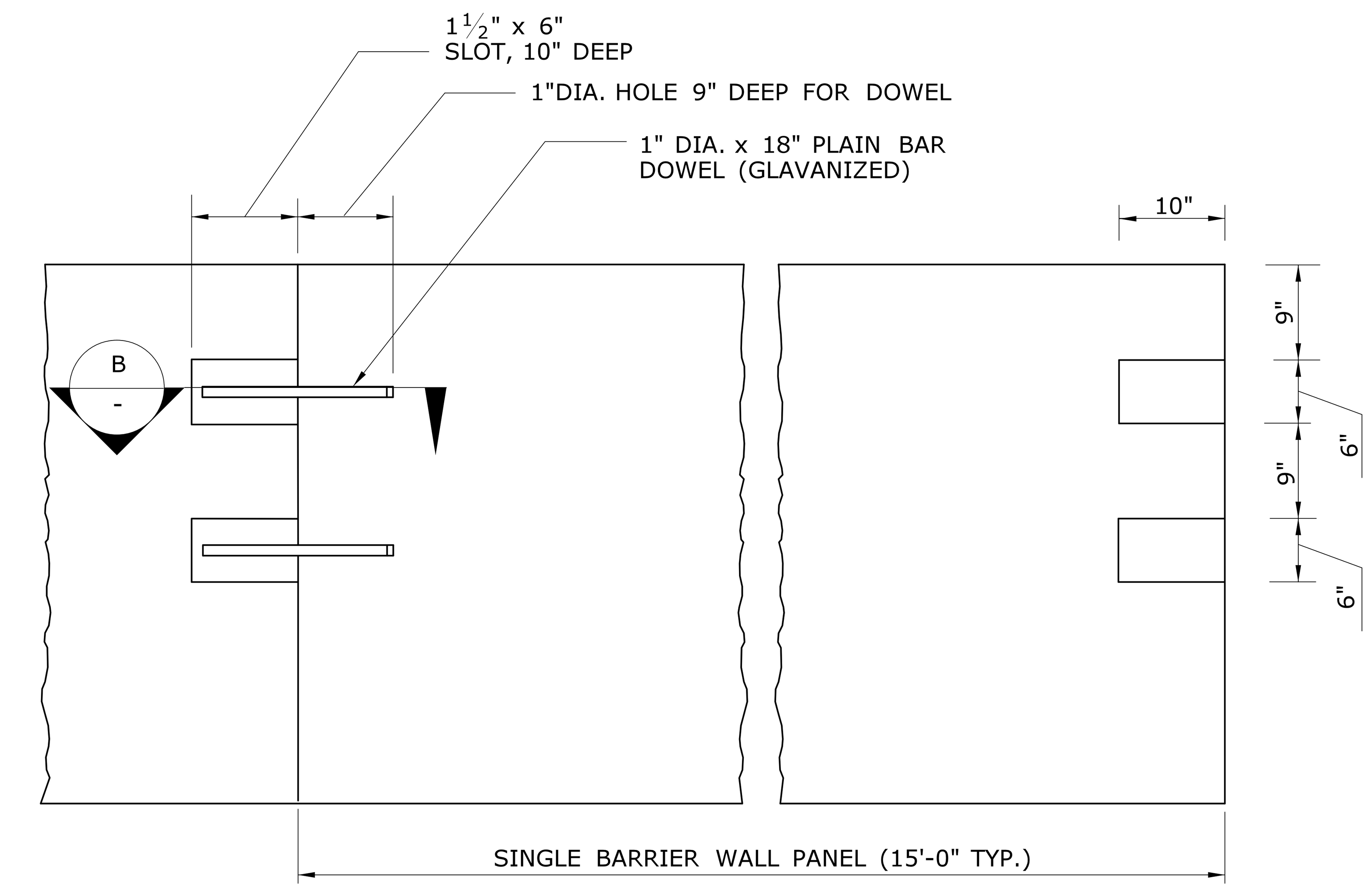
DRAWING TITLE: **BARRIER WALL ELEVATIONS**

PROJECT NO. **113-107**
DRAWING NO. **S-14**
SHEET NO.

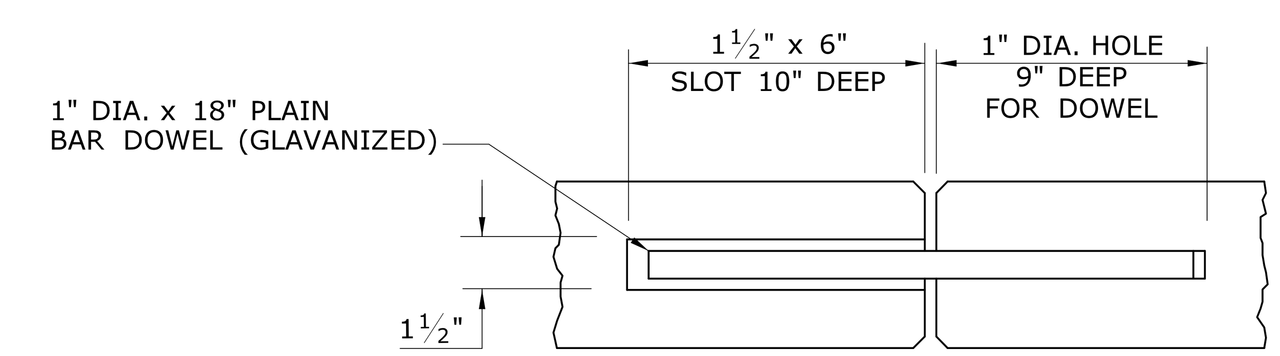
GENERAL NOTES:

1. ALTERNATE DESIGNS FOR UNIT END CONNECTIONS SIMILAR TO THE DESIGNS SHOWN MAY BE SUBMITTED TO THE ENGINEER FOR APPROVAL.

2. TERMINAL END TREATMENTS SHALL BE CONSTRUCTED AS SHOWN ON THE PLANS OR AS DIRECTED BY THE ENGINEER.



DOWEL CONNECTION AT ENDS ELEVATION VIEW



SECTION B -

FINAL DESIGN REVIEW

REV.	DATE	REVISION DESCRIPTION	SHEET NO.

Plotted Date: 2/28/2019

DESIGNER/DRAFTER: DLW

CHECKED BY: -

SCALE AS NOTED

STATE OF CONNECTICUT
DEPARTMENT OF TRANSPORTATION

Filename: ...\04_SB_MST_Br02931_BDTL.dgn

SIGNATURE/BLOCK:

PROJECT TITLE: REHABILITATION OF BRIDGE NO. 02931 ROUTE 2A OVER POQUETANUCK COVE

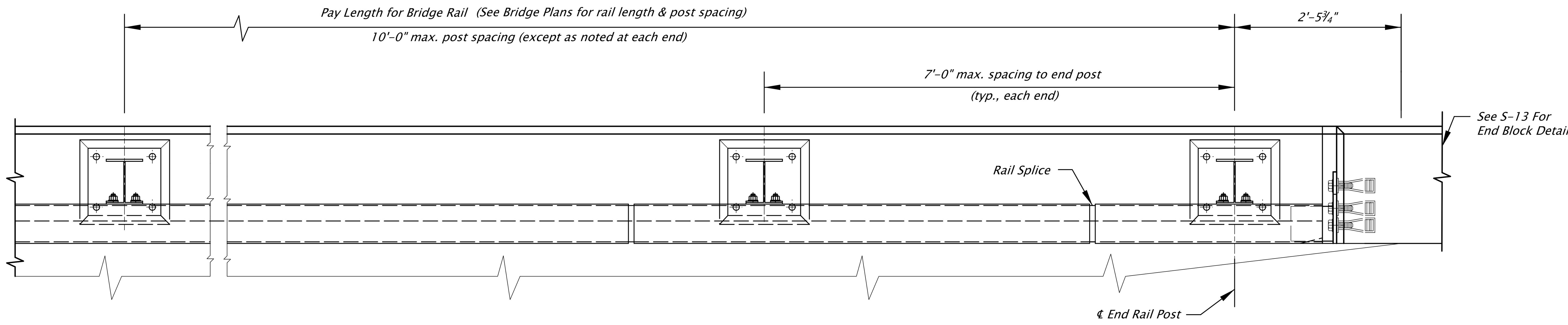
TOWN: PRESTON

DRAWING TITLE: BARRIER WALL DETAILS

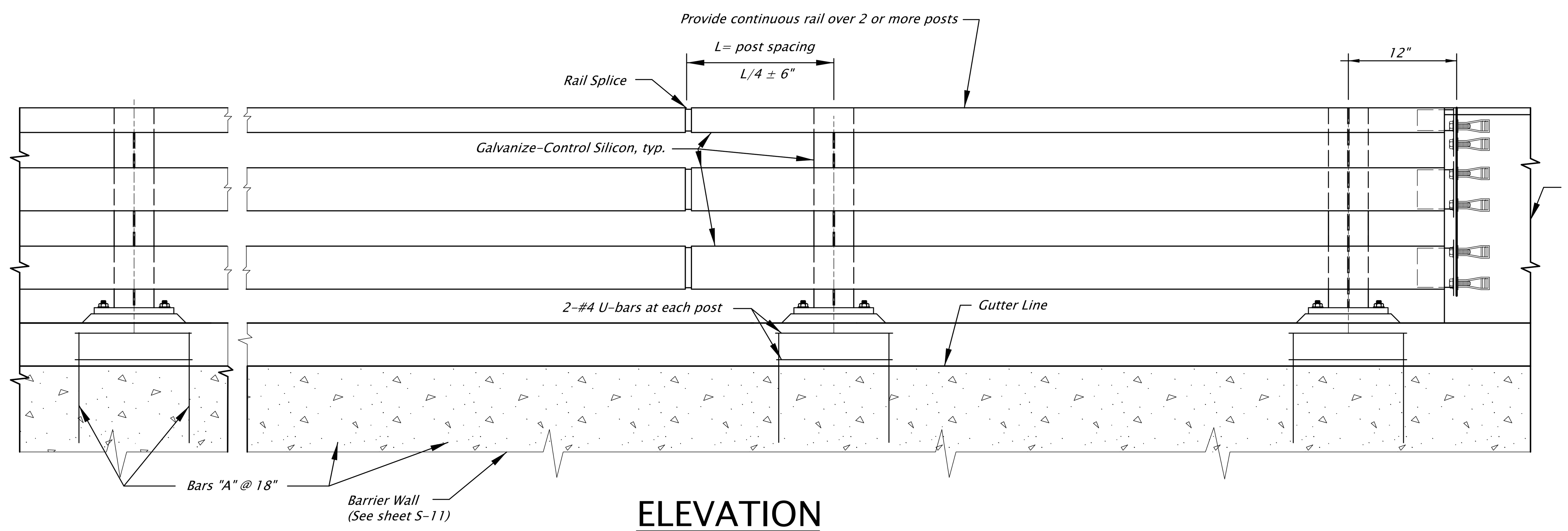
PROJECT NO. 113-107

DRAWING NO. S-15

SHEET NO.

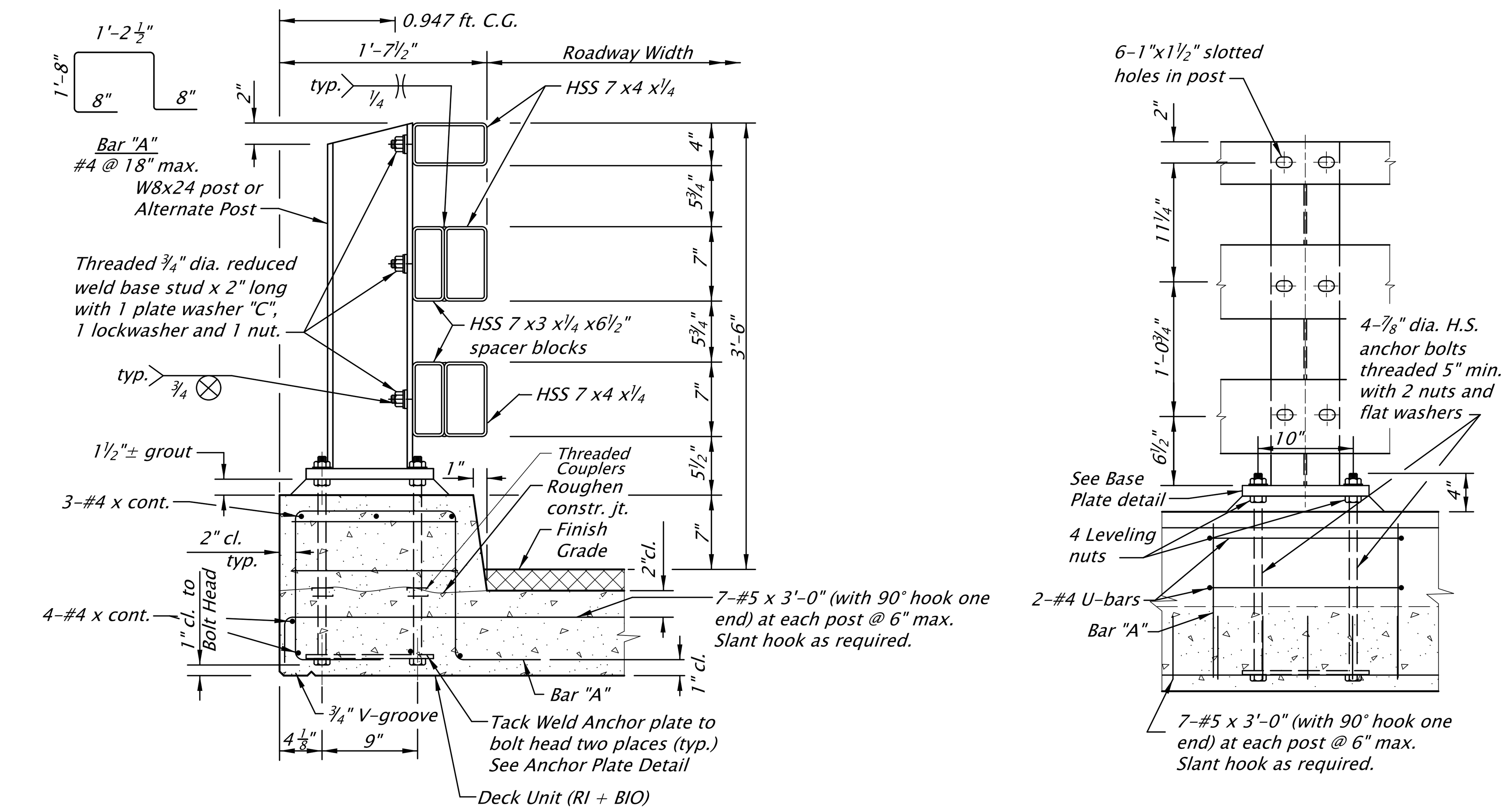


PLAN



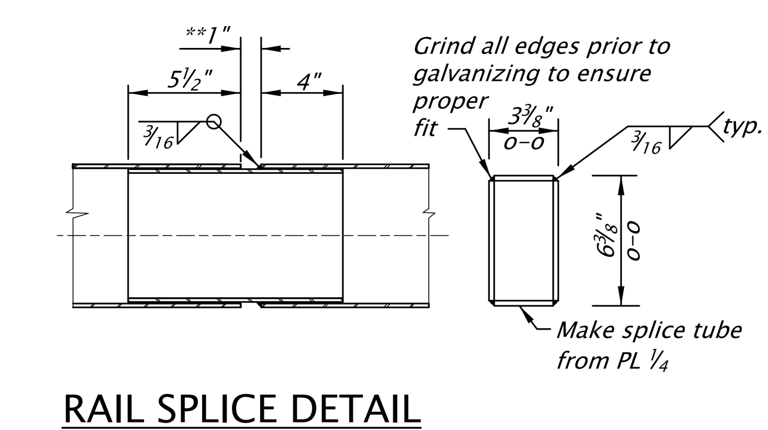
ELEVATION

3/4" = 1'



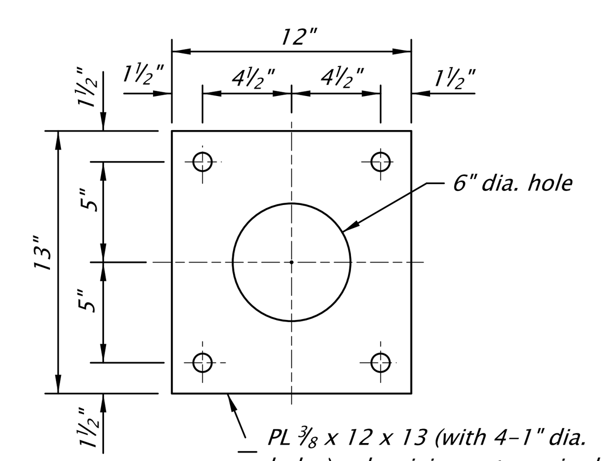
CURB AND POST DETAIL

1" = 1'-0"



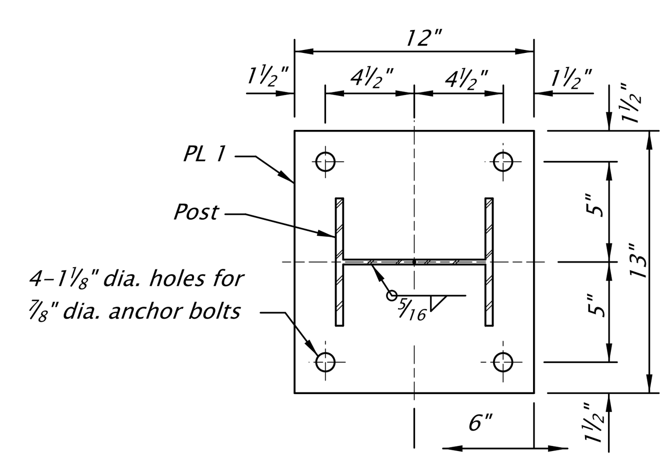
RAIL SPLICE DETAIL

**1" gap unless noted otherwise on detail plans. Provide a Rail Splice in panel that has a deck expansion joint. If more than 2" movement needed, increase length of inner member.



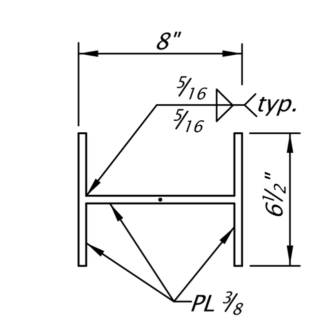
ANCHOR PLATE DETAIL

1 1/2" = 1'-0"



BASE PLATE DETAIL

1 1/2" = 1'-9"



ALTERNATE POST

1 1/2" = 1'-0"

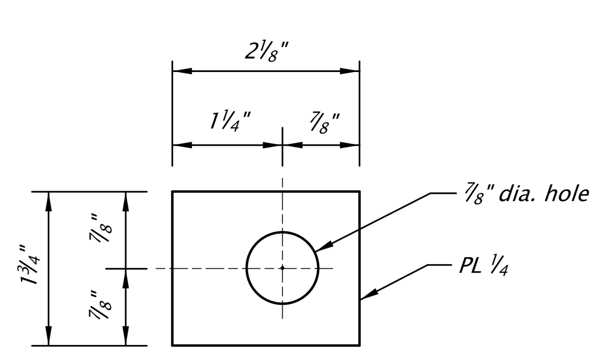
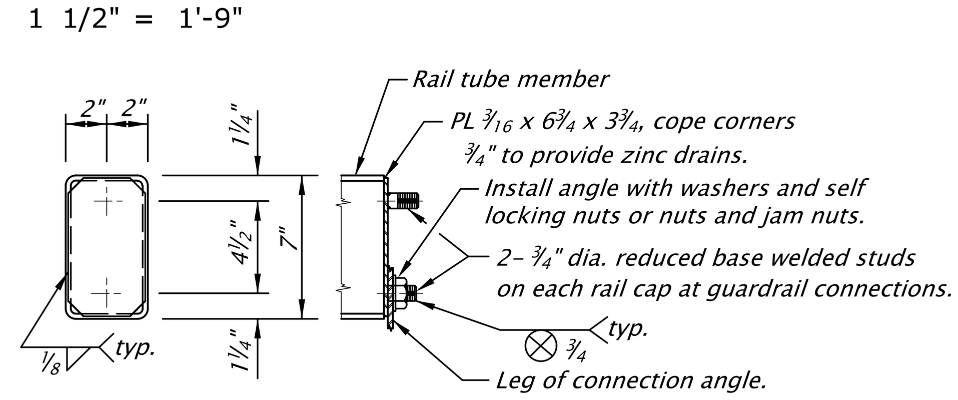


PLATE WASHER "C"

6" = 1'-0"



RAIL CAP DETAIL

1 1/2" = 1'-0"

GENERAL NOTES

1. Rail designed and crash tested to meet NCHRP 350 TL-4 requirements.
2. Provide structural tubing conforming to "ASTM A500, GRADE B."
3. Provide steel posts and plates conforming to AASHTO M183 (ASTM A36) unless otherwise noted.
4. Provide High Strength anchor bolts conforming to "ASTM F1554, GRADE 105." Threaded couplers shall conform to "ASTM A563, GRADE DH."
5. Provide reinforcing steel conforming to ASTM A706 or AASHTO M31 (ASTM A615) Grade 60.
6. Curb shall be constructed with Class F Concrete.
7. Construct railing conforming to the horizontal and vertical alignment of the structure. Install posts normal to grade in longitudinal direction and vertical in transverse direction.
8. Payment for the railing will include compensation for furnishing and installing the necessary guardrail connection plates and terminal connectors.
9. Hot-dip galvanized structural steel including fasteners after fabrication, except as noted.

FINAL DESIGN REVIEW

REV.	DATE	REVISION DESCRIPTION	SHEET NO.

THE INFORMATION, INCLUDING ESTIMATED QUANTITIES OF WORK, SHOWN ON THESE SHEETS IS BASED ON LIMITED INVESTIGATIONS BY THE STATE AND IS IN NO WAY WARRANTED TO INDICATE THE CONDITIONS OF ACTUAL QUANTITIES OF WORK WHICH WILL BE REQUIRED.

Plotted Date: 2/28/2019

DESIGNER/DRAFTER: MRG

CHECKED BY: ASG

SCALE AS NOTED

STATE OF CONNECTICUT
DEPARTMENT OF TRANSPORTATION

Filename: ...\12_SB_MST_Br02932_0113_0108_Bridge Rail Details.dgn

SIGNATURE/ BLOCK:

PROJECT TITLE: REHABILITATION OF BRIDGE 02931 ROUTE 2A OVER POQUETANUCK COVE

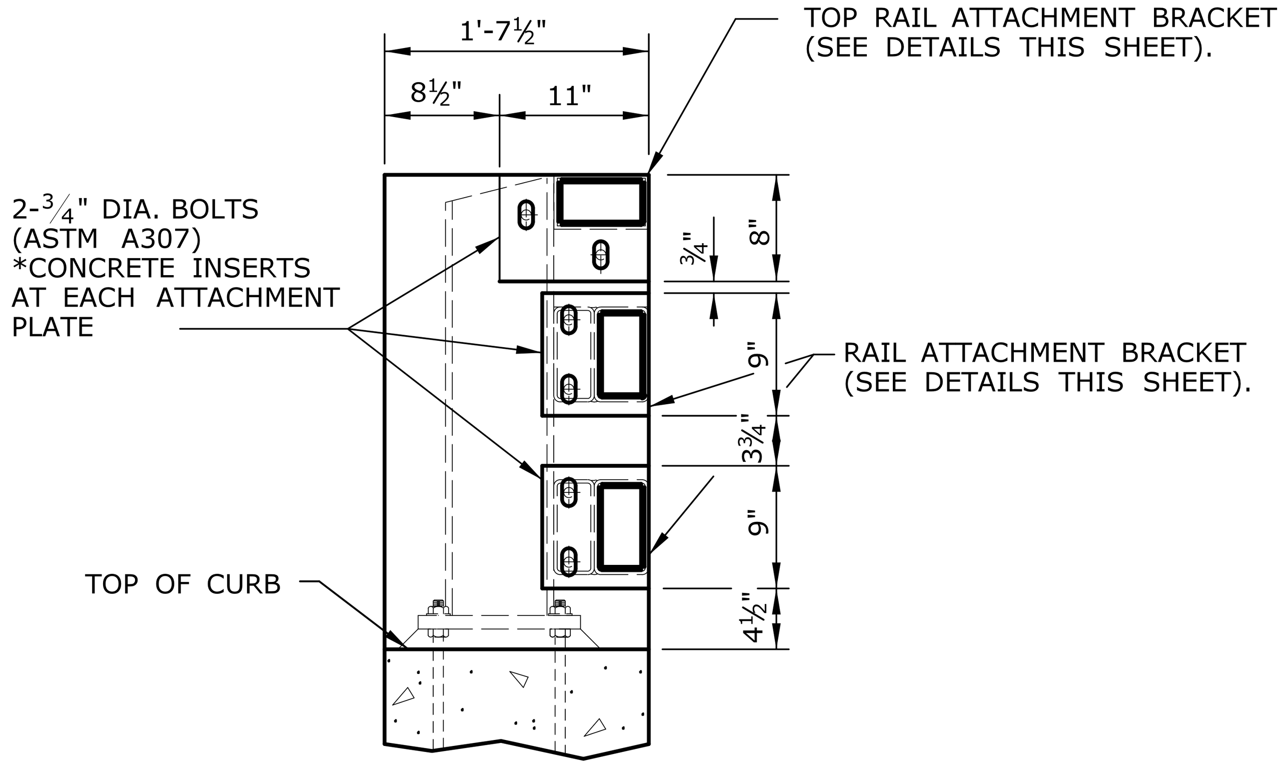
TOWN: PRESTON

DRAWING TITLE: BRIDGE RAIL DETAILS

PROJECT NO. 113-107

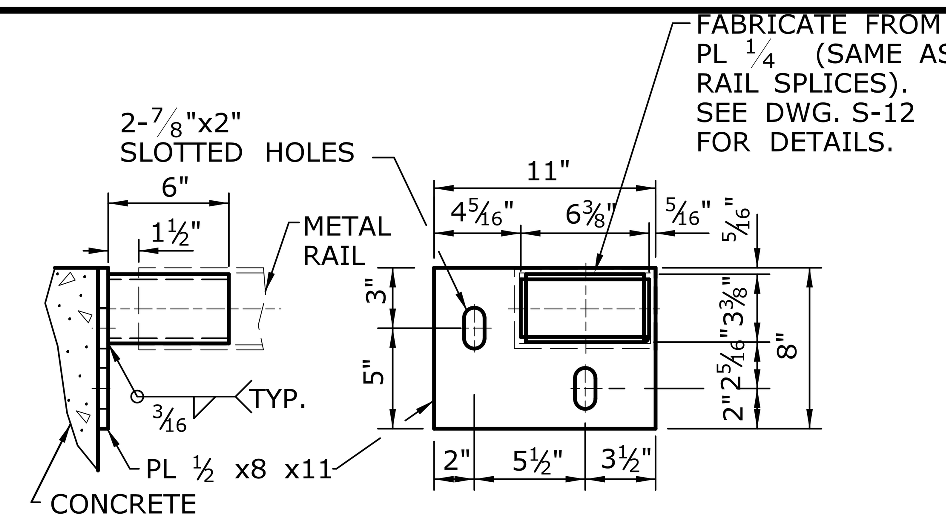
DRAWING NO. S-16

SHEET NO.



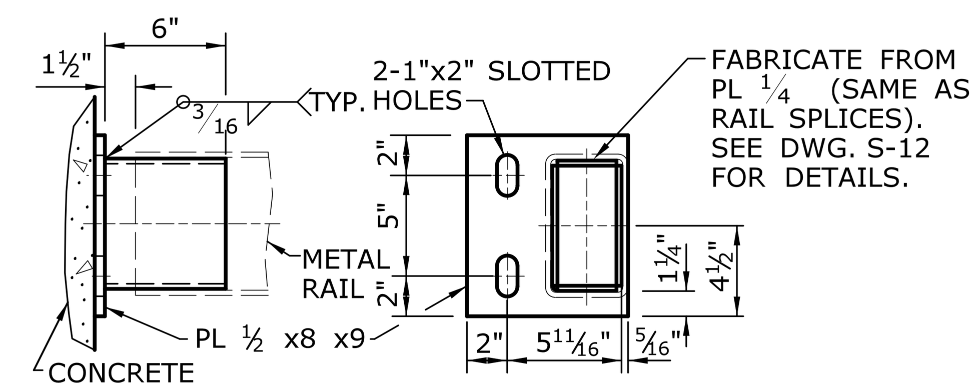
SECTION A -

SCALE:1"=1'-0"



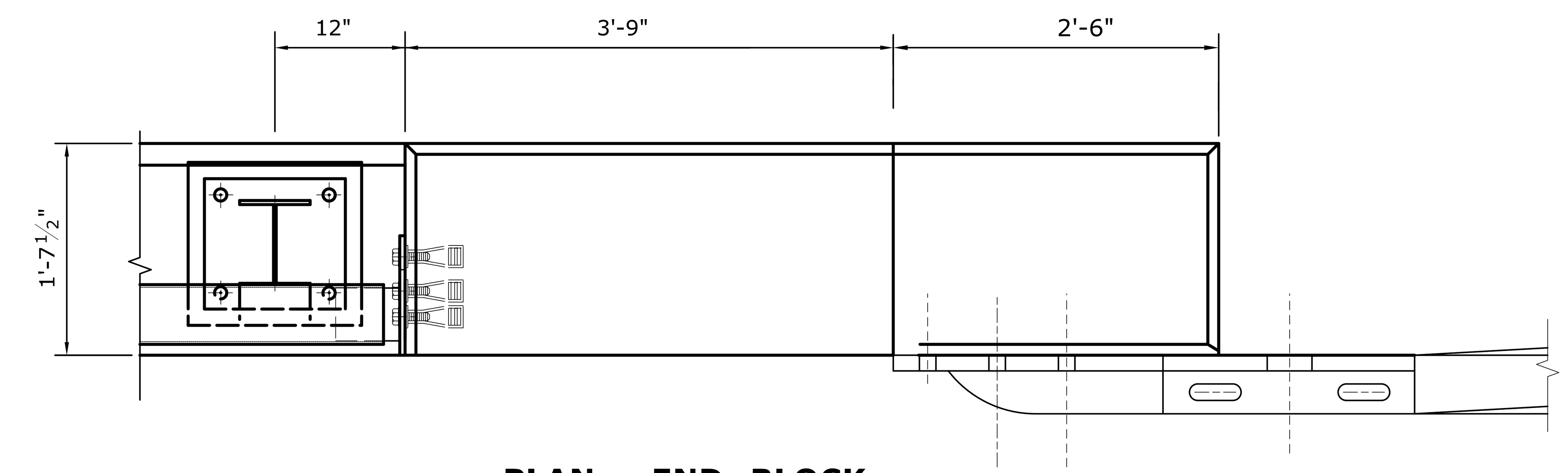
TOP RAIL ATTACHMENT BRACKET

SCALE: N.T.S



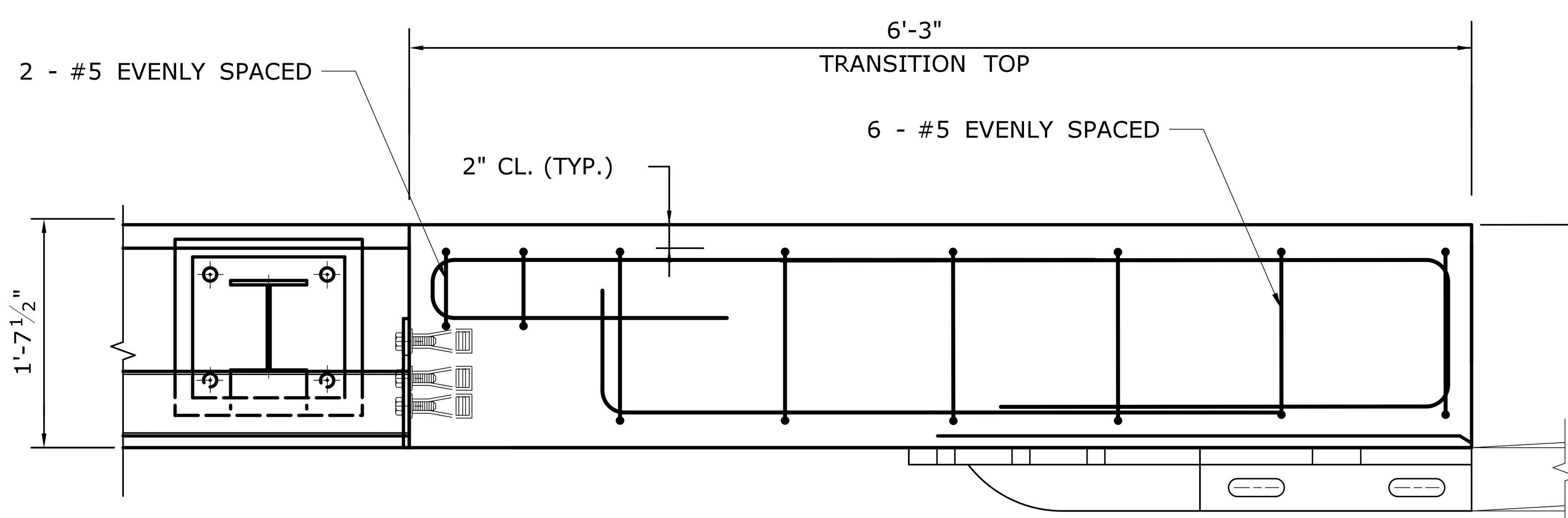
RAIL ATTACHMENT BRACKET

SCALE: N.T.S



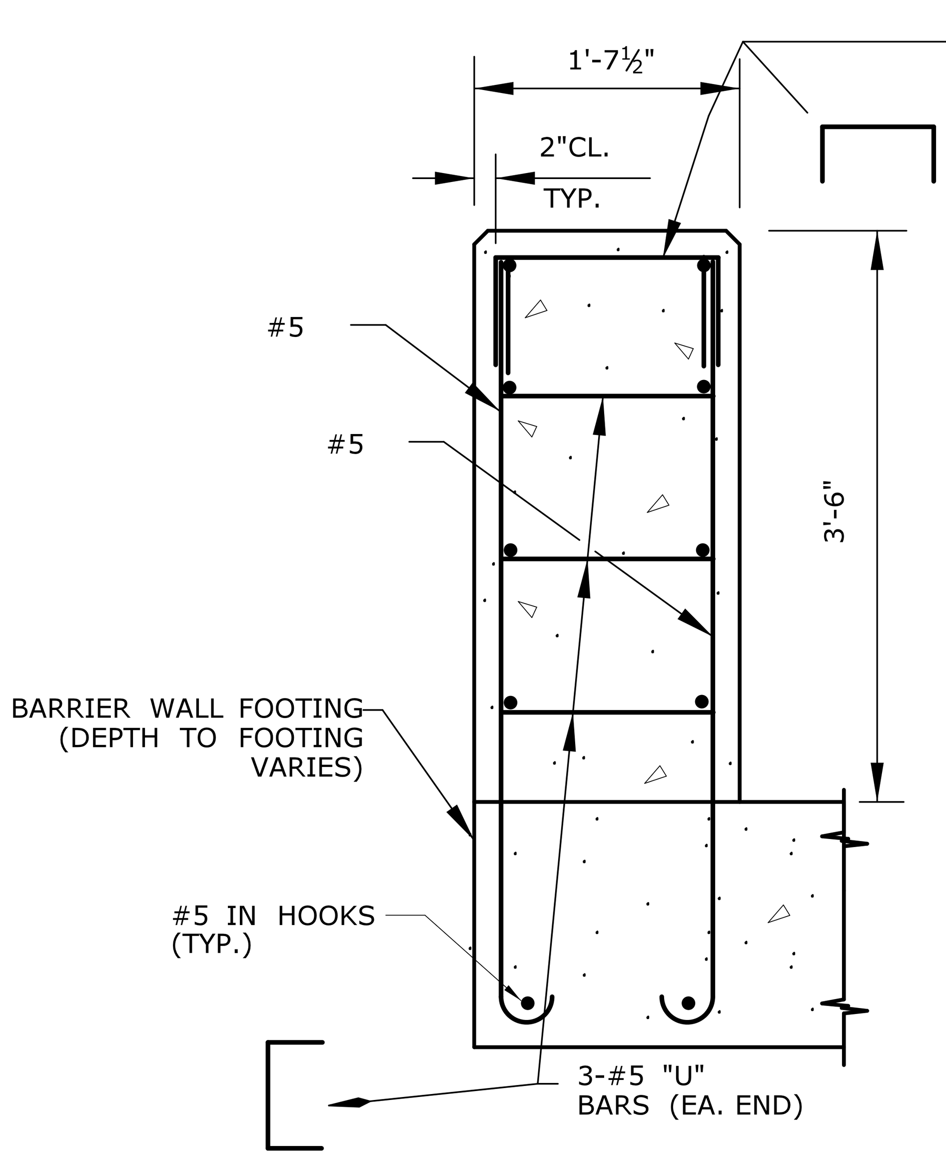
PLAN - END BLOCK

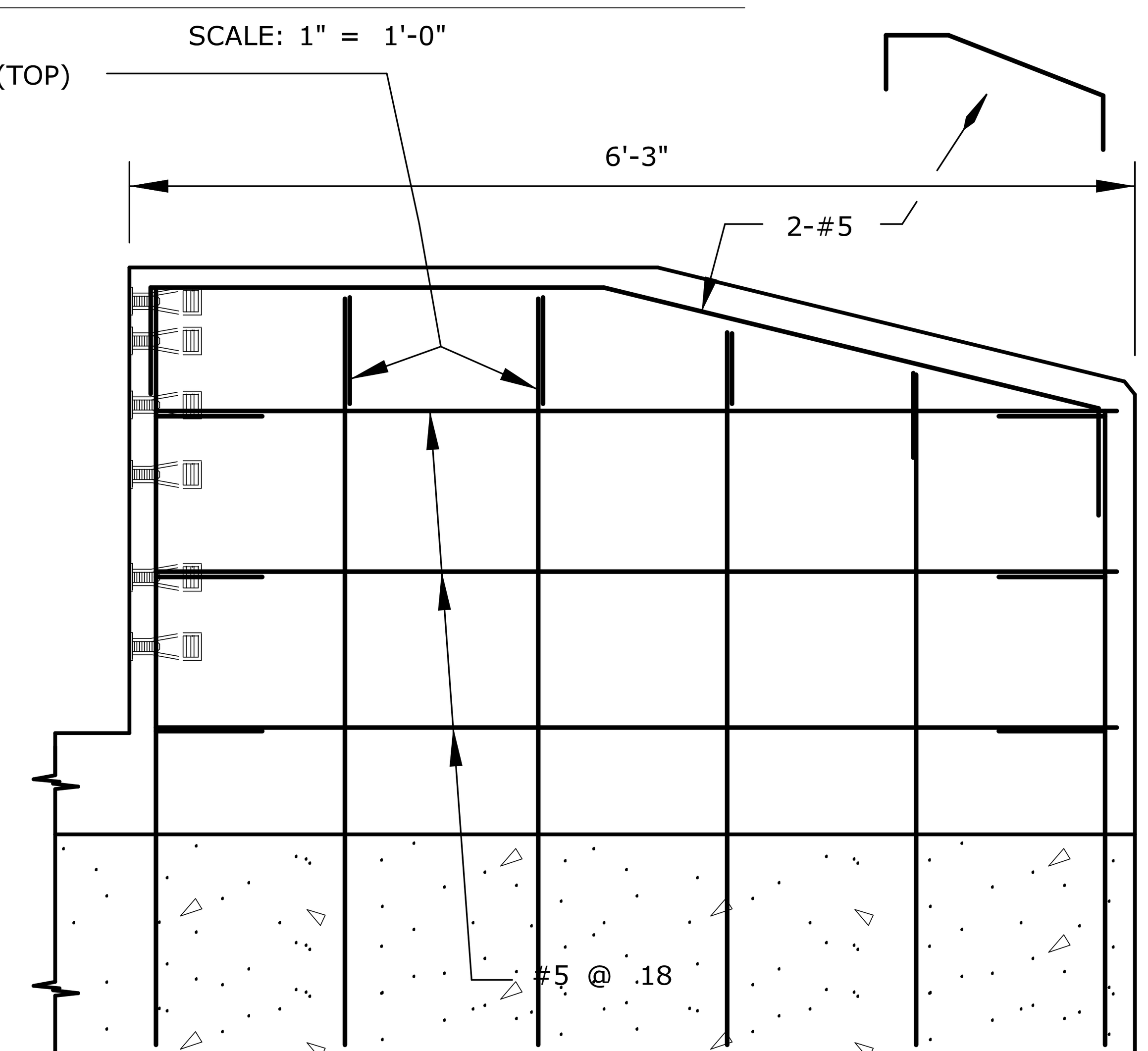
SCALE: 1" = 1'-0"



PLAN - END BLOCK REINFORCING

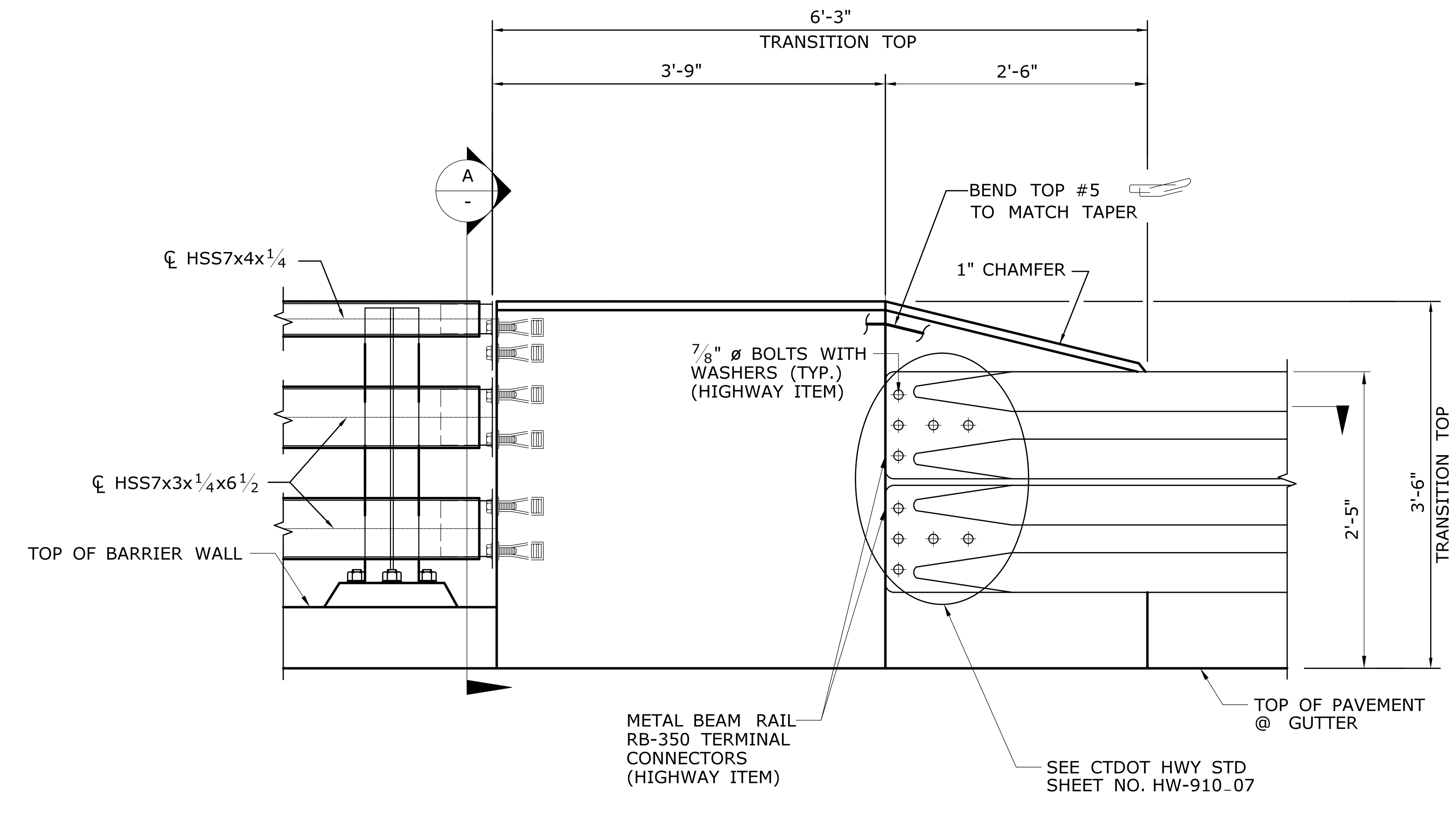
SCALE: 1" = 1'-0"





ELEVATION - END BLOCK REINFORCING

SCALE: 1" = 1'-0"



ELEVATION - END BLOCK

SCALE: 1" = 1'-0"

NOTES:

1. THREADED INSERTS SHALL BE PREQUALIFIED BY THE MANUFACTURER AS BEING CAPABLE OF DEVELOPING A NOMINAL SHEAR RESISTANCE OF 20 KIPS PER ⅞" DIA. S.S. BOLT. S.S. BOLTS SHALL BE ⅞" DIA. x 1 ½" LONG FULLY THREADED AISI TYPE 304N STAINLESS STEEL. INSERTS FOR ⅞" S.S. BOLTS SHALL BE GALVANIZED AND CAST INTO TRANSITION.

FINAL DESIGN REVIEW

REV.	DATE	REVISION DESCRIPTION	SHEET NO.

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Plotted Date: 2/28/2019

DESIGNER/DRAFTER: RR

CHECKED BY: SG

SCALE AS NOTED

STATE OF CONNECTICUT
DEPARTMENT OF TRANSPORTATION

Filename: ...\13_SB_MST_Br02932_0113_0108_End Block Details.dgn

SIGNATURE/BLOCK:

PROJECT TITLE: REHABILITATION OF BRIDGE 02931 ROUTE 2A OVER POQUETANUCK COVE

TOWN: PRESTON

DRAWING TITLE: END BLOCK AND RAIL DETAILS

PROJECT NO. 113-107

DRAWING NO. S-17

SHEET NO.

01.07 - UTILITY
INDEX OF DRAWINGS

DRAWING NUMBER	DRAWING TITLE	DRAWING NUMBER	DRAWING TITLE
INX-01	UTILITY INDEX OF DRAWINGS		
UTL-01	UTILITY PLAN		
UTL-02	HPFF LINE TEMPORARY/PERMANENT SUPPORT		
UTL-03	HPFF LINE TEMPORARY/PERMANENT SUPPORT DETAILS		
UTL-04	GAS LINE TEMPORARY SUPPORT DETAILS		
UTL-05	GAS LINE PERMANENT SUPPORT DETAILS		

DESIGNED BY:
FUSS & O'NEILL INC.
146 HARTFORD ROAD
MANCHESTER, CT 06040

FINAL PLANS FOR REVIEW

REV.	DATE	REVISION DESCRIPTION	SHEET NO.

Plotted: 2/28/2019

DESIGNER/DRAFTER: J.MAZEK
CHECKED BY: S.HARRIS

STATE OF CONNECTICUT
DEPARTMENT OF TRANSPORTATION

Filename: ...\HW_MSH_0113-0107_06_INX-01.dgn

SIGNATURE/ BLOCK:

PROJECT TITLE:
REHABILITATION OF BRIDGE NO. 02931
ROUTE 2A
OVER POQUETANUCK COVE

TOWN: PRESTON

DRAWING TITLE: UTILITY INDEX OF DRAWINGS

PROJECT NO. 113-107

DRAWING NO. INX-01

SHEET NO.

UTILITY WORK TO BE PERFORMED BY CONTRACTOR

1. FURNISH AND INSTALL TEMPORARY SUPPORTS FOR PERMANENT GAS MAIN.
2. FURNISH AND INSTALL NEW BRIDGE SUPPORTS FOR EXISTING HPFF LINE.
3. REMOVE EXISTING UNDERGROUND GAS MAIN (PAID FOR UNDER ITEM "STRUCTURE EXCAVATION - EARTH (COMPLETE).
4. REMOVE EXISTING BRIDGE MOUNTED GAS MAIN (PAID FOR UNDER ITEM "REMOVAL OF SUPERSTRUCTURE (SITE NO. 1).

NOTES

1. THE EXISTING 69KV ELECTRICAL TRANSMISSION CABLE PIPE (HPFF) SHALL BE PROTECTED AGAINST ANY PHYSICAL DAMAGE DURING CONSTRUCTION. INCLUDING VEHICULAR IMPACT. DURING CONSTRUCTION ACTIVITIES WHERE THE HPFF LINE IS SUSCEPTIBLE TO DAMAGE BY CONSTRUCTION ACTIVITY OR VEHICULAR IMPACT. PHYSICAL PROTECTION ENCOMPASSING THE FULL OUTER PERIMETER OF THE PIPE IS REQUIRED.
2. IF CONSTRUCTION EXCAVATION ACTIVITIES REQUIRE THE EXISTING SUBSURFACE PORTION OF THE HPFF PIPE TO BE EXPOSED, UNSUPPORTED LENGTHS EQUAL TO LESS THAN 5' WILL BE REQUIRED TO SUPPORT THE PIPE SYSTEM.
3. CONSTRUCTION ACTIVITIES SHALL BE MONITORED TO PREVENT ADVERSE EFFECTS ON THE HPFF PIPE.
4. THERE IS NO FLEXIBILITY IN THE HPFF PIPE FOR ANY VERTICAL OR LATERAL MOVEMENT.
5. THE MINIMUM ELEVATIONS OF THE TEMPORARY AND PERMANENT OVERHEAD UTILITIES SHALL BE EL 25.94 (ELECTRIC 13.8kV) AND EL 15.94 (COMMUNICATION)

PROPOSED GAS MAIN LOCATION

STA	BASELINE OFFSET	TOP OF PIPE
82+00 to 83+34	6' RT.	3' BELOW GRADE
83+34	19.5' RT.	EL. 1.1
WEST ABUT SUPPORT	19.5' RT.	XX
EAST ABUT SUPPORT	19.5' RT.	XX
83+70	19.5' RT.	EL 1.8
83+70 to 83+94	6' RT.	3' BELOW GRADE

FINAL PLANS FOR REVIEW

REV.	DATE	REVISION DESCRIPTION	SHEET NO.

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Plotted Date: 3/1/2019

DESIGNER/DRAFTER: J.MAZEK
CHECKED BY: S.HARRIS

SCALE IN FEET 0 40 80
SCALE 1"=40'

STATE OF CONNECTICUT
DEPARTMENT OF TRANSPORTATION

Filename: ...\HW_MSH_0113_0107_UTL-01.dgn

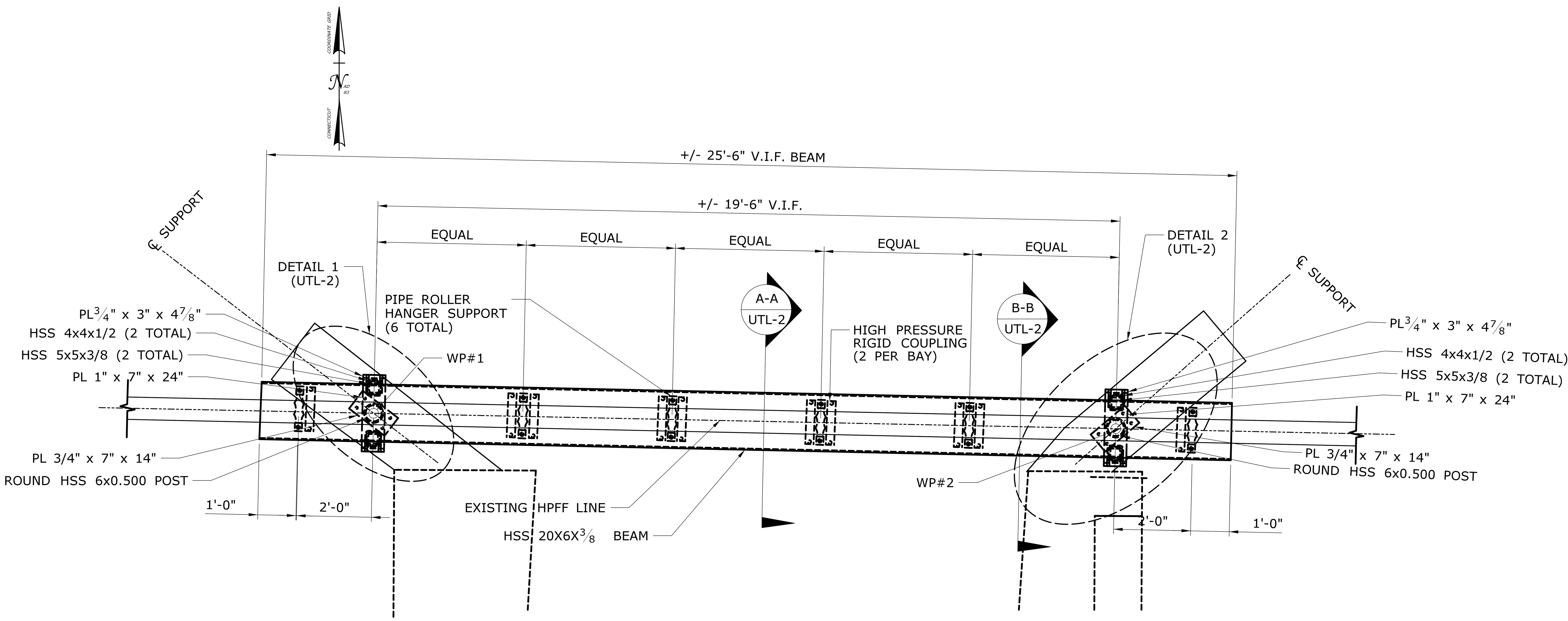
SIGNATURE/ BLOCK:

PROJECT TITLE:
REHABILITATION OF BRIDGE NO. 02931
ROUTE 2A
OVER POQUETANUCK COVE

TOWN: PRESTON

DRAWING TITLE: UTILITY PLAN

PROJECT NO. 113-107
DRAWING NO. UTL-01
SHEET NO.



HANGER SUPPORT FOR HPFF LINE PLAN

SCALE 1/2"= 1'

STRUCTURAL STEEL NOTES:

1. DESIGN, FABRICATION AND ERECTION OF STRUCTURAL STEEL SHALL CONFORM TO THE REQUIREMENTS OF THE AMERICAN INSTITUTE OF STEEL CONSTRUCTION (AISC) MANUAL LATEST EDITION.
2. ALL WELDING SHALL CONFORM TO THE REQUIREMENTS OF THE AMERICAN WELDING SOCIETY (AWS) STRUCTURAL WELDING CODE.
3. STRUCTURAL STEEL SHALL CONFORM TO THE REQUIREMENTS OF ASTM DESIGNATIONS AS FOLLOWS UNLESS OTHERWISE NOTES.

WIDE FLANGE BEAMS:	ASTM A992, GRADE 50
RECTANGULAR HOLLOW SHAPES:	ASTM A500, GRADE B (Fy = 46 ksi) OR C (Fy = 50 ksi)
ROUND HOLLOW SHAPES:	ASTM A500, GRADE C (Fy = 46 ksi)
PLATES:	ASTM A572, GRADE 50
THREADED RODS:	ASTM F1554, GRADE 55
ANCHOR RODS:	ASTM F1554, GRADE 105
BOLTS:	ASTM F3125, GRADE A325, TYPE 3
HEAVY HEX NUTS:	ASTM A563, GRADE DH
HARDENED WASHERS:	ASTM F436

4. PIPE ROLLER, AXLE, T-SOCKETS, HANGER RODS, NUTS, WASHERS AND OTHER ACCESSORIES AS PART OF THE NON-CONDUCTIVE HPFF LINE SUPPORT HANGER SYSTEM SHALL BE BY LINN BROWN & ASSOCIATES, INC. CONTRACTOR MAY PROPOSE AN OR-EQUAL SUPPORT SYSTEM BY ANOTHER MANUFACTURER FOR REVIEW AND APPROVAL BY THE ENGINEER AND EVERSOURCE ENERGY, INC.
5. HIGH PRESSURE RIGID COUPLERS SHALL BE BY GRINNELL, INC. CONTRACTOR MAY PROPOSE AN OR-EQUAL COUPLING SYSTEM FOR REVIEW AND APPROVAL BY THE ENGINEER AND EVERSOURCE ENERY, INC.
6. HALF-PIPE SECTIONS TO BE CONNECTED BY RIGID COUPLING. DETAILS DEPICT GRINNELL HIGH PRESSURE RIGID COUPLINGS. CONTRACTOR MAY PROPOSE AN OR-EQUAL COUPLING SYSTEM FOR REVIEW AND APPROVAL BY THE ENGINEER AND EVERSOURCE ENERGY, INC.
7. ALL STRUCTURAL STEEL SHALL BE HOT DIPPED GALVANIZED IN ACCORDANCE WITH ASTM A123.
8. ALL HARDWARE SHALL BE HOT DIPPED GALVANIZED IN ACCORDANCE WITH ASTM A153.
9. FIELD TROUCH UP OF GALVANIZING SHALL BE REPAIRED IN ACCORDANCE WITH ASTM A780.
10. HIGH-STRENGTH BOLTED CONNECTIONS SHALL BE INSTALLED AND INSPECTED AND CONFORM TO "SPECIFICATIONS FOR STRUCTURAL JOINT USING HIGH STRENGTH BOLTS" PUBLISHED BY THE RESEARCH COUNCIL ON STRUCTURAL CONNECTIONS AND ADOPTED BY AISC.
11. ALL BOLTS SHALL BE 3/4" DIA. HEAVY HEX HIGH STRENGTH STRUCTURAL.
12. ALL HOLES SHALL BE STANDARD HOLES UNLESS OTHERWISE NOTED IN THE DETAILS. THE CONTRACTOR MAY PROPOSE OVERSIZED, SHORT-SLOTTED OR LONG-SLOTTED HOLES ON STEEL SHOP DRAWINGS SUBJECT TO REVIEW BY THE ENGINEER. WASHERS SHALL BE PROVIDED AT JOINTS WITH OVERSIZED, SHORT-SLOTTED OR LONG-SLOTTED HOLES.
13. PRETENSIONED AND SLIP CRITICAL JOINTS ARE TO BE USED FOR THE CONNECTIONS BETWEEN THE POSTS AND THE ARMS. HARDENED WASHERS SHALL BE PROVIDED AS REQUIRED. PRETENSION MAY BE PROVIDED BY ANY OF THE FOLLOWING METHODS: TURN-OF-THE-NUT, CALIBRATED WRENCH, TWIST-OFF-TYPE TENSION CONTROL BOLTS OR DIRECT-TENSION-INDICATOR.
14. ALL CONTACT SURFACES, INCLUDING SURFACES ADJACENT TO THE BOLT HEAD AND NUT, SHALL BE FREE OF SCALE, OIL, PAINT, LACQUER AND OTHER FOREIGN MATERIAL. BURRS THAT WOULD PREVENT SOLID SEATING OF THE CONNECTED PARTS IN SNUG TIGHT CONDITION SHALL BE REMOVED.
15. CONTACT SURFACES IN SLIP CRITICAL CONNECTIONS THAT ARE HOT-DIP GALVANIZED IN ACCORDANCE WITH ASTM A123 SHALL BE ROUGHENED BY MEANS OF HAND WIRE BRUSHING (POWER BRUSHING IS PROHIBITED) TO ACHIEVE CLASS A FAYING SURFACE DESIGNATION.
16. MINIMUM SIZE OF FILLET WELD SHALL BE 1/4".
17. THE STEEL CONTRACTOR SHALL FURSNISH MILL TEST REPORTS FROM THE PRODUCER OF THE STEEL CERTIFYING THAT THE STEEL MEETS REQUIREMENTS AS SPECIFIED BY THE ASTM SPECIFICATIONS.
18. ALL ELECTRODES FOR WELDING SHALL BE E70XX.
19. ALL FILLET WELDS SHALL BE BUILT OUT TO OBTAIN THE FULL THROAT THICKNESS.
20. CONTRACTOR SHALL SUBMIT SHOP DRAWINGS FOR REVIEW AND CONFORMANCE WITH THE DESIGN INTENT. APPROVAL OF SHOP DRAWINGS BY THE ENGINEER OR EVERSOURCE ENERGY, INC. DOES NOT RELIEVE THE CONTRACTOR FROM ANY CONTRACT REQUIREMENTS, EVEN IF SUCH ITEMS ARE NOT ON THE SHOP DRAWINGS.
21. CONTRACTOR SHALL SUBMIT ERECTION DRAWINGS FOR REVIEW AND APPROVAL.
22. NO OPENINGS SHALL BE CUT IN THE STRUCTURAL MEMBERS UNLESS SHOWN ON THE DRAWINGS OR APPROVED BY THE ENGINEER AND EVERSOURCE ENERGY, INC.
23. COLUMN ENDS AT BASE PLATES SHALL HAVE MILLED ENDS.
24. NATURAL MILL CAMBER OF BEAMS SHALL SATISFY THE AISC REQUIREMENTS AND SHALL BE PLACED UP.
25. ALL TUBULAR STEEL ENDS SHALL BE CLOSED WITH 3/8" THICK FULLY WELDED CAP PLATES.
26. FIELD WELDING SHALL BE USED ONLY WHERE BOLTING IS NOT PRACTICAL, AND IT IS SUBJECT TO THE ENGINEER'S APPROVAL.
27. NO FLAME CUTTING OF STEEL WILL BE ALLOWED IN THE FIELD. NEW HOLES SHALL BE DRILLED OR PUNCHED ON THE FIELD.

SUGGESTED SEQUENCE OF CONSTRUCTION

1. PARTIALLY REMOVE WINGWALLS TO PROPOSED CUTLINE ELEVATION.
2. INSTALL STEEL PEDESTAL & POST ASSEMBLIES.
3. ERECT HSS SUPPORT BEAM.
4. INSTALL PROPOSED HPFF ROLLER SUPPORT SYSTEM.
5. REMOVE EXISTING HPFF BRACKETS.
6. REMOVE EXISTING PROTECTION HALF-PIPES.
7. INSTALL PROPOSED PROTECTION HALF-PIPE SECTION AND COUPLING CONNECTIONS.

TEMPORARY SUPPORT FOR HPFF LINE NOTES:

THE DETAILS NOTED ON DRAWINGS UTL-3 THROUGH 5 REPRESENT THE TEMPORARY AND PERMANENT SUPPORT DESIGN OF THE EXISTING HPFF LINE OWNED AND MAINTAINED BY EVERSOURCE ENERGY. SHOULD THE CONTRACTOR DECIDE TO DESIGN AN ALTERNATIVE TEMPORARY SUPPORT SYSTEM, THE FOLLOWING NOTES SHALL APPLY:

1. THE EXISTING 69 KV ELECTRICAL TRANSMISSION CABLE PIPE TYPE (HPFF PIPE) SHALL BE PROTECTED AGAINST ANY PHYSICAL DAMAGE DURING DEMOLITION AND RECONSTRUCTION OF THE BRIDGE AND ROADWAY. THIS SHALL INCLUDE VEHICULAR DAMAGE DURING BRIDGE AND ROADWAY RECONSTRUCTION WITHIN THE LIMITS OF CONSTRUCTION AT ALL TIMES. DURING BRIDGE RECONSTRUCTION ACTIVITIES WHERE THE EXISTING TRANSMISSION CABLE IS SUSCEPTIBLE TO DAMAGE BY CONSTRUCTION ACTIVITY OF VEHICLE IMPACT, PHYSICAL PROTECTION ENCOMPASSING THE FULL OUTER PERIMETER OF THE PIPE IS REQUIRED.
2. THE EXISTING HPFF PIPE SHALL BE SUPPORTED ON TEMPORARY BEAMS AND FOUNDATIONS (STRONG BACK SYSTEM) AND THE PIPE SYSTEM SHALL BE MAINTAINED FOR THE STRUCTURAL AND THERMAL INTEGRITY IN ALL DIRECTIONS. THE EXISTING PIPE SYSTEM IS ESTIMATED TO WEIGH 68 LBS/FT.
3. THE TEMPORARY SUPPORT SYSTEM AND ITS FOUNDATIONS SHALL BE DESIGNED BY A PROFESSIONAL ENGINEER LICENSED IN THE STATE OF CONNECTICUT. THE TEMPORARY SUPPORT SYSTEMS SHALL MEET OR EXCEED THE EVERSOURCE UTRM STANDARD REQUIREMENTS (DRAFT VERSION) FOR POWER CABLE STRUCTURES AND BRIDGE ATTACHMENTS. AN ALTERNATIVE INDUSTRY STANDARD METHOD, SUBJECT TO EVERSOURCE REVIEW AND ACCEPTANCE MAYBE USED.
4. THE TEMPORARY SUPPORT SYSTEM SHALL BE DESIGNED TO SUPPORT THE HPFF PIPE SYSTEM AND BE WITHIN THE EXISTING PIPE SUPPORT SPACING. THE DESIGN SHALL NOT EXCEED UNSUPPORTED SPAN LENGTHS THAT PRESENTLY EXIST.
5. IF CONSTRUCTION EXCAVATION ACTIVITIES REQUIRE SUB-SURFACE PROTECTION OF HPFF PIPE TO BE EXPOSED BEYOND ITS CURRENT BOUNDARY, THEN UNSUPPORTED LENGTHS EQUAL TO OR LESS THAN 5 FT WILL BE REQUIRED TO SUPPORT THE PIPE. THE BEARING SUPPORT SHALL BE NON-CHAFFING MATERIAL FOR TEMPORARY STRUCTURES.
6. CONSTRUCTION ACTIVITY SUCH AS PILE DRIVING, BLASTING AND COMPACTION (AS APPLICABLE) SHALL BE MONITORED TO PREVENT ADVERSE EFFECTS ON HPFF PIPE DURING CONSTRUCTION ACTIVITY.
7. THE TEMPORARY DESIGN OF THE SUPPORT SYSTEM SHALL BE SUBMITTED TO EVERSOURCE TRANSMISSION LINE CIVIL ENGINEERING AT VARIOUS DESIGN STAGES (30%, 70%, 100%) AND ISSUED FOR CONSTRUCTION IFC) SIGNED AND SEALED BY PROFESSIONAL ENGINEER FOR REVIEW AND ACCEPTANCE. THIS INCLUDES THE CALCULATION PACKAGE. EVERSOURCE REQUIRES THE REVIEW OF THE SHOP DRAWINGS WHERE EXCEPTION IS REQUESTED BY THE CONTRACTOR TO DEVIATE FROM ORIGINALLY APPROVED DESIGN DOCUMENTS.

CONCRETE NOTES

1. DESIGN AND DETAILING OF CONCRETE AND REINFORCING STEEL IS IN ACCORDANCE WITH THE BUILDING CODE REQUIREMENTS FOR REINFORCED CONCRETE (ACI-318).
2. DESIGN AND CONSTRUCTION OF FORMWORK IS TO COMPLY WITH ACI STANDARDS.
3. STEEL REINFORCEMENT SHALL CONFORM TO THE STANDARDS LISTED BELOW:
   DEFORMED BILLET STEEL BARS: ASTM A615, GRADE 60
   EPOXY COATED REBAR: ASTM A775
4. CONTRACTOR SHALL SUBMIT CHECKED SHOP DRAWINGS CONSISTING OF COMPLETE PLANS AND DETAILS OF REINFORCEMENT, LOCATIONS OF POUR LINES, CONSTRUCTION JOINT, ETC., FOR CONFORMANCE WITH DESIGN INTENT BEFORE PROCEEDING WITH THE WORK.
5. DO NOT PLACE CONCRETE WITHOUT APPROVED STRUCTURAL SHOP DRAWINGS.
6. ALL REINFORCEMENT SHALL BE ACCURATELY PLACED AND SECURELY WIRED TO PREVENT DISLOCATION FROM PROPER POSITION.
7. THE COMPRESSIVE STRENGTH OF CONCRETE SHALL NOT BE LESS THAN 5,000 PSI WHEN TESTED AT TWENTY-EIGHT (28) DAYS.
8. ALL CONCRETE SHALL BE AIR-ENTRAINED, NORMAL-WEIGHT CONCRETE WITH A MAXIMUM WATER TO CEMENT RATIO OF 0.40.
9. ALL CONCRETE WORK SHALL BE CURED FOR A MINIMUM OF 7 DAYS IN ACCORDANCE WITH ACI STANDARDS.
10. ALL REINFORCEMENT SHALL BE EPOXY COATED.
11. ALL DETAILING, FABRICATION AND ERECTION OF THE REINFOCING BARS SHALL COMPLY WITH THE REQUIREMENTS OF ACI-315 AND ACI-318, CHAPTERS 7 AND 12.
12. ALL SPLICES SHALL BE IN ACCORDANCE WITH ACI-318, CHAPTER 12. THE LOCATIONS SHALL BE INDICATED ON THE SHOP DRAWINGS AND APPROVED BY THE ENGINEER.
13. PROVIDE CHAIRS FOR SUPPORT OF ALL REINFORCEMENT. LIFTING OF BARS OR MESH DURING PLACEMENT OF CONCRETE IS NOT PERMITTED.
14. REINFORCING STEEL SHALL HAVE A MINIMUM OF 2" CLEAR COVER IN ANY DIRECTION.
15. CLEAR COVERS SHALL BE CLEARLY SHOWN ON ALL REBAR DETAIL DRAWINGS.
16. EXISTING CONCRETE SURFACES SHALL BE INTENTIONALLY ROUGHENED PER ACI SPECIFICATIONS TO ACHIEVE A MAXIMUM OF 1/4" AMPLITUDE.
17. BONDING AGENT SHALL BE APPLIED TO THE EXISTING HARDENED CONCRETE SURFACES. CONTRACTOR TO SUBMIT PROPOSED BONDING AGENT FOR REVIEW AND APPROVAL BY THE ENGINEER AND EVERSOURCE ENERGY, INC.

FINAL DESIGN REVIEW

REV.	DATE	REVISION DESCRIPTION	SHEET NO.

THE INFORMATION, INCLUDING ESTIMATED QUANTITIES OF WORK, SHOWN ON THESE SHEETS IS BASED ON LIMITED INVESTIGATIONS BY THE STATE AND IS IN NO WAY WARRANTED TO INDICATE THE CONDITIONS OF ACTUAL QUANTITIES OF WORK WHICH WILL BE REQUIRED.

Plotted Date: 2/22/2019

DESIGNER/DRAFTER: RR
CHECKED BY: BX
SCALE AS NOTED

STATE OF CONNECTICUT
DEPARTMENT OF TRANSPORTATION

Filename: ...\02_UTL_MSH_0113-0107_UTL_1.dgn

SIGNATURE/BLOCK:

PROJECT TITLE: REHABILITATION OF BRIDGE NO. 02931 ROUTE 2A OVER POQUETANUCK COVE

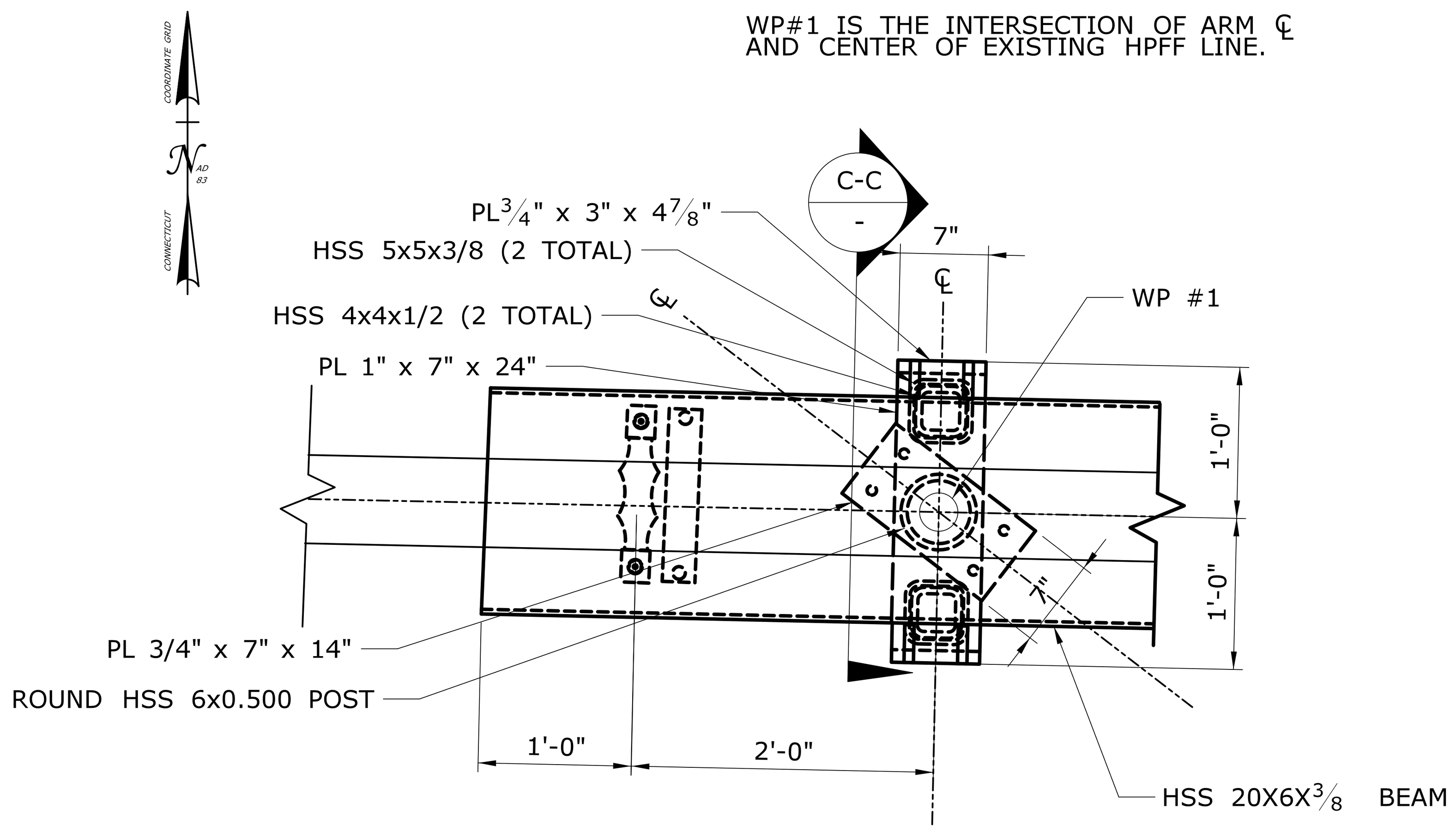
TOWN: PRESTON

DRAWING TITLE: HPFF LINE TEMPORARY/PERMANENT SUPPORT

PROJECT NO. 0113-0107
DRAWING NO. UTL-X
SHEET NO.

NOTES:

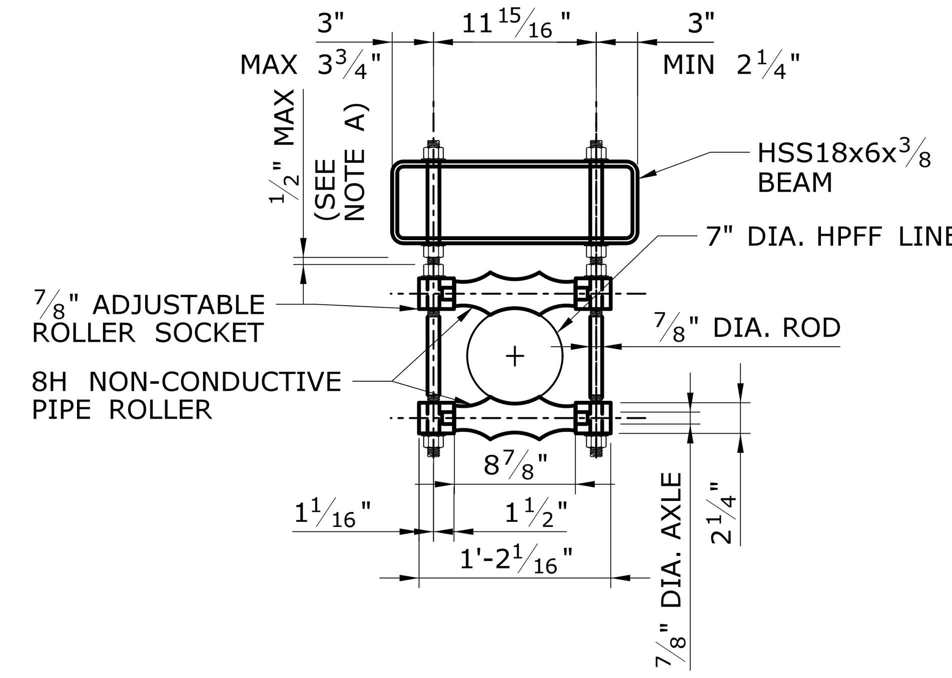
WP#1 IS THE INTERSECTION OF ARM ℄ AND CENTER OF EXISTING HPFF LINE.



DETAIL 1

SCALE 1"=1'

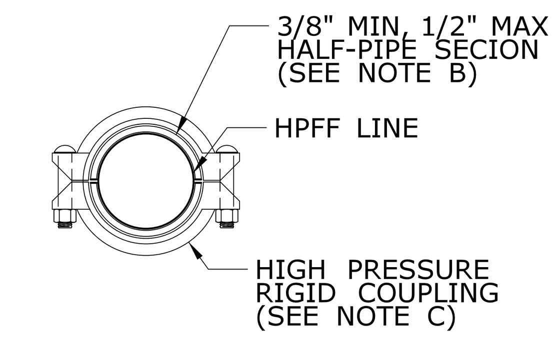
* WINGWALL NOT SHOWN FOR CLARITY



SECTION A-A

SCALE 1"=1'

NOTE A:
CONTRACTOR TO SHIM THE BOTTOM OF HSS18x6x3/8 WITH 3" WIDE x 15" LONG SHIM PLATES SO THAT THE MAXIMUM EXPOSED ROD HEIGHT IS 1/2".



SECTION B-B

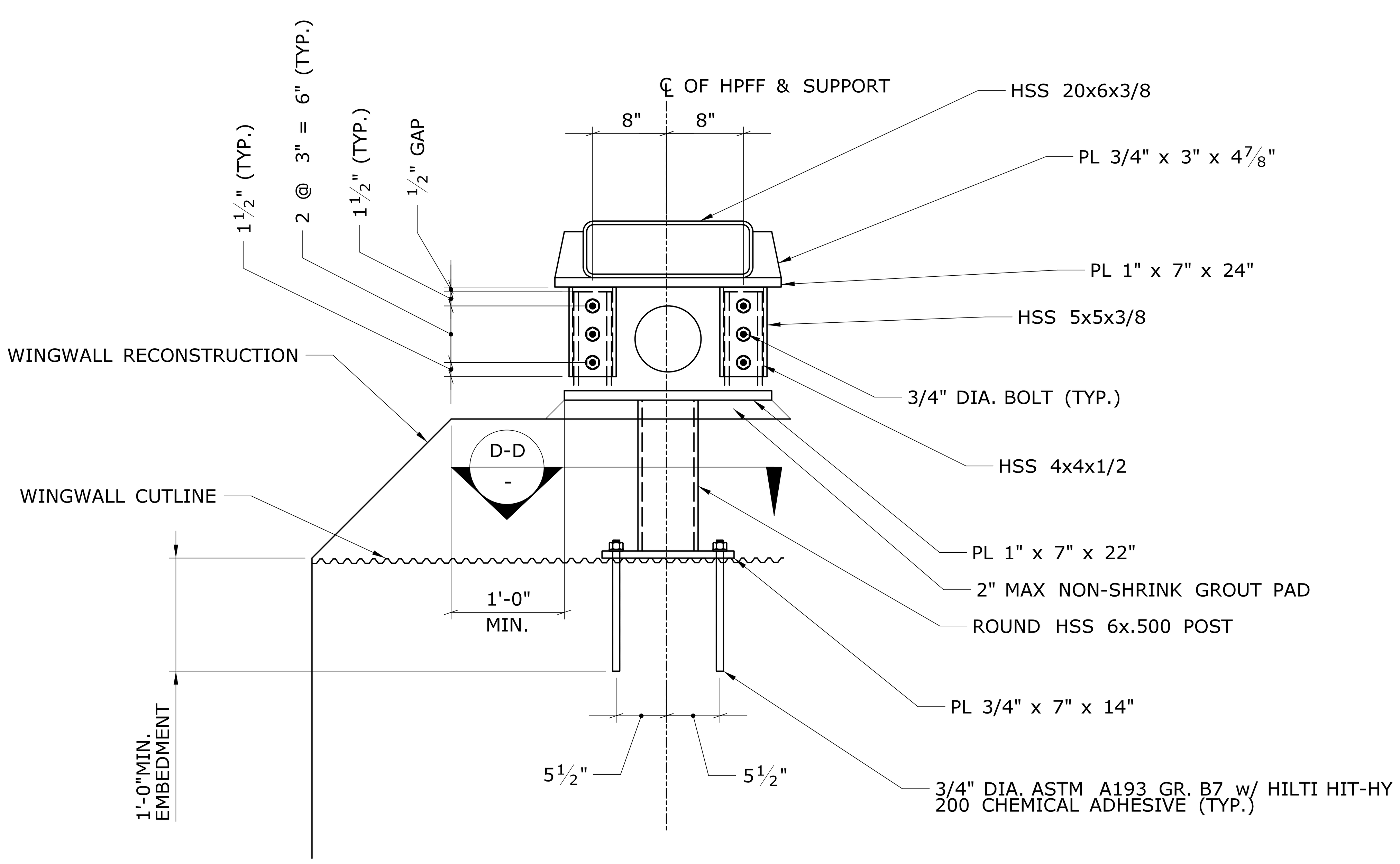
SCALE 1"=1'

NOTE B:
CONTRACTOR TO PROVIDE TO ENGINEER THE PROPOSED PIPE SECTION FOR REVIEW AND APPROVAL. MAXIMUM GAP BETWEEN O.D. OF EXISTING LINE AND I.D. OF HALF PIPE SECTIONS TO BE 1/8".

NOTE C:
CONTRACTOR TO PROPOSE TO ENGINEER THE SIZE AND TYPE OF COUPLER TO BE USED BASED UPON THE SIZE OF HALF-PIPES FOR REVIEW AND APPROVAL.

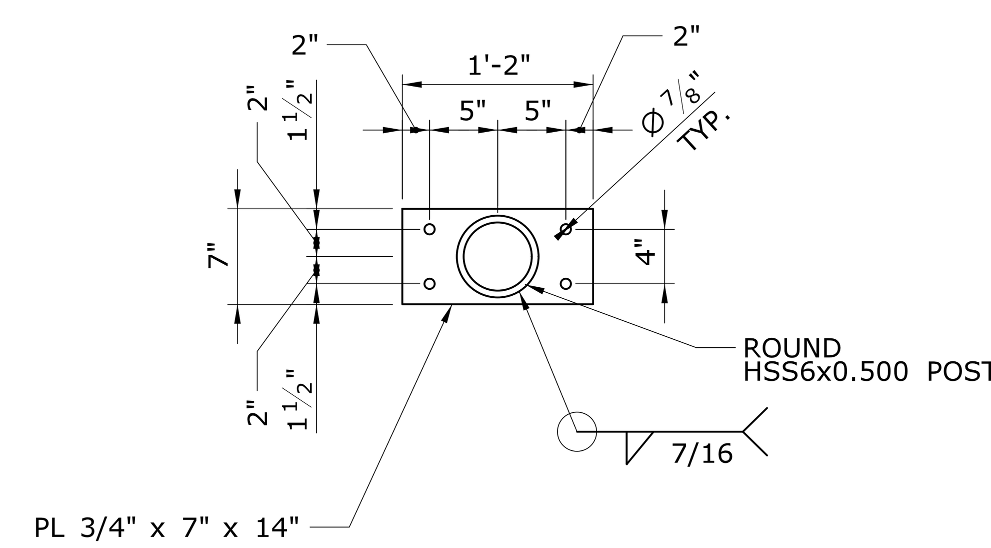
NOTES:

1. ARM TO HSS BEAM AND ROLLER SUPPORT TO HSS BEAM CONNECTIONS TO BE FIELD DRILLED. IF SHOP DRILLING IS PREFERRED THE CONTRACTOR SHALL SURVEY THE HORIZONTAL CURVATURE OF THE EXISTING HPFF LINE, THE SKEW ANGLE OF THE EXISTING WINGWALLS, DETERMINE THE LOCATIONS OF WP#1 & WP#2 AND SHALL DETERMINE THE LOCATION OF THE HOLES.
2. MAXIMUM 1/2" GAP BETWEEN ROLLER SUPPORT AND COUPLER.
3. MINIMUM OF 2 COUPLERS PER BAY.



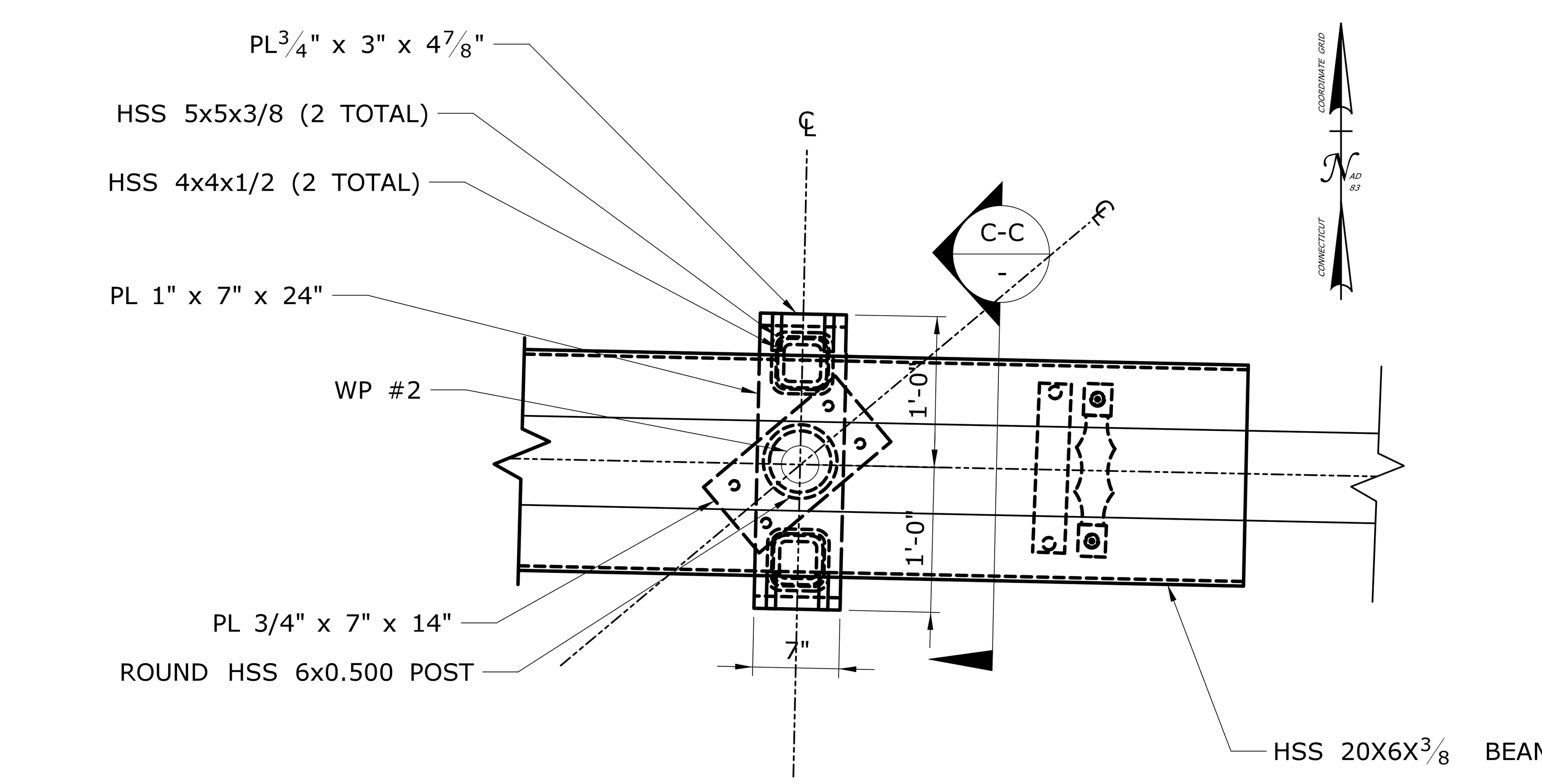
SECTION C-C

SCALE 1"=1'



SECTION D-D

SCALE 1"=1'



DETAIL 2

SCALE 1"=1'

* WINGWALL NOT SHOWN FOR CLARITY

UTILITY DESIGN NOT COMPLETE. INTERIM UTILITY SUBMISSION DUE 3/7/2019.

FINAL DESIGN REVIEW

REV.	DATE	REVISION DESCRIPTION	SHEET NO.

THE INFORMATION, INCLUDING ESTIMATED QUANTITIES OF WORK, SHOWN ON THESE SHEETS IS BASED ON LIMITED INVESTIGATIONS BY THE STATE AND IS IN NO WAY WARRANTED TO INDICATE THE CONDITIONS OF ACTUAL QUANTITIES OF WORK WHICH WILL BE REQUIRED.

Plotted Date: 2/22/2019

DESIGNER/DRAFTER: RR

CHECKED BY: BX

SCALE AS NOTED

STATE OF CONNECTICUT
DEPARTMENT OF TRANSPORTATION

Filename: ...\03_UTL_MSH_0113-0107_UTL_2.dgn

SIGNATURE/ BLOCK:

PROJECT TITLE:
REHABILITATION OF BRIDGE NO. 02932 ROUTE 2A OVER POQUETANUCK COVE

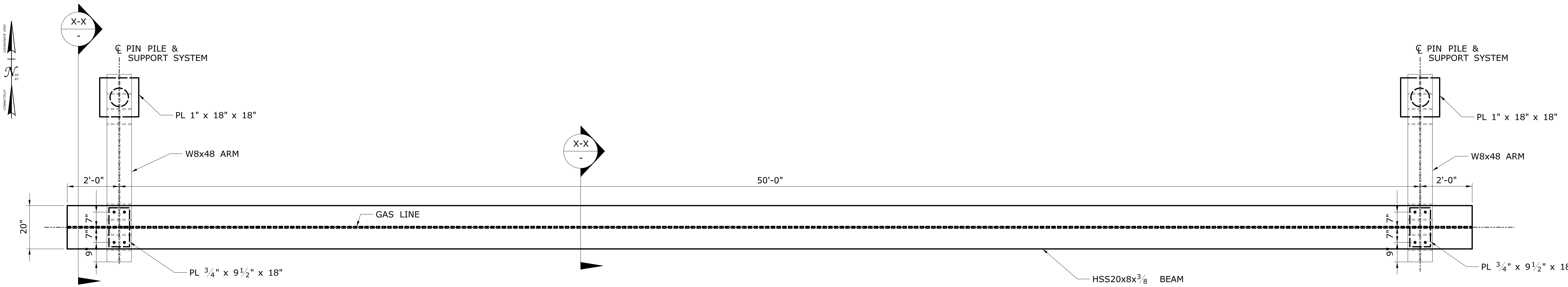
TOWN: **PRESTON**

DRAWING TITLE: **HPFF LINE TEMP./PERM. SUPPORT DETAILS**

PROJECT NO. **0113-0107**

DRAWING NO. **UTL-X**

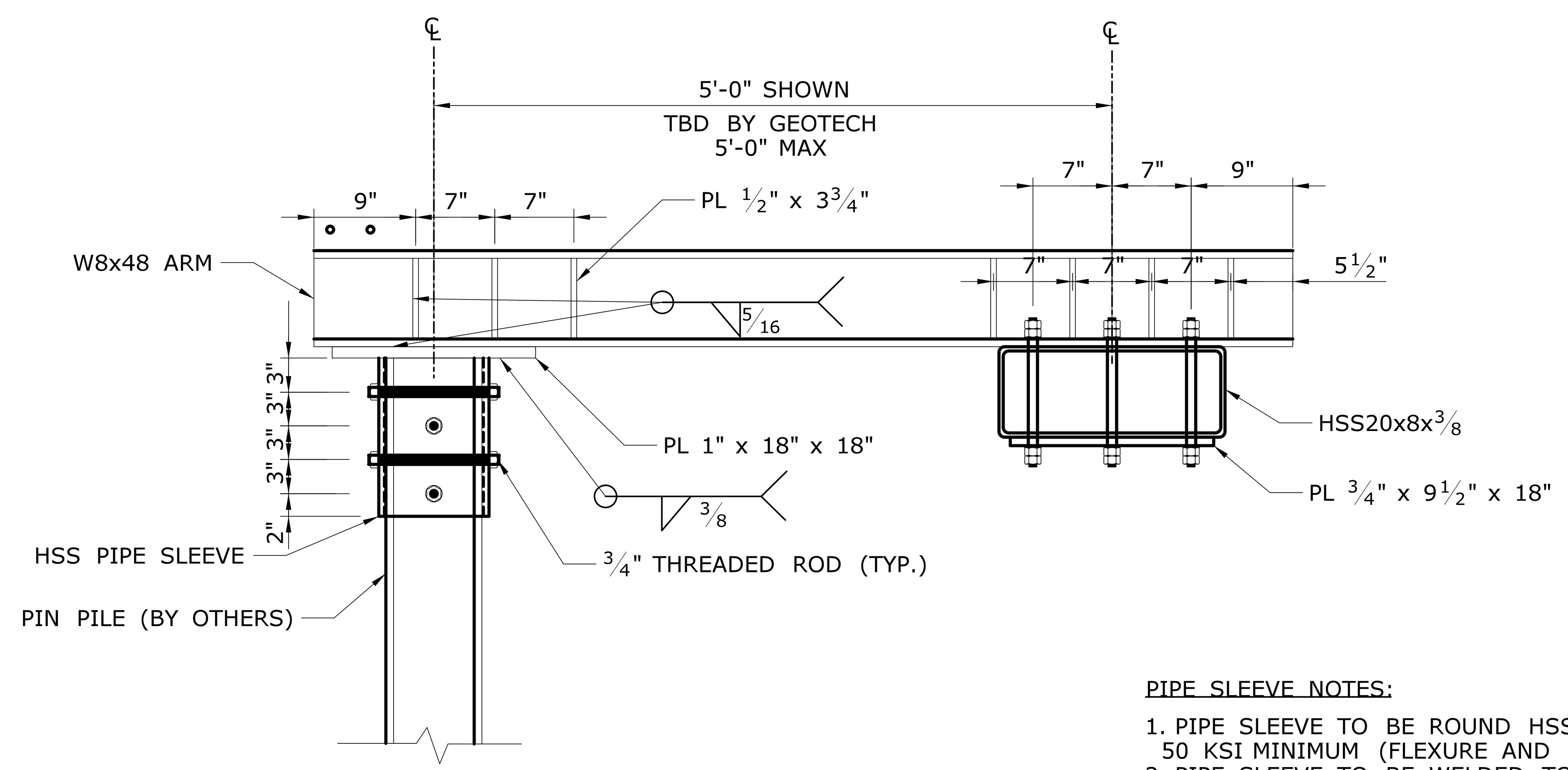
SHEET NO.



TEMPORARY SUPPORT FOR GAS LINE PLAN

SCALE $\frac{1}{2}$"=1'

NOTE:
EXISTING/NEW BRIDGE NOT SHOWN FOR CLARITY.

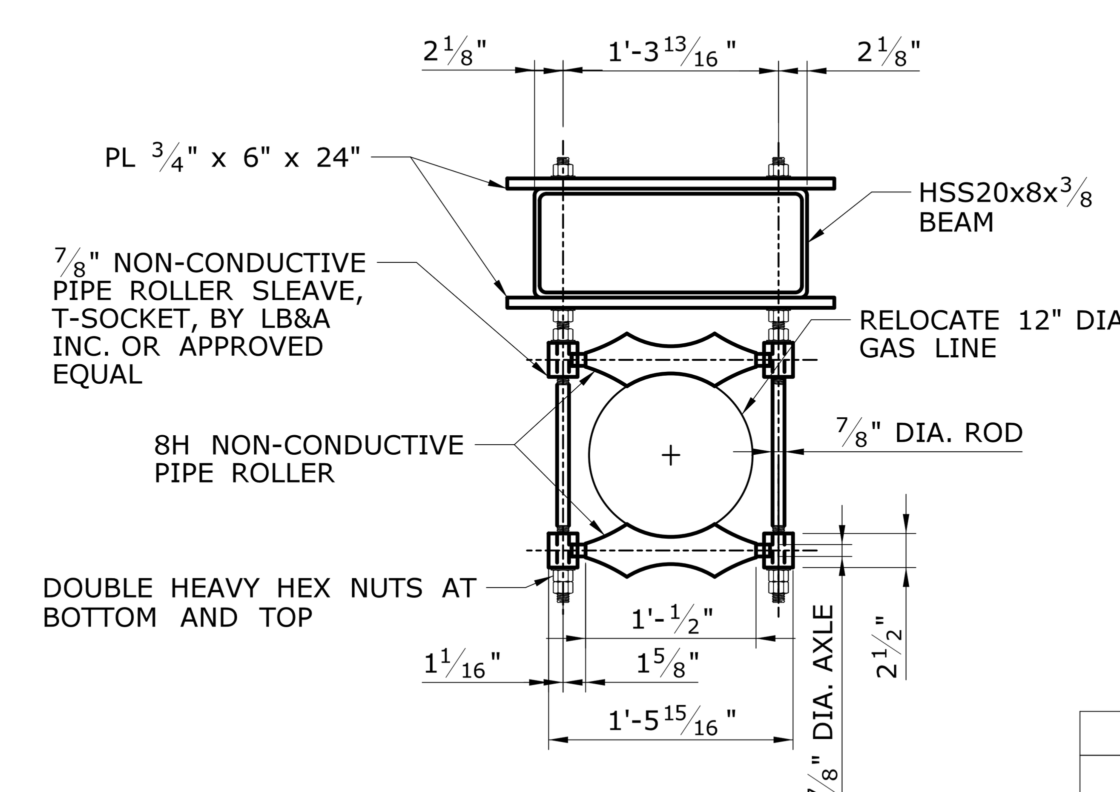


SECTION X-X

SCALE 1"=1'

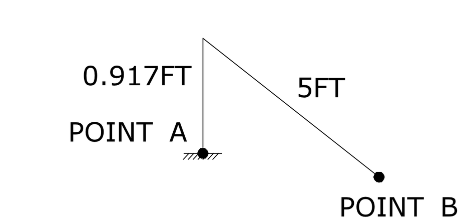
PIPE SLEEVE NOTES:

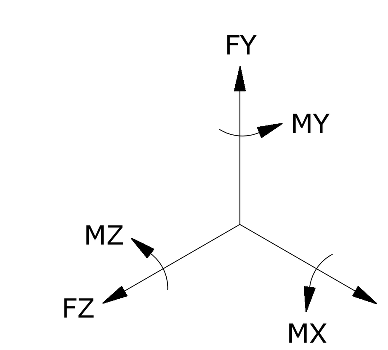
1. PIPE SLEEVE TO BE ROUND HSS10x1/2" GRADE 50 KSI MINIMUM (FLEXURE AND SHEAR)
2. PIPE SLEEVE TO BE WELDED TO CAP PLATE WITH 3/8" FILLET WELDS.
3. THE GAP BETWEEN THE O.D. OF THE PIN PILE AND THE I.D. OF THE PIPE SLEEVE TO BE 1/8" MAX ALL AROUND.



SECTION X-X

SCALE 1"=1'





SERVICE - LEVEL DESIGN LOADS FOR PIN PILE DESIGN							
POINT	DESCRIPTION	FX (KIPS)	FY (KIPS)	FZ (KIPS)	MX (KIPS-FT)	MY (KIPS-FT)	MZ (KIPS-FT)
A	CL HSS PIPE SLEEVE	+/- 2.5	-6.1	0	0	0	+/-30.0
B	FREE END OF CANTILEVER AT CL HSS BEAM	+/- 2.5	-5.1	0	0	0	+/-4.5

UTILITY DESIGN NOT COMPLETE. INTERIM UTILITY SUBMISSION DUE 3/7/2019.

FINAL DESIGN REVIEW

REV.	DATE	REVISION DESCRIPTION	SHEET NO.

THE INFORMATION, INCLUDING ESTIMATED QUANTITIES OF WORK, SHOWN ON THESE SHEETS IS BASED ON LIMITED INVESTIGATIONS BY THE STATE AND IS IN NO WAY WARRANTED TO INDICATE THE CONDITIONS OF ACTUAL QUANTITIES OF WORK WHICH WILL BE REQUIRED.

Plotted Date: 2/22/2019

DESIGNER/DRAFTER: PS

CHECKED BY: BX

SCALE AS NOTED

STATE OF CONNECTICUT
DEPARTMENT OF TRANSPORTATION

Filename: ...\04_UTL_MSH_0113-0107_UTL_3.dgn

SIGNATURE/
BLOCK:

PROJECT TITLE:
REHABILITATION OF BRIDGE NO. 02931 ROUTE 2A OVER POQUETANUCK COVE

TOWN:
PRESTON

DRAWING TITLE:
GAS LINE TEMPORARY SUPPORT DETAILS

PROJECT NO.
0113-0107

DRAWING NO.
UTL-X

SHEET NO.

UTILITY DESIGN NOT COMPLETE. INTERIM UTILITY SUBMISSION DUE 3/7/2019.

FINAL DESIGN REVIEW

REV.	DATE	REVISION DESCRIPTION	SHEET NO.

THE INFORMATION, INCLUDING ESTIMATED QUANTITIES OF WORK, SHOWN ON THESE SHEETS IS BASED ON LIMITED INVESTIGATIONS BY THE STATE AND IS IN NO WAY WARRANTED TO INDICATE THE CONDITIONS OF ACTUAL QUANTITIES OF WORK WHICH WILL BE REQUIRED.

Plotted Date: 2/22/2019

DESIGNER/DRAFTER: RR
CHECKED BY: BX
SCALE AS NOTED

STATE OF CONNECTICUT
DEPARTMENT OF TRANSPORTATION

Filename: ...\06_UTL_MSH_0113-0108_UTL_5.dgn

SIGNATURE/ BLOCK:
OFFICE OF ENGINEERING
APPROVED BY:

PROJECT TITLE:
REHABILITATION OF BRIDGE NO. 02931 ROUTE 2A OVER POQUETANUCK COVE

TOWN: **PRESTON**

DRAWING TITLE: **GAS LINE PERMANENT SUPPORT DETAILS**

PROJECT NO. 0113-0107
DRAWING NO. **UTL-X**
SHEET NO.

Appendix B

Boring and Test Pit Logs

Connecticut DOT Boring Report

Driller:	Ray Cook			Hole No.:	B-2-1
Inspector:	C. Gibb	Town:	Preston, Connecticut	Stat./Offset:	83+51.3/8.8'
Engineer:	M. Chartier	Project No.:	113-107	Northing:	739107.89
Start Date:	04/25/2017 8:45 AM	Route No.:	2A	Easting:	1193076.91
Finish Date:	05/01/2017 3:10 PM	Bridge No.:	02931	Surface Elevation:	7.3 NAVD88

Project Description: Preston Bridge No. 02931 over Poquetanuck Cove

Casing Size/Type: HW 4"	Sampler Type/Size: 1.5" Split Spoon Sampler	Core Barrel Type: N/A
Hammer Wt.: 300 lb. Fall: 24 in.	Hammer Wt.: 140 lb. Fall: 30 in.	

Groundwater Observations: 6.3 ft depth after 0 hours

Depth (ft)	Sample Type/No.	SAMPLES: Blows on Sampler per 6 inches	Pen. (in.)	Rec. (in.)	RQD %	Casing Blows per 6"	Generalized Strata Description	Material Description and Notes	Well Construction	Elevation (ft)
0–1						Casing Dropped 0' to 11'	Asphalt			
1–3	S-1	17 12 15 9	24	9			Embankment Fill	S-1: Brown c-f SAND, some c-f Gravel, trace Silt, medium dense, moist		5
5–7	S-2	4 2 4 8	24	11				S-2: Brown c-f SAND, little fine Gravel, little Silt, loose, moist		0
10–11.7	S-3A/B	1 1 13 50/4"	20	13		190, 160, 170, 150, 170, 140, 100, 20, 14, 10, 5, 2		S-3A: Brown c-f SAND, some fine Gravel, trace Silt, loose to medium dense, wet S-3B: Gray c-f SAND and c-f Gravel, loose to medium dense, wet		-5
16–18	S-4A/B	7 9 5 2	24	5		5, 2, 5, 8, 2, 2	Organic Silt	S-4A: Gray c-f SAND, some c-f Gravel, some Silt, loose, wet S-4B: Dary gray to dark brown SILT, some fine SAND, loose, wet		-10
20–22	S-5A/B	1 2 10 24	24	5		4, 5, 4, 3, 10, 10, 15		S-5A: Dark brown ORGANIC SILT, trace fine Sand, loose, wet S-5B: Gray ORGANIC SILT, some fine Sand, loose, wet		-15
25–27	S-6	37 35 34 36	24	10		70, 100, 130, 80, 70, 90, 60, 50, 60, 50, 70, 90, 80	Terrace Deposit	S-6: Tan fine SAND, some Silt, very dense, wet		-20
30										

Sample type: S = Split Spoon C = Core UP = Undisturbed Piston V = Vane Shear Test

Proportions Used: Trace = 1-10%, Little = 10-20%, Some = 20-35%, And = 35-50%

Total Penetration in Earth: 50.3 ft Rock: 0 ft	* Sample overdriven w/ 300# hammer to obtain more recovery. Blows from 300# hammer not indicated in log. 1. Casing refusal at 48.5' bgs. Boring terminated at 50.3' bgs. 2. Upon completion, the boring was backfilled with excess drill cuttings and grouted at the surface. 3. Station values are based upon those shown along CT Rt. 2A on the "PD 30% Structure Plans_CT_RPE_0113-0108" dated 10/28/2016, and provided by CME Engineering, Inc. 4. Ground surface elevations were estimated from drawing "SV_D2_170_3250F_PRESTON_CT 2A OVER POQUETANUCK COVE BR02931 AND DICKERMANS BROOK BR02932_GRN" dated 2/16/2016.	Sheet 1 of 2
No. of Soil Samples: 14 No. of Core Runs: 0		SM-001-M REV. 1/02

Connecticut DOT Boring Report

Driller:	Ray Cook	Town:	Preston, Connecticut	Hole No.:	B-2-1
Inspector:	C. Gibb	Project No.:	113-107	Stat./Offset:	83+51.3/8.8'
Engineer:	M. Chartier	Route No.:	2A	Northing:	739107.89
Start Date:	04/25/2017 8:45 AM	Bridge No.:	02931	Easting:	1193076.91
Finish Date:	05/01/2017 3:10 PM			Surface Elevation:	7.3 NAVD88

Project Description: Preston Bridge No. 02931 over Poquetanuck Cove

Casing Size/Type: HW 4"	Sampler Type/Size: 1.5" Split Spoon Sampler	Core Barrel Type: N/A
Hammer Wt.: 300 lb. Fall: 24 in.	Hammer Wt.: 140 lb. Fall: 30 in.	

Groundwater Observations: 6.3 ft depth after 0 hours

Depth (ft)	Sample Type/No.	Blows on Sampler per 6 inches	Pen. (in.)	Rec. (in.)	RQD %	Generalized Strata Description	Material Description and Notes
30	S-7	14 14 13 35	24	11			S-7: Tan SILT, little fine Sand, medium dense, wet
35	S-8	18 50/4"	16	16*			S-8: Grayish brown c-f SAND, some c-f Gravel, trace Silt, very dense, wet
40	S-9	50/4"	4	4			S-9: Grayish brown c-f GRAVEL, some c-f Sand, trace Silt, very dense, wet
45	S-10	50/0"	0	0			S-10: Gray c-f GRAVEL, trace coarse Sand, very dense, wet (Wash)
50	S-11	50/1"	3	1*		Glacial Till	S-11: Grayish brown SILT and c-f GRAVEL, some c-f Sand, very dense, wet
							End of Boring at 50.3' bgs.
55							
60							

Casing Blows per 6": 70, 60, 100, 70, 80, 100, 70, 70, 90, 60, 60, 50, 70, 50, 50, 65, 80, 60, 100, 80, 80, 75, 95, 80, 100, 50, 70, 100, 80, 80, 70, 90, 100, 150, 200, 400, 500

Elevation (ft): -25, -30, -35, -40, -45, -50

Sample type: S = Split Spoon C = Core UP = Undisturbed Piston V = Vane Shear Test

Proportions Used: Trace = 1-10%, Little = 10-20%, Some = 20-35%, And = 35-50%

Total Penetration in Earth: 50.3 ft Rock: 0 ft	* Sample overdriven w/ 300# hammer to obtain more recovery. Blows from 300# hammer not indicated in log. 1. Casing refusal at 48.5' bgs. Boring terminated at 50.3' bgs. 2. Upon completion, the boring was backfilled with excess drill cuttings and grouted at the surface. 3. Station values are based upon those shown along CT Rt. 2A on the "PD 30% Structure Plans_CT_RPE_0113-0108" dated 10/28/2016, and provided by CME Engineering, Inc. 4. Ground surface elevations were estimated from drawing "SV_D2_170_3250F_PRESTON_CT 2A OVER POQUETANUCK COVE BR02931 AND DICKERMANS BROOK BR02932_GRN" dated 2/16/2016.	Sheet 2 of 2
No. of Soil Samples: 14 No. of Core Runs: 0		SM-001-M REV. 1/02

Connecticut DOT Boring Report

Driller:	Ray Cook			Hole No.:	B-2-2A
Inspector:	C. Gibb	Town:	Preston, Connecticut	Stat./Offset:	83+49.3/-11.3'
Engineer:	M. Chartier	Project No.:	113-107	Northing:	739128.01
Start Date:	05/02/2017 9:00 AM	Route No.:	2A	Easting:	1193074.94
Finish Date:	05/02/2017 2:30 PM	Bridge No.:	02931	Surface Elevation:	7.3 NAVD88

Project Description: Preston Bridge No. 02931 over Poquetanuck Cove

Casing Size/Type: HW 4"	Sampler Type/Size: 1.5" Split Spoon Sampler	Core Barrel Type: N/A
Hammer Wt.: 300 lb. Fall: 24 in.	Hammer Wt.: 140 lb. Fall: 30 in.	

Groundwater Observations: 7.0 ft depth after 0 hours

Depth (ft)	Sample Type/No.	Blows on Sampler per 6 inches	Pen. (in.)	Rec. (in.)	RQD %	Casing Blows per 6"	Generalized Strata Description	Material Description and Notes	Well Construction	Elevation (ft)
0						Casing Dropped from 0' to 10'	Asphalt			
1-3	S-1	10 9 7 5	24	9			Embankment Fill	S-1: Dark tan to brown c-f SAND, trace fine Gravel, trace Silt, medium dense, moist		5
5-7	S-2	5 5 5 5	24	8				S-2: Dark brown c-f SAND, some fine Gravel, trace Silt, loose, moist		
7-9	S-3	6 5 3 7	24	7				S-3: Brown c-f SAND, some Silt, little fine Gravel, loose, wet		0
9-11	S-4	2 1 5 10	24	5		20 20		S-4: Dark brown to gray c-f SAND, some Silt, little fine Gravel, loose, wet		
11-13	S-5A/B	10 7 18 9	24	11		15 23 21 19		S-5A: Dark brown fine SAND, trace c-m Sand, medium dense, wet S-5B: Dark brown c-f SAND, some fine Gravel, trace Silt, medium dense, wet		-5
13-15	S-6	9 8 8 10	24	3		50 60 50 40		S-6: Black to brown coarse SAND, some fine Gravel, medium dense, wet (Wash)		
15-17	S-7	1 1 2 3	24	14		1 1 1 1	Organic Silt	S-7: Black ORGANIC SILT, trace m-f Sand, loose, wet		-10
17-19	S-8A/B/C	2 3 4 5	24	20		1 1 1 2		S-8A: Dark gray to brown ORGANIC SILT, loose, wet S-8B: Dark gray to brown m-f Sand, trace fine Gravel, trace Organics, loose, wet S-8C: Dark gray to brown ORGANIC SILT, loose, wet		
19-20	S-9	50/0"	1	4*		25 50 100 150		S-9: Black ORGANIC SILT, trace fine Sand, very dense, wet		
21-22	S-10A/B	60 68/6"	12	21*		80 160 140 90	Terrace Deposit	S-10A: Black to Dark gray ORGANIC SILT, very dense, wet S-10B: Brown c-f SAND, some Silt, trace Gravel, very dense, wet		-15
25-26	S-11	16 50/6"	12	15*		50 50 60 40		S-11: Brown c-f SAND, some fine Gravel, trace Silt, very dense, wet		
26-30								End of Boring at 26' bgs. Boring terminated due to damaged casing.		-20

Sample type: S = Split Spoon C = Core UP = Undisturbed Piston V = Vane Shear Test

Proportions Used: Trace = 1-10%, Little = 10-20%, Some = 20-35%, And = 35-50%

Total Penetration in Earth: 26 ft Rock: 0 ft

No. of Soil Samples: 15 No. of Core Runs: 0

* Sample overdriven w/ 300# hammer to obtain more recovery. Blows from 300# hammer not indicated in log.
1. Casing refusal at 25' bgs due to damage during driving. Boring terminated at 26' bgs.
2. Upon completion, the boring was backfilled with excess drill cuttings and coldpatched at the surface.
3. Station values are based upon those shown along CT Rt. 2A on the "PD 30% Structure Plans_CT_RPE_0113-0108" dated 10/28/2016, and provided by CME Engineering, Inc.
4. Ground surface elevations were estimated from drawing "SV_D2_170_3250F_PRESTON_CT 2A OVER POQUETANUCK COVE BR02931 AND DICKERMANS BROOK BR02932_GRN" dated 2/16/2016.

SM-001-M REV. 1/02

Connecticut DOT Boring Report

Driller:	Ray Cook	Town:	Preston, Connecticut	Hole No.:	B-2-2B
Inspector:	C. Gibb	Project No.:	113-107	Stat./Offset:	83+52.3/-11.3
Engineer:	M. Chartier	Route No.:	2A	Northing:	739128.01
Start Date:	05/03/2017 8:40 AM	Bridge No.:	02931	Easting:	1193077.94
Finish Date:	05/03/2017 12:00 PM			Surface Elevation:	7.1 NAVD88

Project Description: Preston Bridge No. 02931 over Poquetanuck Cove

Casing Size/Type: HW 4"	Sampler Type/Size: 1.5" Split Spoon Sampler	Core Barrel Type: N/A
Hammer Wt.: 300 lb. Fall: 24 in.	Hammer Wt.: 140 lb. Fall: 30 in.	

Groundwater Observations: 6.0 ft depth after 0 hours

Depth (ft)	Sample Type/No.	Blows on Sampler per 6 inches	Pen. (in.)	Rec. (in.)	RQD %	Casing Blows per 6"	Generalized Strata Description	Material Description and Notes	Well Construction	Elevation (ft)
0							Asphalt			
						Casing Dropped from 0' to 10'	Embankment Fill			5
5										0
10						5, 7, 5, 3, 4, 6, 5, 7, 4, 5				-5
15	S-1	2 1 2 1	24	15		8, 7, 9, 5	Organic Silt	S-1: Dark brown to black ORGANIC SILT, some c-f Sand, loose, wet		
	S-2	2 3 8 13	24	16		8, 9, 6, 8		S-2: Dark brown to black ORGANIC SILT, some c-f SAND, loose, wet		-10
20								End of Boring at 19' bgs. Boring terminated due to damaged casing.		-15
25										-20
30										

Sample type: S = Split Spoon C = Core UP = Undisturbed Piston V = Vane Shear Test

Proportions Used: Trace = 1-10%, Little = 10-20%, Some = 20-35%, And = 35-50%

Total Penetration in Earth: 19 ft	Rock: 0 ft
No. of Soil Samples: 2	No. of Core Runs: 0

1. Casing damaged during driving 15' to 19'. Roller bit could not advance past 18' bgs due to damaged casing. Boring terminated at 19' bgs.
2. Upon completion, the boring was backfilled with excess drill cuttings and coldpatched at the surface.
3. Station values are based upon those shown along CT Rt. 2A on the "PD 30% Structure Plans_CT_RPE_0113-0108" dated 10/28/2016, and provided by CME Engineering, Inc.
4. Ground surface elevations were estimated from drawing "SV_D2_170_3250F_PRESTON_CT 2A OVER POQUETANUCK COVE BR02931 AND DICKERMANS BROOK BR02932_GRN" dated 2/16/2016.

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Connecticut DOT Boring Report

Driller:	Ray Cook	Town:	Preston, Connecticut	Hole No.:	B-2-2C
Inspector:	C. Gibb	Project No.:	113-107	Stat./Offset:	83+53.3/-11.3'
Engineer:	M. Chartier	Route No.:	2A	Northing:	739128.01
Start Date:	05/03/2017 12:10 PM	Bridge No.:	02931	Easting:	1193078.94
Finish Date:	05/04/2017 10:30 AM			Surface Elevation:	7.2 NAVD88

Project Description: Preston Bridge No. 02931 over Poquetanuck Cove

Casing Size/Type: HW 4"	Sampler Type/Size: 1.5" Split Spoon Sampler	Core Barrel Type: N/A
Hammer Wt.: 300 lb. Fall: 24 in.	Hammer Wt.: 140 lb. Fall: 30 in.	

Groundwater Observations: 6.0 ft depth after 0 hours

Depth (ft)	Sample Type/No.	SAMPLES: Blows on Sampler per 6 inches	Pen. (in.)	Rec. (in.)	RQD %	Casing Blows per 6"	Generalized Strata Description	Material Description and Notes	Well Construction	Elevation (ft)
0						Casing Dropped from 0' to 15'	Asphalt			
							Embankment Fill			5
5										0
	S-1	GRAB	N/A	N/A				S-1: Dark brown to black c-f SAND, some c-f Gravel, some Silt with Wood, wet		
10										-5
	S-2	GRAB	N/A	N/A			Organic Silt	S-2: Dark brown to black ORGANIC SILT, some c-f SAND, wet		
15						5, 3, 2, 2, 1, 1, 2, 1				-10
						20, 80	Terrace Deposit			
20	S-3	44*	6	15		300, 150, 150, 200		S-3: Brown c-f SAND and c-f GRAVEL, little Silt, very dense, wet		
	S-4	50/3"*	3	9		300, 400		S-4: Brown to dark brown c-f SAND, some c-f Gravel, some Silt, very dense, wet		-15
25								End of Boring at 25' bgs. Boring terminated due to casing refusal.		-20
30										

Sample type: S = Split Spoon C = Core UP = Undisturbed Piston V = Vane Shear Test

Proportions Used: Trace = 1-10%, Little = 10-20%, Some = 20-35%, And = 35-50%

Total Penetration in Earth: 25 ft Rock: 0 ft No. of Soil Samples: 4 No. of Core Runs: 0	* Sample overdriven w/ 300# hammer to obtain more recovery. Blows from 300# hammer not indicated in log. 1. Casing refusal at 23' bgs. Boring terminated at 25' bgs. 2. Upon completion, the boring was backfilled with excess drill cuttings and coldpatched at the surface. 3. Station values are based upon those shown along CT Rt. 2A on the "PD 30% Structure Plans_CT_RPE_0113-0108" dated 10/28/2016, and provided by CME Engineering, Inc. 4. Ground surface elevations were estimated from drawing "SV_D2_170_3250F_PRESTON_CT 2A OVER POQUETANUCK COVE BR02931 AND DICKERMANS BROOK BR02932_GRN" dated 2/16/2016.	Sheet 1 of 1 SM-001-M REV. 1/02

Connecticut DOT Boring Report

Driller:	Ray Cook			Hole No.:	B-2-3
Inspector:	C. Gibb	Town:	Preston, Connecticut	Stat./Offset:	83+87.4/-11.4
Engineer:	M. Chartier	Project No.:	113-107	Northing:	739128.11
Start Date:	04/24/2017 8:45 AM	Route No.:	2A	Easting:	1193116.07
Finish Date:	04/24/2017 2:30 PM	Bridge No.:	02931	Surface Elevation:	8.3 NAVD88
Project Description:	Preston Bridge No. 02931 over Poquetanuck Cove				
Casing Size/Type:	HW 4"	Sampler Type/Size:	1.5" Split Spoon Sampler	Core Barrel Type:	N/A
Hammer Wt.:	300 lb. Fall: 24 in.	Hammer Wt.:	140 lb. Fall: 30 in.		
Groundwater Observations:	7.0 ft depth after 0 hours				

Depth (ft)	Sample Type/No.	SAMPLES: Blows on Sampler per 6 inches	Pen. (in.)	Rec. (in.)	RQD %	Casing Blows per 6"	Generalized Strata Description	Material Description and Notes	Well Construction	Elevation (ft)
1–3	S-1A/B	12 13 13 15	24	9		Casing Dropped 0' to 10"	Asphalt / Embankment Fill	S-1A: Black fine SAND, some Silt, trace fine Gravel, medium dense, moist S-1B: Brown c-f SAND, trace fine Gravel, trace Silt, medium dense, moist		
5–7	S-2	4 4 3 4	24	9			Embankment Fill	S-2: Brown to dark brown fine SAND, some medium Gravel, some Silt, loose, moist		
10–12	S-3	4 2 1 2	24	16			Embankment Fill	S-3: Black fine SAND and Silt, loose, wet		
15–17	S-4	6 10 50/3"	9	6			Embankment Fill	S-4: Dark gray c-f SAND, some Silt, trace fine Gravel, very dense, wet		
20–22	S-5	50/3"	3	3			Terrace Deposit	S-5: Brown to gray c-f SAND, some m-f Gravel, some Silt, very dense, wet		
25								End of Boring at 25' bgs. Boring terminated due to damaged casing.		

Generalized strata:

Stratum	Approximate depth on log
Asphalt	0 to about 0.5 ft
Embankment Fill	about 0.5 to 17 ft
Terrace Deposit	17 to 25 ft

Casing blows per 6", starting at 10 ft depth and listed in order down the hole: 7, 6, 8, 5, 8, 8, 7, 6, 8, 9, 30, 80, 100, 170, 200, 210, 190, 220, 170, 150, 400, 800

Elevation scale (ft): 5, 0, -5, -10, -15, -20

Sample type: S = Split Spoon C = Core UP = Undisturbed Piston V = Vane Shear Test

Proportions Used: Trace = 1-10%, Little = 10-20%, Some = 20-35%, And = 35-50%

Total Penetration in Earth: 25 ft	Rock: 0 ft
No. of Soil Samples: 6	No. of Core Runs: 0

1. Casing refusal at 21' bgs due to damage during driving. Boring terminated at 25' bgs.
2. Upon completion, the boring was backfilled with excess drill cuttings and grouted at the surface.
3. Station values are based upon those shown along CT Rt. 2A on the "PD 30% Structure Plans_CT_RPE_0113-0108" dated 10/28/2016, and provided by CME Engineering, Inc.
4. Ground surface elevations were estimated from drawing "SV_D2_170_3250F_PRESTON_CT 2A OVER POQUETANUCK COVE BR02931 AND DICKERMANS BROOK BR02932_GRN" dated 2/16/2016.

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Connecticut DOT Boring Report

Driller: Ray Cook		Hole No.: B-2-4A	
Inspector: C. Gibb	Town: Preston, Connecticut	Stat./Offset: 83+84.5/10.4'	
Engineer: M. Chartier	Project No.: 113-107	Northing: 739105.93	
Start Date: 05/15/2017 9:00 AM	Route No.: 2A	Easting: 1193110.20	
Finish Date: 05/15/2017 3:00 PM	Bridge No.: 02931	Surface Elevation: 8.2 NAVD88	

Project Description: Preston Bridge No. 02931 over Poquetanuck Cove

Casing Size/Type: HW 4"	Sampler Type/Size: 1.5" Split Spoon Sampler	Core Barrel Type: N/A
Hammer Wt.: 300 lb. Fall: 24 in.	Hammer Wt.: 140 lb. Fall: 30 in.	

Groundwater Observations: 7.5 ft depth after 0 hours

Depth (ft)	Sample Type/No.	SAMPLES: Blows on Sampler per 6 inches	Pen. (in.)	Rec. (in.)	RQD %	Casing Blows per 6"	Generalized Strata Description	Material Description and Notes	Well Construction	Elevation (ft)
0						Casing Dropped 0' to 10'	Asphalt			
	S-1	8 5 5 5	24	6			Embankment Fill	S-1: Brown c-f SAND, some c-f Gravel, trace Silt, loose, moist		5
5	S-2	2 3 3 3	24	0				S-2: No Recovery		0
10	S-3	2 14 7 4	24	3		20 18 14 15 13 16 15 10 5 3		S-3: Brown c-f SAND, some c-f Gravel, some Silt, medium dense, wet		-5
15	S-4	2 3 1 2	24	10		1 4 7 4	Organic Silt	S-4: Dark brown very high plasticity ORGANIC SILT, little c-f Sand, loose, wet		
	S-5	3 2 3 4	24	17		3 6 4 2		S-5: Dark brown to black very high plasticity ORGANIC SILT, trace c-f Sand, loose, wet		-10
	S-6	50/0"*	0	2		30 40		S-6: Black ORGANIC SILT and c-f GRAVEL, very dense, wet		
20	S-7	50/0"	0	0			Terrace Deposit	S-7: No Recovery		
	S-8	50/5"	5	2				S-8: Light brown to brown c-f SAND and c-f GRAVEL, some Silt, very dense, wet		-15
25								End of Boring at 25' bgs.		-20
30										

Sample type: S = Split Spoon C = Core UP = Undisturbed Piston V = Vane Shear Test

Proportions Used: Trace = 1-10%, Little = 10-20%, Some = 20-35%, And = 35-50%

Total Penetration in Earth: 25 ft Rock: 0 ft

No. of Soil Samples: 8 No. of Core Runs: 0

* Sample overdriven w/ 300# hammer to obtain more recovery. Blows from 300# hammer not indicated in log.
1. Casing refusal at 20' bgs. HSA refusal at 20.5' bgs. Boring terminated at 25' bgs.
2. Upon completion, the boring was backfilled with excess drill cuttings and coldpatched at the surface.
3. Station values are based upon those shown along CT Rt. 2A on the "PD 30% Structure Plans_CT_RPE_0113-0108" dated 10/28/2016, and provided by CME Engineering, Inc.
4. Ground surface elevations were estimated from drawing "SV_D2_170_3250F_PRESTON_CT 2A OVER POQUETANUCK COVE BR02931 AND DICKERMANS BROOK BR02932_GRN" dated 2/16/2016.

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Connecticut DOT Boring Report

Driller:	Ray Cook	Connecticut DOT Boring Report		Hole No.:	B-2-4B
Inspector:	C. Gibb	Town:	Preston, Connecticut	Stat./Offset:	83+87.5/10.8'
Engineer:	M. Chartier	Project No.:	113-107	Northing:	739105.93
Start Date:	05/16/2017 9:00 AM	Route No.:	2A	Easting:	1193113.20
Finish Date:	05/16/2017 9:40 AM	Bridge No.:	02931	Surface Elevation:	8.3 NAVD88

Project Description: Preston Bridge No. 02931 over Poquetanuck Cove

Casing Size/Type: N/A	Sampler Type/Size: 1.5" Split Spoon Sampler	Core Barrel Type: N/A
Hammer Wt.: N/A Fall: N/A	Hammer Wt.: 140 lb. Fall: 30 in.	

Groundwater Observations: 9 ft depth after 0 hours

Depth (ft)	Sample Type/No.	SAMPLES Blows on Sampler per 6 inches	Pen. (in.)	Rec. (in.)	RQD %	Casing Blows per 6"	Generalized Strata Description	Material Description and Notes	Well Construction	Elevation (ft)
0							Asphalt			
							Embankment Fill			5
5										
										0
10										
							Organic Silt			-5
15										
										-10
20								End of Boring at 19' bgs.		
										-15
25										
										-20
30										

Sample type: S = Split Spoon C = Core UP = Undisturbed Piston V = Vane Shear Test

Proportions Used: Trace = 1-10%, Little = 10-20%, Some = 20-35%, And = 35-50%

Total Penetration in Earth: 19 ft Rock: 0 ft

No. of Soil Samples: 0 No. of Core Runs: 0

1. HSA refusal at 19' bgs due to possible boulder. Boring terminated at 19' bgs.
2. Upon completion, the boring was backfilled with excess drill cuttings and coldpatched at the surface.
3. Station values are based upon those shown along CT Rt. 2A on the "PD 30% Structure Plans_CT_RPE_0113-0108" dated 10/28/2016, and provided by CME Engineering, Inc.
4. Ground surface elevations were estimated from drawing "SV_D2_170_3250F_PRESTON_CT 2A OVER POQUETANUCK COVE BR02931 AND DICKERMANS BROOK BR02932_GRN" dated 2/16/2016.

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Connecticut DOT Boring Report

Driller:	Ray Cook	Town:	Preston, Connecticut	Hole No.:	B-2-4C
Inspector:	C. Gibb	Project No.:	113-107	Stat./Offset:	83+90.5/10.8'
Engineer:	M. Chartier	Route No.:	2A	Northing:	739105.93
Start Date:	05/16/2017 10:00 AM	Bridge No.:	02931	Easting:	1193116.20
Finish Date:	05/16/2017 10:40 AM			Surface Elevation:	8.3 NAVD88

Project Description: Preston Bridge No. 02931 over Poquetanuck Cove

Casing Size/Type: N/A	Sampler Type/Size: 1.5" Split Spoon Sampler	Core Barrel Type: N/A
Hammer Wt.: N/A Fall: N/A	Hammer Wt.: 140 lb. Fall: 30 in.	

Groundwater Observations: 9 ft depth after 0 hours

Depth (ft)	Sample Type/No.	SAMPLES: Blows on Sampler per 6 inches	Pen. (in.)	Rec. (in.)	RQD %	Casing Blows per 6"	Generalized Strata Description	Material Description and Notes	Well Construction	Elevation (ft)
0							Asphalt			
							Embankment Fill			5
5										
										0
10										
							Organic Silt			-5
15										
								End of Boring at 18' bgs.		-10
20										
										-15
25										
										-20
30										

Sample type: S = Split Spoon C = Core UP = Undisturbed Piston V = Vane Shear Test

Proportions Used: Trace = 1-10%, Little = 10-20%, Some = 20-35%, And = 35-50%

Total Penetration in Earth: 19 ft Rock: 0 ft

No. of Soil Samples: 0 No. of Core Runs: 0

1. HSA refusal at 18' bgs due to possible boulder. Boring terminated at 18' bgs.
2. Upon completion, the boring was backfilled with excess drill cuttings and coldpatched at the surface.
3. Station values are based upon those shown along CT Rt. 2A on the "PD 30% Structure Plans_CT_RPE_0113-0108" dated 10/28/2016, and provided by CME Engineering, Inc.
4. Ground surface elevations were estimated from drawing "SV_D2_170_3250F_PRESTON_CT 2A OVER POQUETANUCK COVE BR02931 AND DICKERMANS BROOK BR02932_GRN" dated 2/16/2016.

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Connecticut DOT Boring Report

Driller:	Ray Cook			Hole No.:	B-2-4D
Inspector:	C. Gibb	Town:	Preston, Connecticut	Stat./Offset:	83+81.5/10.8'
Engineer:	M. Chartier	Project No.:	113-107	Northing:	739105.93
Start Date:	05/16/2017 10:50 AM	Route No.:	2A	Easting:	1193107.20
Finish Date:	05/17/2017 2:00 PM	Bridge No.:	02931	Surface Elevation:	8.1 NAVD88

Project Description: Preston Bridge No. 02931 over Poquetanuck Cove

Casing Size/Type: 3" ID HSA	Sampler Type/Size: 1.5" Split Spoon Sampler	Core Barrel Type: N/A
Hammer Wt.: N/A Fall: N/A	Hammer Wt.: 140 lb. Fall: 30 in.	

Groundwater Observations: 11 ft depth after 0 hours

Depth (ft)	Sample Type/No.	SAMPLES: Blows on Sampler per 6 inches	Pen. (in.)	Rec. (in.)	RQD %	Casing Blows per 6"	Generalized Strata Description	Material Description and Notes	Well Construction	Elevation (ft)
0										
5										5
10										0
15										-5
20										-10
										-15
25	S-1	50 50/1"*	7	11			Terrace Deposit	S-1: Brown c-f SAND, some Silt, trace c-f Gravel, very dense, wet		
										-20
30										

Sample type: S = Split Spoon C = Core UP = Undisturbed Piston V = Vane Shear Test

Proportions Used: Trace = 1-10%, Little = 10-20%, Some = 20-35%, And = 35-50%

Total Penetration in Earth: 52.3 ft Rock: 0 ft

No. of Soil Samples: 7 No. of Core Runs: 0

* Sample overdriven w/ 300# hammer to obtain more recovery. Blows from 300# hammer not indicated in log.
1. Due to difficulty of drilling, 3" ID HSA was used instead of drive and wash method. Boring terminated at 52.3' bgs.
2. Upon completion, the boring was backfilled with excess drill cuttings and grouted at the surface.
3. Station values are based upon those shown along CT Rt. 2A on the "PD 30% Structure Plans_CT_RPE_0113-0108" dated 10/28/2016, and provided by CME Engineering, Inc.
4. Ground surface elevations were estimated from drawing "SV_D2_170_3250F_PRESTON_CT 2A OVER POQUETANUCK COVE BR02931 AND DICKERMANS BROOK BR02932_GRN" dated 2/16/2016.

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Driler:	Ray Cook	**Connecticut DOT Boring Report**		Hole No.:	B-2-4D
Inspector:	C. Gibb	Town:	Preston, Connecticut	Stat./Offset:	83+81.5/10.8'
Engineer:	M. Chartier	Project No.:	113-107	Northing:	739105.93
Start Date:	05/16/2017 10:50 AM	Route No.:	2A	Easting:	1193107.20
Finish Date:	05/17/2017 2:00 PM	Bridge No.:	02931	Surface Elevation:	8.1 NAVD88

Project Description: Preston Bridge No. 02931 over Poquetanuck Cove

Casing Size/Type: 3" ID HSA	Sampler Type/Size: 1.5" Split Spoon Sampler	Core Barrel Type: N/A
Hammer Wt.: N/A Fall: N/A	Hammer Wt.: 140 lb. Fall: 30 in.	

Groundwater Observations: 11 ft depth after 0 hours

Depth (ft)	Sample Type/No.	Blows on Sampler per 6 inches	Pen. (in.)	Rec. (in.)	RQD %	Casing Blows per 6"	Generalized Strata Description	Material Description and Notes	Well Construction	Elevation (ft)
30	S-2	50/0"*	0	0				S-2: No Recovery		
	S-3	57 56 50/4"	16	11				S-3: Brown to black c-f SAND, some c-f Gravel, some Silt, very dense, wet		-25
35	S-4	50/1"*	1	4				S-4: Dark brown c-f SAND, some c-f Gravel, some Silt, very dense, wet		-30
40	S-5	50/5"*	5	6				S-5: Gray to black m-f GRAVEL, some c-f Sand, some Silt, very dense, wet		-35
45	S-6	50/2"*	2	3				S-6: Brown c-f SAND, some c-f Gravel, some Silt, very dense, wet		-40
50	S-7	50/5"*	5	8				S-7: Brown c-f SAND, little fine Gravel, little Silt, very dense, wet		
								End of Boring at 52.3' bgs.		-45
55										-50
60										

Sample type: S = Split Spoon C = Core UP = Undisturbed Piston V = Vane Shear Test

Proportions Used: Trace = 1-10%, Little = 10-20%, Some = 20-35%, And = 35-50%

Total Penetration in Earth: 52.3 ft Rock: 0 ft

No. of Soil Samples: 7 No. of Core Runs: 0

* Sample overdriven w/ 300# hammer to obtain more recovery. Blows from 300# hammer not indicated in log.
1. Due to difficulty of drilling, 3" ID HSA was used instead of drive and wash method. Boring terminated at 52.3' bgs.
2. Upon completion, the boring was backfilled with excess drill cuttings and grouted at the surface.
3. Station values are based upon those shown along CT Rt. 2A on the "PD 30% Structure Plans_CT_RPE_0113-0108" dated 10/28/2016, and provided by CME Engineering, Inc.
4. Ground surface elevations were estimated from drawing "SV_D2_170_3250F_PRESTON_CT 2A OVER POQUETANUCK COVE BR02931 AND DICKERMANS BROOK BR02932_GRN" dated 2/16/2016.

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Connecticut DOT Boring Report

Driller:	Ray Cook	Town:	Preston, Connecticut	Hole No.:	B-2-5
Inspector:	C. Gibb	Project No.:	113-107	Stat./Offset:	83+62.0/-4.2'
Engineer:	M. Chartier	Route No.:	2A	Northing:	739120.89
Start Date:	05/05/2017 11:00 AM	Bridge No.:	02931	Easting:	1193087.60
Finish Date:	05/05/2017 2:30 PM			Surface Elevation:	7.7 NAVD88

Project Description: Preston Bridge No. 02931 over Poquetanuck Cove

Casing Size/Type: HW 4"	Sampler Type/Size: 1.5" SS/3" ID Standard ST	Core Barrel Type: N/A
Hammer Wt.: 300 lb. Fall: 24 in.	Hammer Wt.: 140 lb. Fall: 30 in.	

Groundwater Observations: Open Channel Water Levels Encountered

Depth (ft)	Sample Type/No.	Blows on Sampler per 6 inches	Pen. (in.)	Rec. (in.)	RQD %	Casing Blows per 6"	Generalized Strata Description	Material Description and Notes	Well Construction	Elevation (ft)
0						Casing Dropped 0' to 10'	Asphalt			
							Concrete			5
5										0
10	S-1	8 6 9 6	24	8		1 1 2 1	Alluvial Deposit	S-1: Black c-f SAND, some fine Gravel, little Silt, medium dense, wet		
	S-2		24	12		3 3 2 2	Organic Silt	S-2: Black ORGANIC SILT, wet (Shelby Tube)		-5
15	S-3	WOR WOR WOR WOR	24	1		1 3 3 5		S-3: Black to dark brown ORGANIC SILT, some c-f Sand, loose, wet		
	S-4A/B	3 4 50/4"	16	11*		1 2 5 10		S-4A: Black to dark brown ORGANIC SILT, trace fine Sand, loose to very dense, wet S-4B: Boulder fragments from split spoon tip		-10
						50 100 75 100	Boulder			
20	S-5	21 50/3"	9	14*		50 30 40 80	Terrace Deposit	S-5: Brown to tan c-f SAND, some c-f Gravel, some Silt, very dense, wet		
						50 60 50 50 60 40				-15
25	S-6	50/5"	5	5*		20 50 60 60		S-6: Brown to dark gray c-f SAND, some c-f Gravel, some Silt, very dense, wet		
						50 60 50 70 90 80				-20
30										

Sample type: S = Split Spoon C = Core UP = Undisturbed Piston V = Vane Shear Test

Proportions Used: Trace = 1-10%, Little = 10-20%, Some = 20-35%, And = 35-50%

Total Penetration in Earth: 35.5 ft Rock: 0 ft	* Sample overdriven w/ 300# hammer to obtain more recovery. Blows from 300# hammer not indicated in log. 1. Casing refusal at 34' bgs due to damaged casing. Boring terminated at 35.5' bgs. 2. Upon completion, the boring was backfilled with excess drill cuttings and grouted at the surface. 3. Station values are based upon those shown along CT Rt. 2A on the "PD 30% Structure Plans_CT_RPE_0113-0108" dated 10/28/2016, and provided by CME Engineering, Inc. 4. Ground surface elevations were estimated from drawing "SV_D2_170_3250F_PRESTON_CT 2A OVER POQUETANUCK COVE BR02931 AND DICKERMANS BROOK BR02932_GRN" dated 2/16/2016.	Sheet 1 of 2
No. of Soil Samples: 9 No. of Core Runs: 0		SM-001-M REV. 1/02

Connecticut DOT Boring Report

Driller:	Ray Cook			Hole No.:	B-2-5
Inspector:	C. Gibb	Town:	Preston, Connecticut	Stat./Offset:	83+62.0/-4.2'
Engineer:	M. Chartier	Project No.:	113-107	Northing:	739120.89
Start Date:	05/05/2017 11:00 AM	Route No.:	2A	Easting:	1193087.60
Finish Date:	05/05/2017 2:30 PM	Bridge No.:	02931	Surface Elevation:	7.7 NAVD88

Project Description: Preston Bridge No. 02931 over Poquetanuck Cove

Casing Size/Type:	HW 4"	Sampler Type/Size:	1.5" SS/3" ID Standard ST	Core Barrel Type:	N/A
Hammer Wt.: 300 lb.	Fall: 24 in.	Hammer Wt.: 140 lb.	Fall: 30 in.		

Groundwater Observations: Open Channel Water Levels Encountered

Depth (ft)	Sample Type/No.	SAMPLES: Blows on Sampler per 6 inches	Pen. (in.)	Rec. (in.)	RQD %	Casing Blows per 6"	Generalized Strata Description	Material Description and Notes	Well Construction	Elevation (ft)
30										
	S-7	19 36 50/5"	17	6		70 60 100 70 80 100 70 300		S-7: Brownish gray to gray c-f SAND, some c-f Gravel, trace Silt, very dense, wet		-25
35	S-8	50/5"	5	3*				S-8: Brownish gray m-f GRAVEL and c-f SAND, some Silt, very dense, wet		
								End of Boring at 35.5' bgs. Boring terminated due to damaged casing.		-30
40										-35
45										-40
50										-45
55										-50
60										

Sample type: S = Split Spoon C = Core UP = Undisturbed Piston V = Vane Shear Test

Proportions Used: Trace = 1-10%, Little = 10-20%, Some = 20-35%, And = 35-50%

Total Penetration in Earth: 35.5 ft Rock: 0 ft

No. of Soil Samples: 9 No. of Core Runs: 0

* Sample overdriven w/ 300# hammer to obtain more recovery. Blows from 300# hammer not indicated in log.
1. Casing refusal at 34' bgs due to damaged casing. Boring terminated at 35.5' bgs.
2. Upon completion, the boring was backfilled with excess drill cuttings and grouted at the surface.
3. Station values are based upon those shown along CT Rt. 2A on the "PD 30% Structure Plans_CT_RPE_0113-0108" dated 10/28/2016, and provided by CME Engineering, Inc.
4. Ground surface elevations were estimated from drawing "SV_D2_170_3250F_PRESTON_CT 2A OVER POQUETANUCK COVE BR02931 AND DICKERMANS BROOK BR02932_GRN" dated 2/16/2016.

SM-001-M REV. 1/02

Connecticut DOT Boring Report

Driller: Scott Marino	Town: Preston, Connecticut	Hole No.: B-2-6	
Inspector: R. Lavorati	Project No.: 113-107	Stat./Offset: 83+76.5/-10.9'	
Engineer: M. Chartier	Route No.: 2A	Northing: 739127.58	
Start Date: 12/12/18 9:35 AM	Bridge No.: 02931	Easting: 1193102.09	
Finish Date: 12/12/18 12:20 PM		Surface Elevation: 8.0 NAVD88	

Project Description: Preston Bridge No. 02931 over Poquetanuck Cove

Casing Size/Type: HW 4"	Sampler Type/Size: 1.5" SS	Core Barrel Type: NX
Hammer Wt.: 300 lb. Fall: 30 in.	Hammer Wt.: 140 lb. Fall: 30 in.	

Groundwater Observations: Not measured

Depth (ft)	Sample Type/No.	SAMPLES: Blows on Sampler per 6 inches	Pen. (in.)	Rec. (in.)	RQD %	Casing Blows per 6"	Generalized Strata Description	Material Description and Notes	Well Construction	Elevation (ft)
0						Spun casing	Fill	Spun casing to 10' bgs. Hammered casing from 10' bgs to 13' bgs.		
5										5
10						5, 5, 5, 5, 10, 50				0
13	C-1	4.3 2.3	24	17	71		Granite	C-1: gray/black/pink GRANTE Suspected abutment footing @ 13'		-5
15	S-1	8 22 40 14	24	12			Terrace	S-1: brown/black m-f SAND, some Silt, very dense, moist (fall in)		
17	S-2	16 18 18 50/5"	24	18				S-2: broan/tan SAND, some silt, some gravel, dense, moist		-10
20								End of Boring @ 19' bgs.		
25										-15
30										-20

Sample type: S = Split Spoon C = Core UP = Undisturbed Piston V = Vane Shear Test

Proportions Used: Trace = 1-10%, Little = 10-20%, Some = 20-35%, And = 35-50%

Total Penetration in Earth: 17.5 ft. Rock: 1.5' Rock	1. Core barrel advance times are given in the "Blows on Sampler per 6 inches" column in minutes per foot. Boring terminated at 19' bgs. 2. Upon completion, the boring was backfilled with grout and excess drill cuttings and grouted at the surface. The boring was sealed on 12/14/18. 3. Station values are based upon those shown along CT Rt. 2A on the "PD 30% Structure Plans_CT_RPE_0113-0108" dated 10/28/2016, and provided by CME Engineering, Inc. 4. Ground surface elevations were estimated from drawing "SV_D2_170_3250F_PRESTON_CT 2A OVER POQUETANUCK COVE BR02931 AND DICKERMANS BROOK BR02932_GRN" dated 2/16/2016.	Sheet 1 of 1
No. of Soil Samples: 2 No. of Core Runs: 1		SM-001-M REV. 1/02

Connecticut DOT Boring Report

Driller:	Scott Marino			Hole No.:	B-2-7A
Inspector:	R. Lavorati	Town:	Preston, Connecticut	Stat./Offset:	83+57.3/-9.5'
Engineer:	M. Chartier	Project No.:	113-107	Northing:	739126.23
Start Date:	12/14/18 9:25 AM	Route No.:	2A	Easting:	1193082.89
Finish Date:	12/14/18 10:45 AM	Bridge No.:	02931	Surface Elevation:	7.4 NAVD88

Project Description: Preston Bridge No. 02931 over Poquetanuck Cove

Casing Size/Type: HW 4"	Sampler Type/Size: 1.5" SS	Core Barrel Type: NX
Hammer Wt.: 300 lb. Fall: 30 in.	Hammer Wt.: 140 lb. Fall: 30 in.	

Groundwater Observations: Not measured

Depth (ft)	Sample Type/No.	Blows on Sampler per 6 inches	Pen. (in.)	Rec. (in.)	RQD %	Casing Blows per 6"	Generalized Strata Description	Material Description and Notes	Well Construction	Elevation (ft)
0–14						2, 2, 1, 1, 2, 1, 2, 2, 1, 1, 2, 2, 1, 1, 2, 2, 2, 2, 2, 1, 1, 2, 3, 2, 3, 2, 2, 50	Fill	Solid stem augered to 10' bgs. Hammered casing to 14' bgs. Color changed from brown with wood chips to black		
14–15.5	C-1	2.3 4.5	18	10	0		Concrete	C-1: gray/white CONCRETE		
15.5	~~C-1A~~	~~5.2~~	~~0~~	~~4.5~~	~~0~~			C-1A: gray/white CONCRETE (leftover material from previous run) Metal shavings encountered in return fluid from coring C-1A End of Boring @ 15.5'		

Depth scale (ft): 0, 5, 10, 15, 20, 25, 30

Elevation scale (ft): 5, 0, -5, -10, -15, -20

Sample type: S = Split Spoon C = Core UP = Undisturbed Piston V = Vane Shear Test

Proportions Used: Trace = 1-10%, Little = 10-20%, Some = 20-35%, And = 35-50%

Total Penetration in Earth: 14 ft. Rock: 1.5' Conc.	1. Core barrel advance times are given in the "Blows on Sampler per 6 inches" column in minutes per foot. Boring terminated at 15.5' bgs. 2. Upon completion, the boring was backfilled with grout to the surface. The boring was sealed on 12/14/18. 3. Station values are based upon those shown along CT Rt. 2A on the "PD 30% Structure Plans_CT_RPE_0113-0108" dated 10/28/2016, and provided by CME Engineering, Inc. 4. Ground surface elevations were estimated from drawing "SV_D2_170_3250F_PRESTON_CT 2A OVER POQUETANUCK COVE BR02931 AND DICKERMANS BROOK BR02932_GRN" dated 2/16/2016. 5. While coring C-1A, NEBC and GCC noticed metal cuttings in the return fluid. Boring terminated and offset north.	Sheet 1 of 1
No. of Soil Samples: 0 No. of Core Runs: 1		SM-001-M REV. 1/02

Connecticut DOT Boring Report

Driller:	Scott Marino	Town:	Preston, Connecticut	Hole No.:	B-2-7B
Inspector:	R. Lavorati	Project No.:	113-107	Stat./Offset:	83+57.4/-10.5
Engineer:	M. Chartier	Route No.:	2A	Northing:	739127.23
Start Date:	12/14/18 9:25 AM	Bridge No.:	02931	Easting:	1193083.06
Finish Date:	12/14/18 10:45 AM			Surface Elevation:	7.4 NAVD88

Project Description: Preston Bridge No. 02931 over Poquetanuck Cove

Casing Size/Type: HW 4"	Sampler Type/Size: 1.5" SS	Core Barrel Type: NX
Hammer Wt.: 300 lb. Fall: 30 in.	Hammer Wt.: 140 lb. Fall: 30 in.	

Groundwater Observations: Not measured

Depth (ft)	Sample Type/No.	SAMPLES: Blows on Sampler per 6 inches	Pen. (in.)	Rec. (in.)	RQD %	Casing Blows per 6"	Generalized Strata Description	Material Description and Notes	Well Construction	Elevation (ft)
0						2, 2, 1, 1, 2, 1, 2, 2, 1, 1, 2, 2, 1, 1, 2, 2, 2, 2, 2, 1, 1, 2, 3, 2, 3, 2, 2, 50	Fill	Solid stem augered to 10' bgs. Hammered casing to 14' bgs.		5, 0, -5
								Color changed from brown to black		
15	C-1	4.1 1.3	18	14	28		Concrete	C-1: gray/black/blue CONCRETE, metal shavings encountered in return fluid		
	C-1A	4.5 0.1	12	1	0			C-1A: black/gray REBAR		
	S-1	6 50/0"	5	5			ML	S-1: brown/black SILT, moist		-10
	C-2	3.2 2.1 3.3 0.9	48	36	63		Boulders	C-2: gray/black/pink GRANITE		
20	S-2	33 50/5"	11	6			Terrace	S-2: brown/tan c-f SAND, some fine gravel, some silt, very dense, moist		
	S-3	24 50/4"	10	4				S-3: brown/tan c-f SAND, some fine gravel, some silt, very dense, moist		-15
	S-4	17 33 50/3"	15	7				S-4: brown/tan c-f SAND, some fine gravel, some silt, very dense, moist		
25								Bottom of Boring @ 24'		-20
30										

Sample type: S = Split Spoon C = Core UP = Undisturbed Piston V = Vane Shear Test

Proportions Used: Trace = 1-10%, Little = 10-20%, Some = 20-35%, And = 35-50%

Total Penetration in Earth: 18'	Rock: 2' Conc./4' Rock	1. Core barrel advance times are given in the "Blows on Sampler per 6 inches" column in minutes per foot. Boring terminated at 24' bgs. 2. Upon completion, the boring was backfilled with grout to the surface. The boring was sealed on 12/14/18. 3. Station values are based upon those shown along CT Rt. 2A on the "PD 30% Structure Plans_CT_RPE_0113-0108" dated 10/28/2016, and provided by CME Engineering, Inc. 4. Ground surface elevations were estimated from drawing "SV_D2_170_3250F_PRESTON_CT 2A OVER POQUETANUCK COVE BR02931 AND DICKERMANS BROOK BR02932_GRN" dated 2/16/2016.	Sheet 1 of 1
No. of Soil Samples: 4	No. of Core Runs: 3		SM-001-M REV. 1/02

Client:	CME Associates	**Date:**	10/03/2018
Project:	220693 – CME Preston Bridges	**Weather:**	Partly Cloudy 65°F
Location:	Preston, CT	**On-Site:**	8:00 AM
Geocomp Field Representative:	Ryan Lavorati	**Off-Site:**	3:45 PM

Observed Construction Activities:
Meeting with test pit contractor at bridge 02931.
Started and finished test pits T-2-1 (northwest test pit), T-2-2 (northeast test pit), and T-2-4 (southeast test pit) at bridge 02931. Saw cut areas for test pits T-2-3 (southwest test pit) at bridge 02931, and T-1-1 (northwest test pit) and T-1-2 (northeast test pit) at bridge 02932.

Equipment on site:
Husqvarna Pavement Cutter
430F2 IT Excavator
Cusco Hydro Trencher Truck

Personnel on site:
Ryan Lavorati – Geocomp
Jose – Laydon Industries
5 Laydon Industries workers
2 State Police Officers
Mark Gardner – CME Associates
Corey Hutchings – Connecticut Department of Transportation

Field Observations:
Geocomp arrived onsite at bridge 02931 at approximately 8:00 AM. Laydon Industries was onsite before Geocomp arrived. Geocomp spoke with Laydon about the order of the test pits. We agreed to start with the northern test pits at bridge 02931, then move to the southern test pits at bridge 02931, then finish with the two test pits at bridge 02932. Laydon then started coordinating with the state police officers to cone off and provide traffic controls for the work. At 8:30 AM, Laydon started assembling equipment on the road.

At 8:45 AM, Laydon started to cut the asphalt for the test pits T-2-1 and T-2-2 based on markings provided by Geocomp. Mark Gardner from CME arrived onsite at approximately 9:00 AM. As Laydon started removing the asphalt from T-2-2, a former trolley rail was exposed in the excavation. Following the removal of the asphalt, the vacuum truck removed soil until the concrete bridge deck was exposed. Laydon then excavated soil until the back of the east abutment was located. The soil behind the abutment contained some asphalt. Photos and measurements were taken of the test pit. The exposed backface of the abutment was vertical.

After Geocomp and CME finished taking photos and measurements, Laydon moved to test pit T-2-1 to remove asphalt and excavate the soil at 9:30 AM. As Laydon started removing the asphalt, a former trolley rail was found on the southern side of the test pit. After the asphalt was removed, soil was excavated with the vacuum truck until the top of the bridge deck and the back of the west abutment was located. An unreinforced concrete patch was encountered behind the concrete deck. The concrete patch blocked the view of the backside of the northwest abutment. Laydon looked beneath bridge deck, along the west abutment. At 10:36, CME decided to remove the unreinforced concrete behind the abutment to expose the back of the northwest abutment. After the concrete was removed, Laydon continued to use the vacuum truck to remove soil. Once the back of the northwest abutment was exposed, photos and measurements were taken of the test pit. The exposed backface of the northwest abutment was vertical. After Geocomp and CME finished with taking photos and measurements, Laydon started bringing in equipment to backfill the test pits.

At 11:45 AM, Laydon stopped for lunch. By 12:15 Laydon resumed work.

Each of the northern test pits at bridge 02931 were backfilled with imported soil and compacted. The test pits were then covered and capped with three lifts of compacted hot-asphalt totaling approximately 5 to 6 inches.

After the northern test pits were backfilled, compacted, and covered, Laydon moved equipment to the two southern test pits at bridge 02931. Laydon started to cut the asphalt for test pits T-2-3 and T-2-4. Corey Hutchings from ConnDOT arrived onsite at 1:30 PM. After the asphalt was cut and removed, the soil was vacuumed in test pit T-2-4 until the top of the bridge deck and the back of the southeast concrete abutment were exposed. Corey left at approximately 2:00 PM. Photos and measurements were taken of test pit T-2-4. The exposed backface of the southeast abutment appeared to have a 2.7V:1H across the test pit. There was also a 1/8" vertical crack running through the abutment and bridge deck. The crack spanned from the bottom of the test pit to the top of the deck. After Geocomp and CME finished taking photos and measurements, Laydon started to backfill test pit T-2-4 by 2:15 PM. At 2:25 PM, CME was off the site. Laydon told Geocomp that the DOT permit allows them to work on the road until 4:00 PM. Laydon did not want to risk opening another test pit given this time constraint. Laydon said they would backfill the current test pit, and then cut the asphalt for the two test pits at bridge 02932. Test pit T-2-4 was backfilled with imported soil and compacted. The test pit was then covered and capped in three lifts of compacted hot-asphalt, totaling approximately 5 to 6 inches.

At 3:00 PM, Geocomp moved to bridge 02932 to start marking out the locations of the test pits T-1-1 and T-1-2. By 3:12 PM, Laydon started to cut the asphalt of the test pits at bridge 02932. By 3:40 PM, Laydon was off the road and finishing packing up their equipment. Geocomp and Laydon were off site by 3:45 PM.

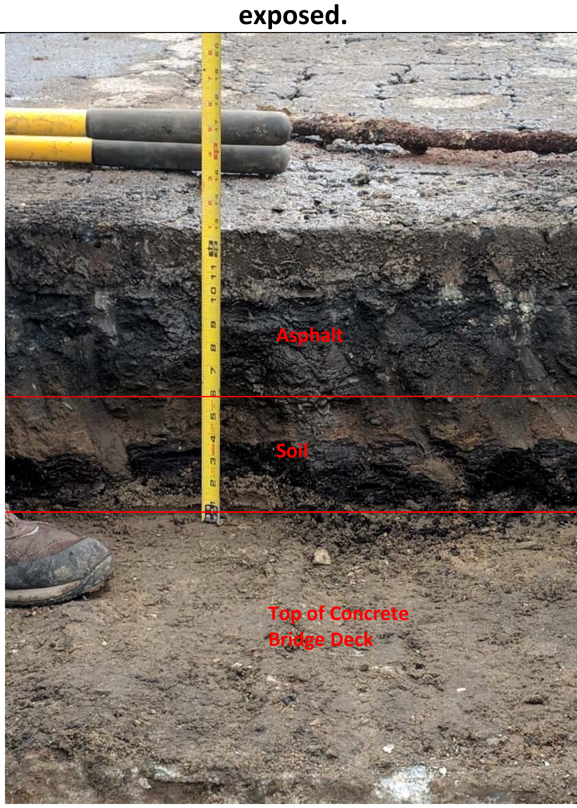
At 1:15 PM, Laydon said that they will come back Friday to finish the remaining test pits.

Refer to photos and test pit logs for additional details.

Photos and Attachments:

Bridge 02931, Test Pit T-2-1, facing south, looking down.
Top of exposed bridge deck, unreinforced concrete behind bridge deck, trolley rail exposed.

Bridge 02931, Test Pit T-2-1, facing west, looking down.
Test pit during vacuum excavation.

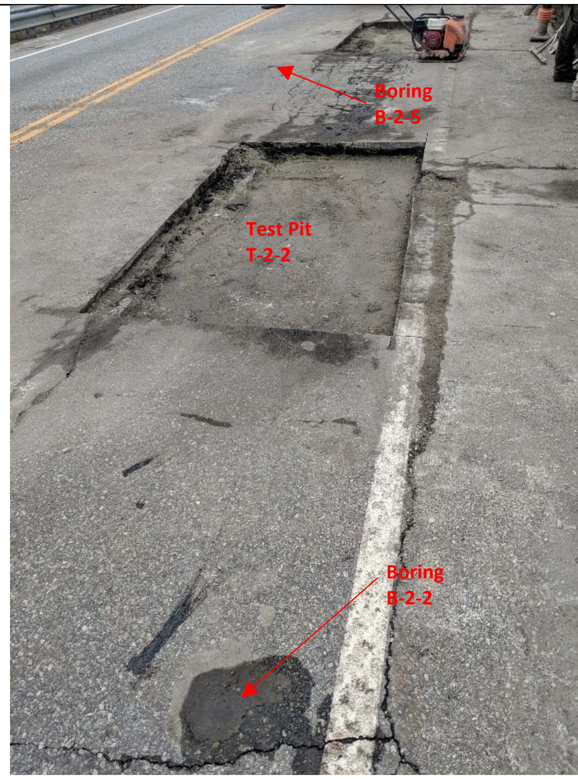


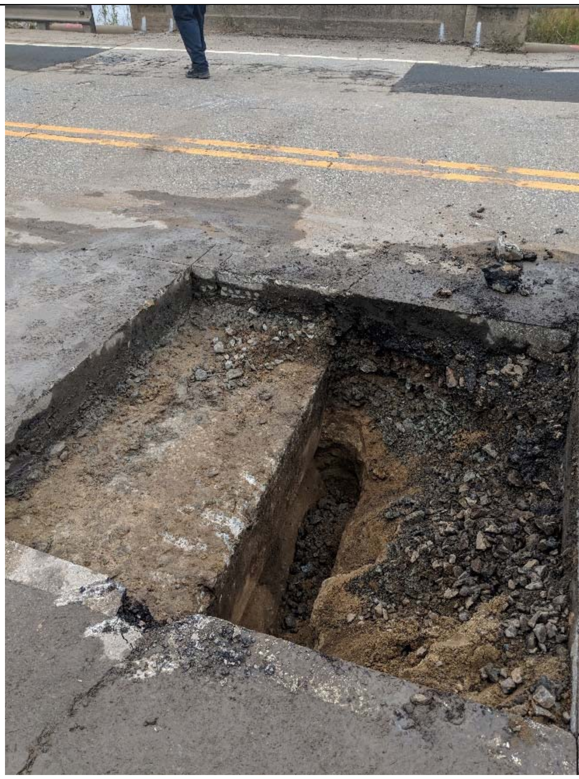
Bridge 02931, Test Pit T-2-1, facing east.
Thickness of asphalt and soil above bridge deck.

Bridge 02931, Test Pit T-2-1, facing east.
Thickness of bridge deck and depth of test pit.

 **Bridge 02931, Test Pit T-2-2, facing south, looking down.** **Back of the abutment and exposed rail line.**	 **Bridge 02931, Test Pit T-2-2, facing west.** **Thickness of asphalt and soil above bridge deck.**

 **Bridge 02931, Test Pit T-2-2, facing west, looking down.** **Depth of test pit.**	 **Bridge 02931, Test Pit T-2-2, facing west.** **Looking across test pit.**

	
Bridge 02931, Test Pit T-2-2, facing north, looking down. Test pit during excavation.	**Bridge 02931, Test Pit T-2-2 (foreground) and T-2-1 (background), facing west, looking down. Test pits in relation to borings B-2-3 (foreground) and B-2-5 (to the left of T-2-1).**

	
Bridge 02931, Test Pit T-2-4, facing north, looking down. Exposed bridge deck and back of abutment.	**Bridge 02931, Test Pit T-2-4, facing west, looking down. Crack running from bridge deck and through abutment.**

	
Bridge 02931, Test Pit T-2-4, facing south, looking down. Test pit during excavation.	**Bridge 02931, Test Pit T-2-4, facing west. Depth from bottom of test pit to the top of the concrete deck.**

 **Bridge 02932, Test Pit T-1-1 (foreground) and T-1-2 (background). General view of asphalt cuts.**	 **Bridge 02932, Test Pit T-1-2, facing north, looking down. General view of asphalt cut in relation to boring B-1-1.**

Client:	CME Associates	**Date:**	10/05/2018
Project:	220693 – CME Preston Bridges	**Weather:**	Sunny 65°F
Location:	Preston, CT	**On-Site:**	8:00 AM
Geocomp Field Representative:	Ryan Lavorati	**Off-Site:**	3:00 PM

Observed Construction Activities:
Meeting with test pit contractor at bridge 02931.
Started and finished test pits T-2-3 (southwest test pit) at bridge 02931, and T-1-1 (northwest test pit) and T-1-2 (northeast test pit) at bridge 02932.

Equipment on site:
Husqvarna Pavement Cutter
430F2 IT Excavator
Cusco Hydro Trencher Truck

Personnel on site:

Ryan Lavorati – Geocomp
Jose – Laydon Industries
5 Laydon Industries workers
2 State Police Officers
Mark Gardner – CME Associates
Gregory Roto – CME Associates
Corey Hutchings – Connecticut Department of Transportation

Field Observations:
Geocomp arrived onsite at bridge 02931 at approximately 8:00 AM. Laydon Industries onsite before Geocomp arrived. Geocomp spoke with Laydon about the order of the test pits. We agreed to start with the northern test pits at bridge 02932, then move to the last test pit at bridge 02931. Laydon then started coordinating with the state police officers to cone off and provide traffic controls for the work. At 8:30 AM, Laydon started assembling equipment on the road.

Laydon started to remove the asphalt for the test pits T-1-1 and T-1-2 based on previous saw cuts. Mark Gardner arrived onsite at approximately 9:00 AM. Laydon used a jackhammer on the asphalt at one end of each test pit to help the excavator remove the existing asphalt. Following the removal of the asphalt at test pit T-1-2, the vacuum truck and excavator removed soil until concrete bridge deck was exposed. Laydon then removed soil until the back of the northeast abutment was located. While CME and Geocomp were examining test pit T-1-2, Laydon used the vacuum truck to remove soil at test pit T-1-1. Photos and measurements were taken of test pits T-1-1 and T-1-2. The exposed backface of the northwest abutment in test pit T-1-1 appeared to have a 2.6V:1H slope across the test pit. The exposed backface of the northeast abutment in test pit T-1-2 appeared to have a 4.1V:1H slope across the test pit. By approximately 10:00 AM, CME and Geocomp finished taking measurements and photos, and Laydon started backfilling the two test pits. By approximately 11:48 AM, Laydon finished paving test pits T-1-1 and T-1-2. Each test pit was covered and capped with two lifts of compacted hot-asphalt totaling approximately 5 to 6 inches. At approximately 11:55 AM, Laydon moved equipment to bridge 02931.

Corey of ConnDOT arrived onsite at approximately 10:10 AM and was offsite at approximately 10:35 AM. Laydon stopped for lunch at approximately 12:07 PM, and resumed work at approximately 12:37 PM.

After the lunch break, Laydon started removing the asphalt at test pit T-2-3 at bridge T-2-3. After the asphalt was cut and removed, the soil was vacuumed in test pit T-2-3 until the top of the bridge deck and the back of the concrete southwest abutment were exposed. Photos and measurements were taken of test pit T-2-3. The exposed backface of the southwest abutment appeared to have a 2.5V:1H slope across the test pit. The exposed test pit revealed two cracks, one on the concrete bridge deck and one on the west abutment backface. The crack in the abutment backface became narrower with depth and extended to the bottom of the test pit. After Geocomp and CME finished taking photos and measurements, Laydon started to backfill test pit T-2-3 by approximately 1:45 PM. By approximately 2:40 PM, Laydon had finished backfilling, compacting, and paving. The test pit was covered and capped with two lifts of compacted hot-asphalt totaling approximately 5 to 6 inches. At approximately 2:50 PM, CME was off the site. By approximately 2:55 PM, Laydon was packing equipment and off road.

At approximately 1:15 AM, Gregory of CME Associates arrived onsite. Gregory said he was going to work with Mark to get photos and measurements beneath the bridge. At approximately 1:43 PM, Gregory and Mark made preparations to go beneath the bridge.

Geocomp was offsite at approximately 3:00 PM.

Refer to photos and test pit logs for additional details.

Photos and Attachments:

Bridge 02932, facing east, beneath bridge
Abutment face

Bridge 02932, facing west, beneath bridge
Abutment face

Bridge 02932, T-1-1, facing south
General view of depth of test pit

Bridge 02932, T-1-1, facing east
Thickness of existing asphalt above bridge deck

 **Bridge 02932, T-1-1, facing east** **Thickness of existing asphalt and soil above bridge deck**	 **Bridge 02932, facing east** **Length of bridge deck**

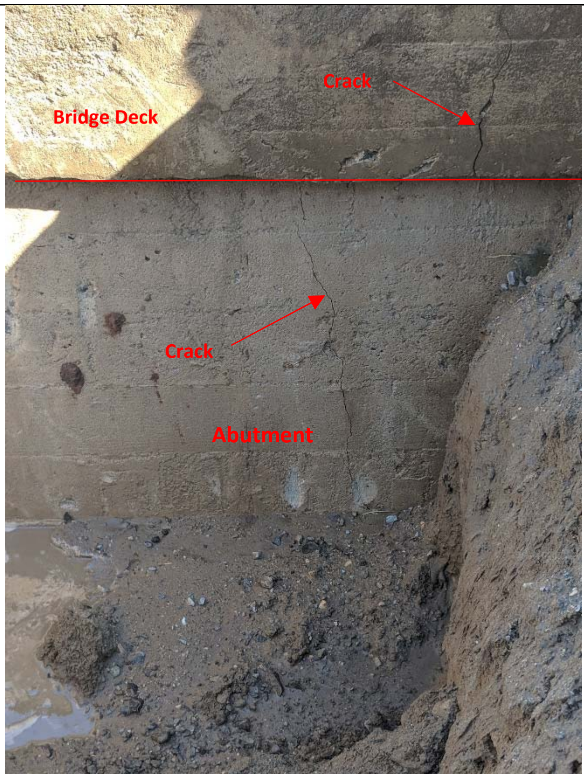
Bridge 02932, T-1-1, facing down
Water at bottom of Test Pit

Bridge 02932, T-1-2, facing northwest
General view of exposed bridge abutment and deck

 **Bridge 02932, T-1-2, facing northwest Thickness of bridge deck**	 **Bridge 02932, T-1-2, facing southeast Thickness of existing asphalt and soil above bridge deck**

 **Bridge 02931, facing west** **Cracks along western face of bridge**	 **Bridge 02931, T-2-3, facing east** **Vacuum excavating the test pit**

 **Bridge 02931, T-2-3, facing east** **Measuring the slope of the abutment**	 **Bridge 02931, T-2-3, facing north** **Thickness of existing asphalt and soil above bridge deck**



Bridge 02931, T-2-3, facing east
Cracks on exposed abutment and bridge decks

Geocomp

CALCULATIONS

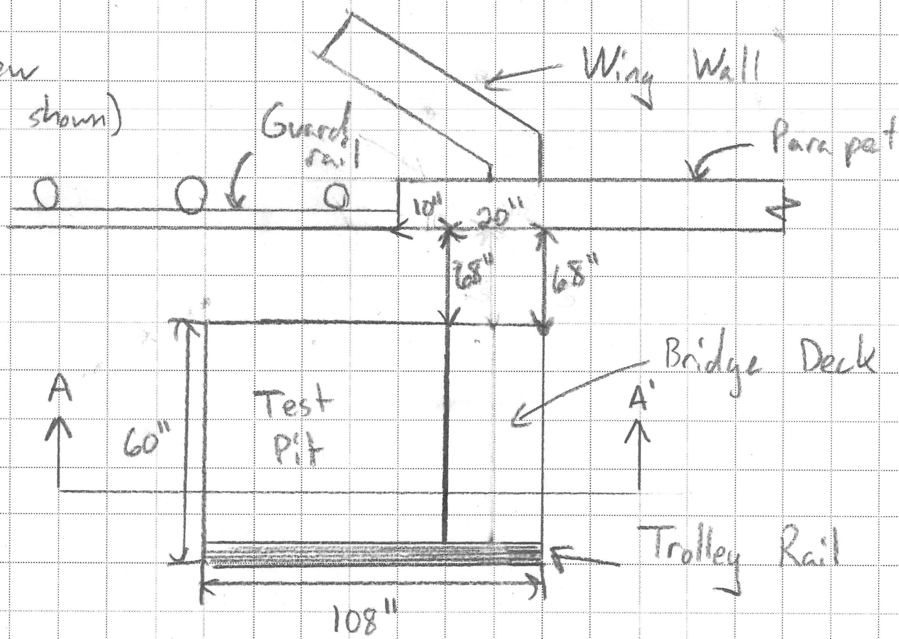
Job Number	220693
Sheet	3 of 6
Date	10/8/18
Computed By	RTL
Checked By	MC

Client: CME

Project: 220693- Preston Bridges

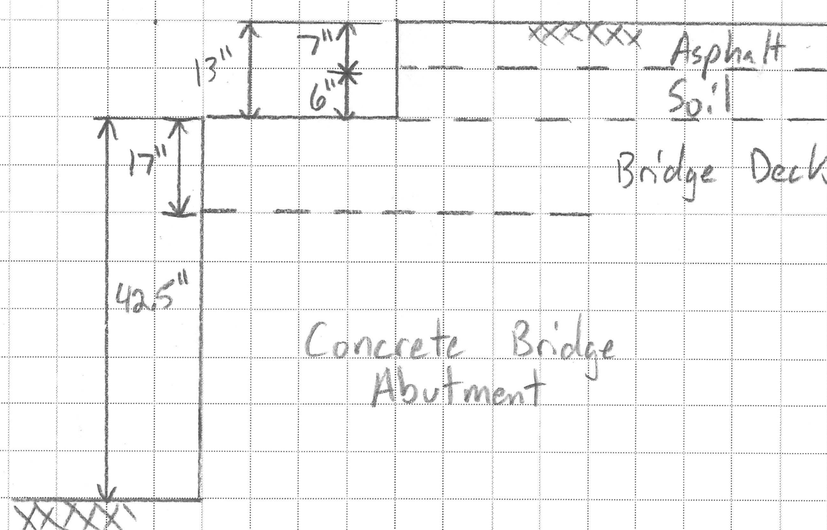
Subject: Test Pit T-2-1, Bridge 02931

Plan View
(scale as shown)



Units are in inches

Cross Section AA'
(scale as shown)



Units are in inches

Geocomp

CALCULATIONS

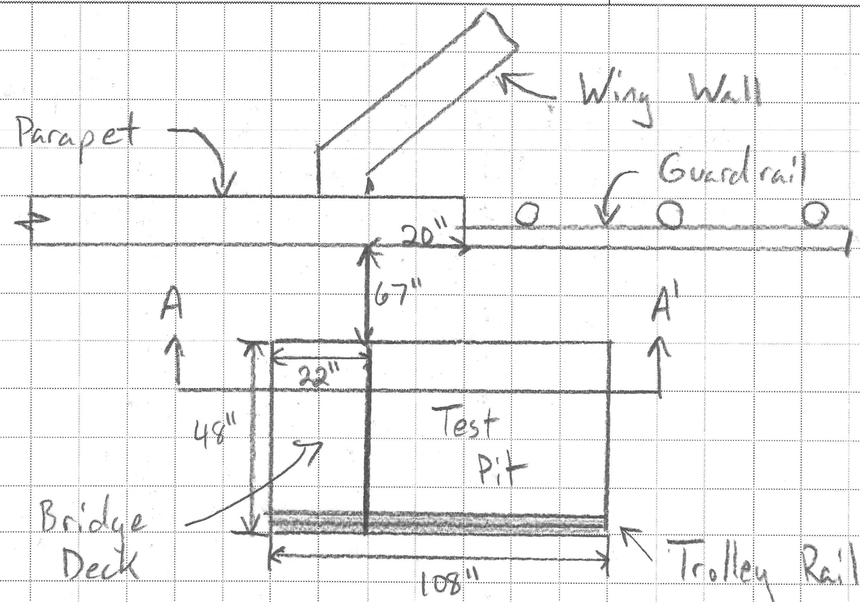
Job Number	220693
Sheet	4 of 6
Date	10/8/18
Computed By	RTL
Checked By	MC

Client: CME

Project: 220693 - Preston Bridges

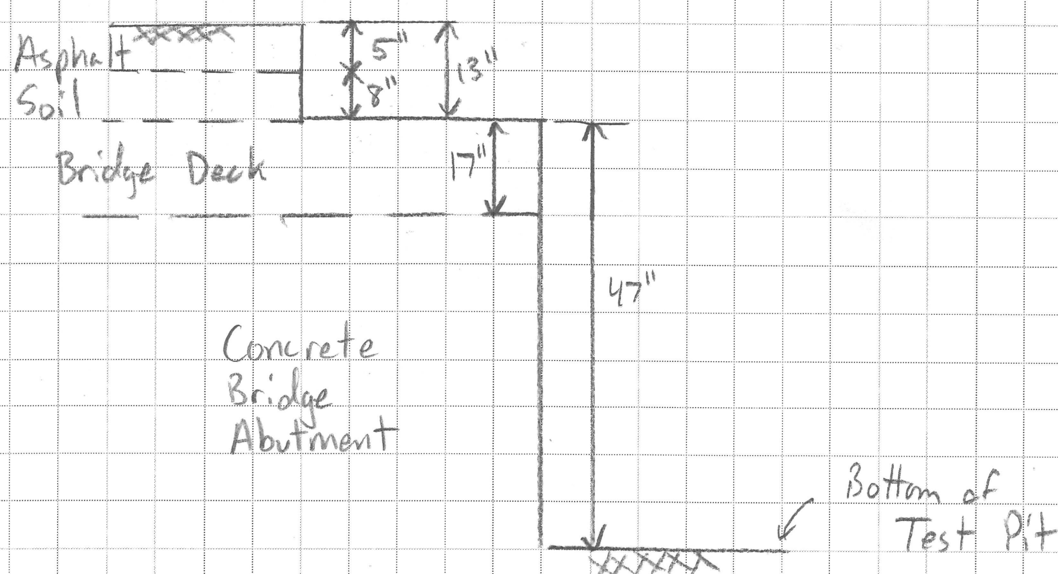
Subject: Test Pit T-2-2, Bridge 02931

Plan View
(scale as shown)



Units are in inches

Cross Section AA'
(scale as shown)



Units are in inches

Geocomp

CALCULATIONS

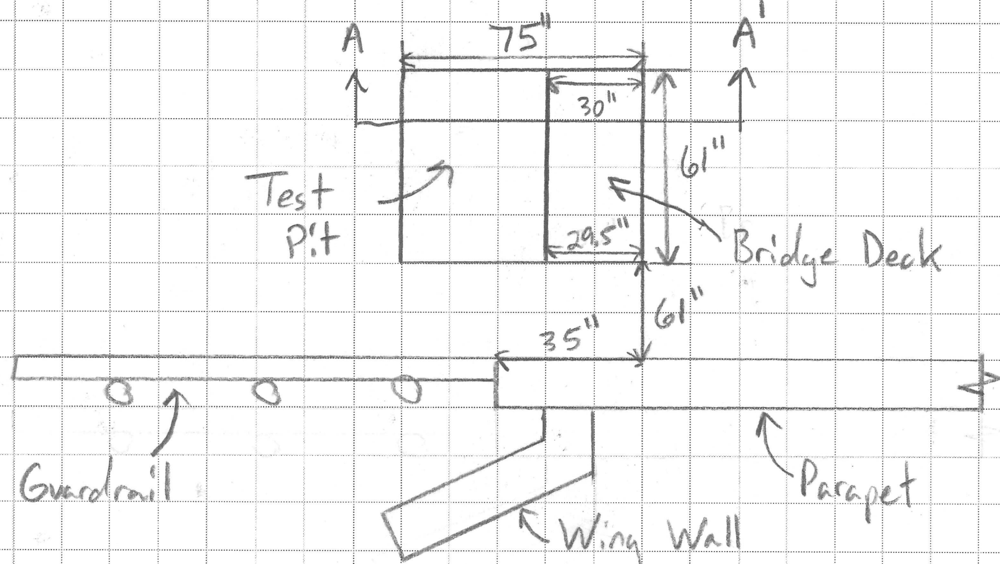
Job Number	220693
Sheet	5 of 6
Date	10/8/18
Computed By	RTL
Checked By	MC

Client: CME

Project: 220693 - Preston Bridges

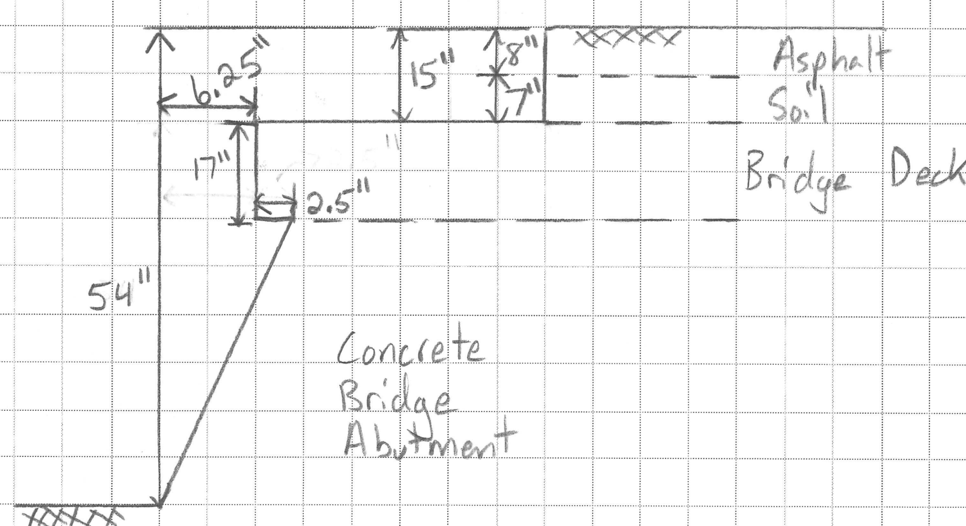
Subject: Test Pit T-2-3, Bridge 02931

Plan View
(scale as shown)



Units are in inches

Cross Section AA'
(scale as shown)



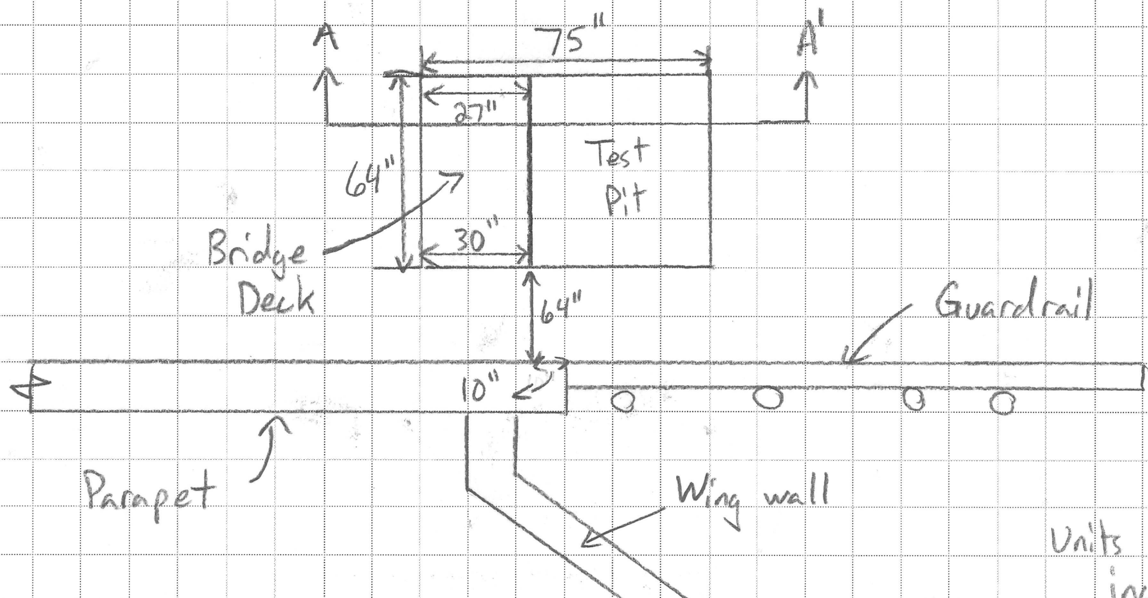
Units are in inches

Geocomp

CALCULATIONS

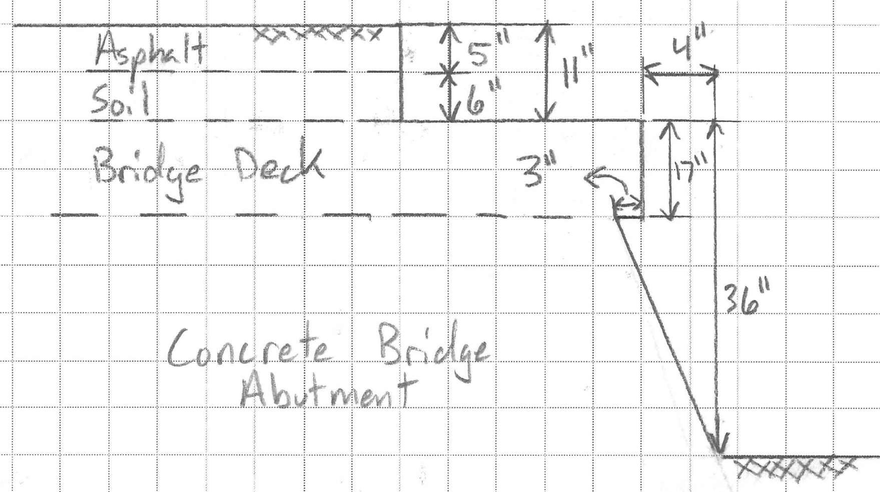
Client	CME	Job Number	220693
Project	220693 - Preston Bridges	Sheet	6 of 6
Subject	Test Pit T-2-4, Bridge 02931	Date	10/8/18
		Computed By	RTL
		Checked By	MC

Plan View
(scale as shown)



Units are in inches

Cross Section AA'
(scale as shown)



Units are in inches

Appendix C

Laboratory Test Results

Client:	Geocomp Consulting
Project Name:	Preston Bridge No. 02932
Project Location:	Preston, CT
GTX #:	305775
Test Date:	05/19/17
Tested By:	jbr
Checked By:	jdt

pH by AASHTO T 289

Boring ID	Sample ID	Depth, ft	Description	pH
B-2-5	S-4A	16-18	Moist, very dark brown silt	5.05

Notes:

Client:	Geocomp Consulting				
Project:	Preston Bridge No. 02932				
Location:	Preston, CT			Project No:	GTX-305775
Boring ID:	B-2-2B	Sample Type:	jar	Tested By:	cam
Sample ID:	S-2	Test Date:	05/17/17	Checked By:	jdt
Depth :	17-19 ft	Test Id:	411469		
Test Comment:	---				
Visual Description:	Moist, dark grayish brown silt with sand and organics				
Sample Comment:	---				

Moisture, Ash, and Organic Matter - ASTM D2974

Boring ID	**Sample ID**	**Depth**	**Description**	**Moisture Content,%**	**Ash Content,%**	**Organic Matter,%**
B-2-2B	S-2	17-19 ft	Moist, dark grayish brown silt with sand and organics	89	90.0	10.0

Notes: Moisture content determined by Method A and reported as a percentage of oven-dried mass;
dried to a constant mass at temperature of 105º C
Ash content and organic matter determined by Method C; dried to constant mass at temperature 440º C

Client:	Geocomp Consulting
Project Name:	Preston Bridge No. 02932
Project Location:	Preston, CT
GTX #:	305775
Test Date:	05/24/17
Tested By:	jbr
Checked By:	jdt

Minimum Laboratory Soil Resistivity by AASHTO T 288

Boring ID	Sample ID	Depth, ft.	Sample Description	Minimum Soil Resistivity, ohm-cm
B-2-5	S-4A	16-18	Moist, very dark brown silt	609

Comments: Test Equipment: Nilsson Model 400 Soil Resistance Meter, MC Miller Soil Box

Test conducted in standard laboratory atmosphere: 68-73 F

FUGRO CONSULTANTS, INC.

6100 HILLCROFT
PHONE (713) 369-5400

HOUSTON, TEXAS 77081
FAX (713) 369-5518

RESULTS OF TESTS

PROJECT:	**PRESTON BRIDGE (GTX 305775)** **SAMPLE ID: B-2-5, 16 – 18'**	**REPORT DATE:**	**05-17-17**
		CLIENT NUMBER:	
		JOB NUMBER:	**04.1115-0003**
FOR:	**GEOTESTING EXPRESS, INC.** **125 NAGOG PARK ACTION, MA 01720**	**REPORT NUMBER:**	
		DATE SAMPLED:	
		TIME SAMPLED:	
REPORTED TO:	**ETHAN MARRO**	**SAMPLED BY:**	**CLIENT**
		DATE RECEIVED:	**05-16-17**
		TIME RECEIVED:	**1430**
LAB NUMBER:	**0516052**	**RECEIVED BY:**	**SD**

PARAMETER	RESULTS	UNITS	METHOD	TIME/DATE	ANALYST
Sulfate, Soluble	617 *	mg/kg	AASHTO T 290	0900/05-17-17	SD
Chloride, Soluble	46 *	mg/kg	AASHTO T 291	1000/05-17-17	SD
Oxidation-Reduction Potential	135	mV	ASTM G-200	1030/05-17-17	SD

SO4CL 048-17-02

Respectfully submitted,

*** Dry weight basis**

Steve DeGregorio
Chemist

SD

**** WATER EXTRACTION PERFORMED BY USING A 1:10 RATIO OF SAMPLE AND REAGENT WATER FOLLOWED BY CENTRIFUGE AND VACUUME FILTRATION. THE WATER EXTRACT IS THEN ANALYZED USING THE ASTM D-512 AND D-516 METHODS.**

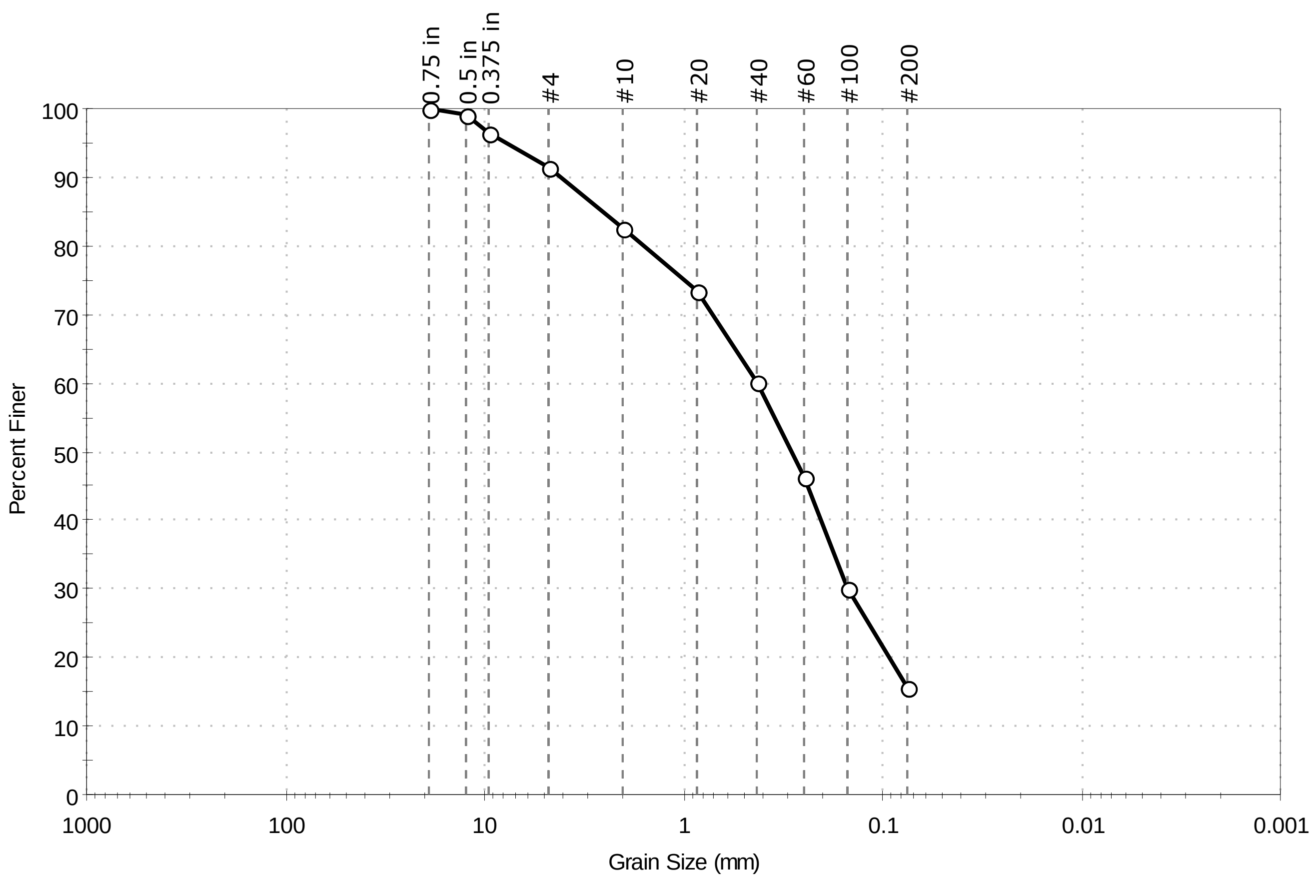
END OF REPORT

GeoTesting EXPRESS

Client:	Geocomp Consulting				
Project:	Preston Bridge No. 02932				
Location:	Preston, CT			Project No:	GTX-305775
Boring ID:	B-2-1	Sample Type:	jar	Tested By:	jbr
Sample ID:	S-2	Test Date:	05/17/17	Checked By:	jdt
Depth :	5-7 ft	Test Id:	411463		

Test Comment: ---
Visual Description: Moist, grayish brown silty sand
Sample Comment: ---

Particle Size Analysis - ASTM D422



% Cobble	% Gravel	% Sand	% Silt & Clay Size
---	8.6	75.7	15.7

Sieve Name	Sieve Size, mm	Percent Finer	Spec. Percent	Complies
0.75 in	19.00	100		
0.5 in	12.50	99		
0.375 in	9.50	96		
#4	4.75	91		
#10	2.00	83		
#20	0.85	73		
#40	0.42	60		
#60	0.25	46		
#100	0.15	30		
#200	0.075	16		

Coefficients

D_{85} =2.5137 mm D_{30} =0.1500 mm
D_{60} =0.4214 mm D_{15} =N/A
D_{50} =0.2874 mm D_{10} =N/A
C_u =N/A C_c =N/A

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

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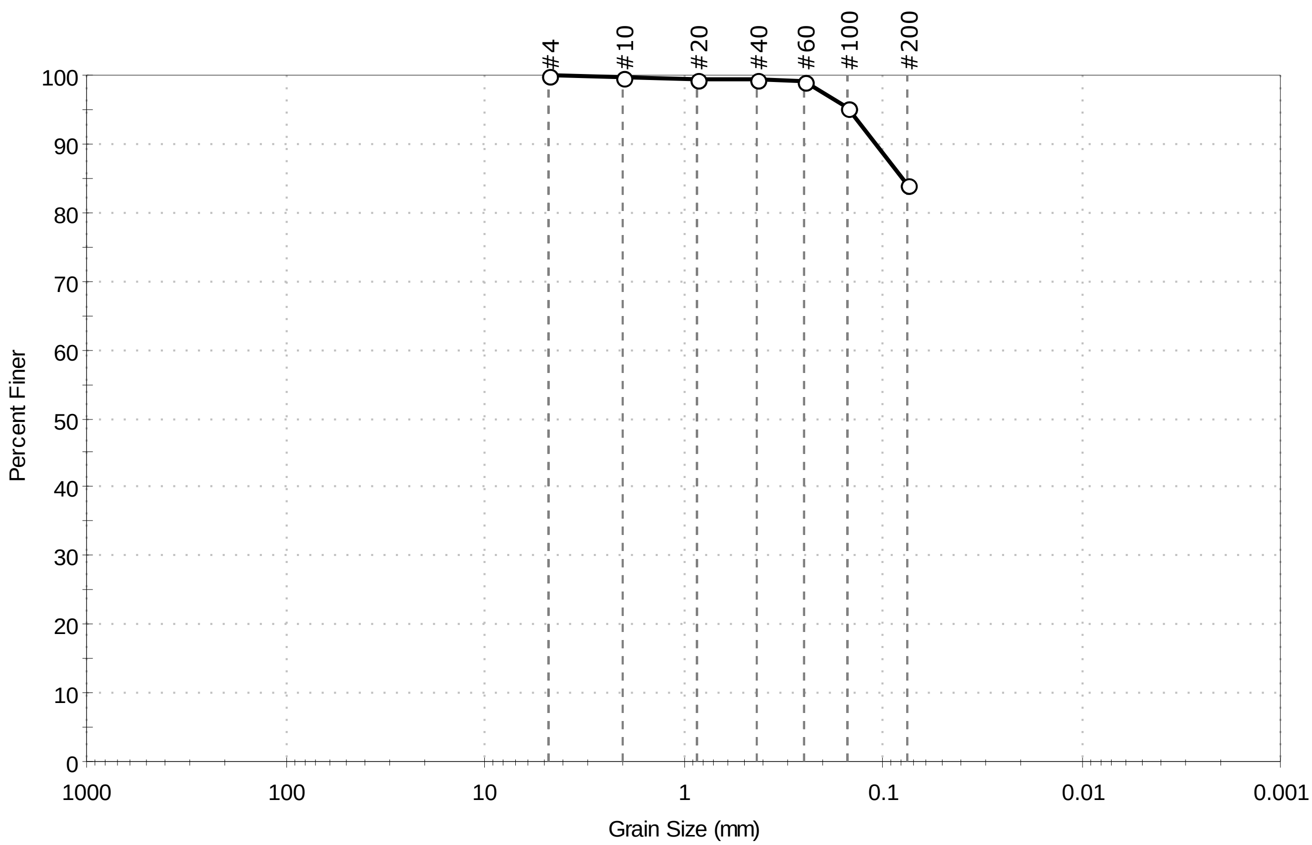
Client: Geocomp Consulting			
Project: Preston Bridge No. 02932			
Location: Preston, CT		Project No:	GTX-305775
Boring ID: B-2-1	Sample Type: jar	Tested By:	jbr
Sample ID: S-7	Test Date: 05/17/17	Checked By:	jdt
Depth : 30-32 ft	Test Id: 411464		
Test Comment: ---			
Visual Description: Moist, olive brown silt with sand			
Sample Comment: ---			

Particle Size Analysis - ASTM D422



% Cobble	% Gravel	% Sand	% Silt & Clay Size
---	0.0	16.0	84.0

Sieve Name	Sieve Size, mm	Percent Finer	Spec. Percent	Complies
#4	4.75	100		
#10	2.00	100		
#20	0.85	99		
#40	0.42	99		
#60	0.25	99		
#100	0.15	95		
#200	0.075	84		

Coefficients

D_{85} = 0.0796 mm D_{30} = N/A
D_{60} = N/A D_{15} = N/A
D_{50} = N/A 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 : ANGULAR

Sand/Gravel Hardness : HARD

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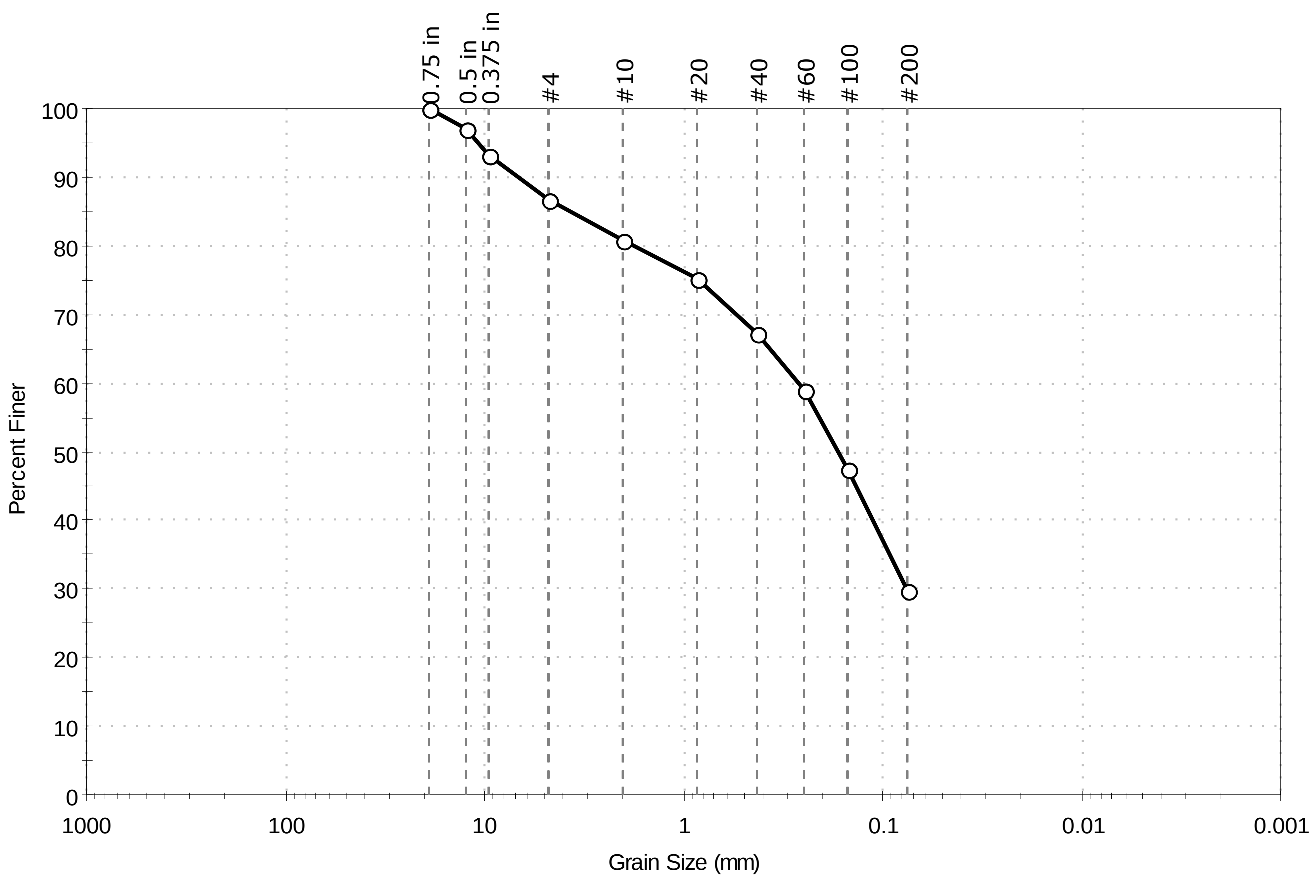
Client:	Geocomp Consulting		
Project:	Preston Bridge No. 02932		
Location:	Preston, CT	Project No:	GTX-305775
Boring ID:	B-2-2	Sample Type: jar	Tested By: jbr
Sample ID:	S-3/S-4	Test Date: 05/18/17	Checked By: jdt
Depth :	7-11 ft	Test Id: 411465	
Test Comment:	---		
Visual Description:	Moist, olive brown silty sand		
Sample Comment:	---		

Particle Size Analysis - ASTM D422



% Cobble	% Gravel	% Sand	% Silt & Clay Size
---	13.2	57.0	29.8

Sieve Name	Sieve Size, mm	Percent Finer	Spec. Percent	Complies
0.75 in	19.00	100		
0.5 in	12.50	97		
0.375 in	9.50	93		
#4	4.75	87		
#10	2.00	81		
#20	0.85	75		
#40	0.42	67		
#60	0.25	59		
#100	0.15	47		
#200	0.075	30		

Coefficients

D_{85} =3.6234 mm　D_{30} =0.0755 mm

D_{60} =0.2665 mm　D_{15} =N/A

D_{50} =0.1677 mm　D_{10} =N/A

C_u =N/A　C_c =N/A

Classification

ASTM　N/A

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

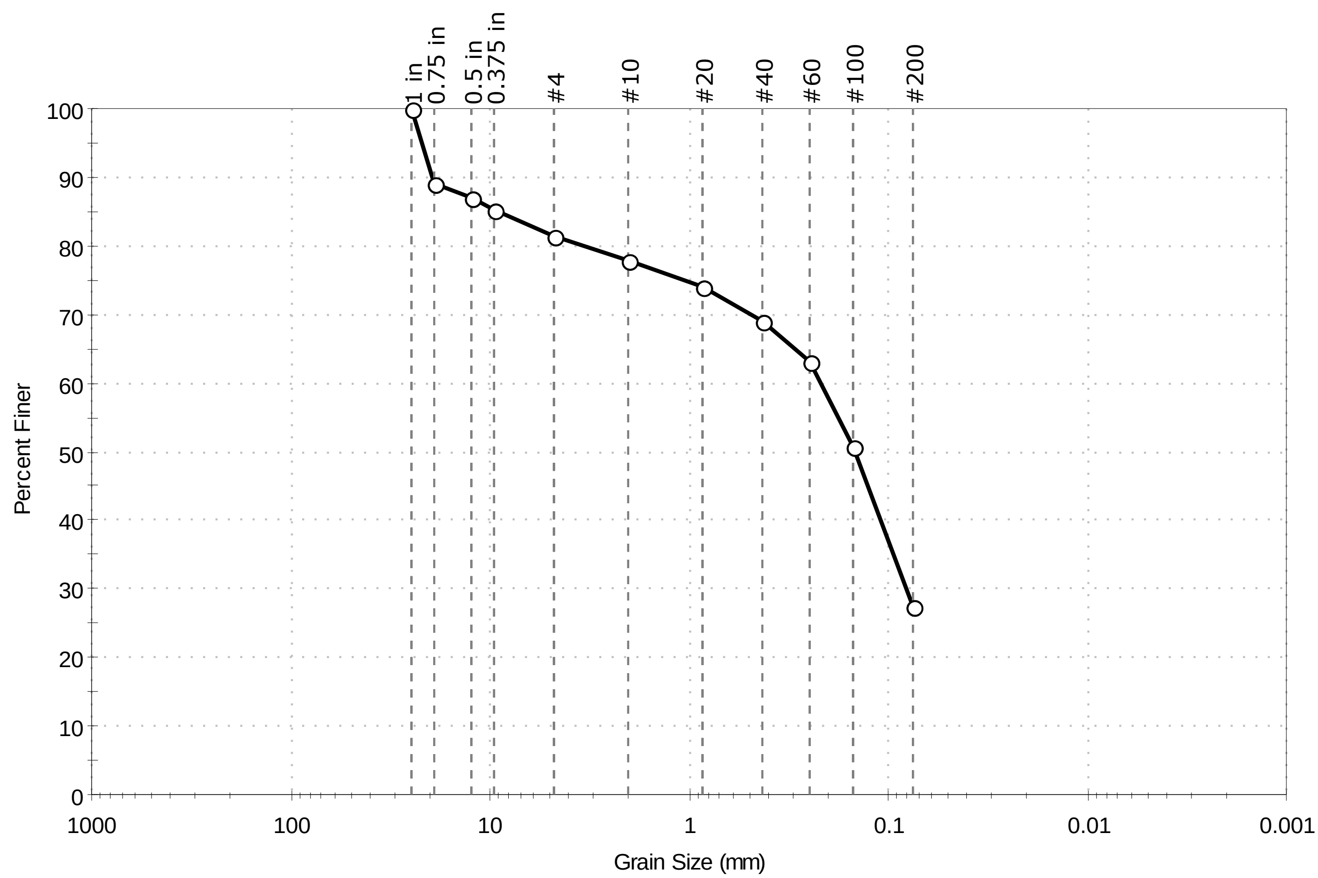
Sample/Test Description

Sand/Gravel Particle Shape : ANGULAR

Sand/Gravel Hardness : HARD

Client: Geocomp Consulting			
Project: Preston Bridge No. 02932			
Location: Preston, CT		Project No:	GTX-305775
Boring ID: B-2-3	Sample Type: jar	Tested By:	jbr
Sample ID: S-2	Test Date: 05/17/17	Checked By:	jdt
Depth : 5-7 ft	Test Id: 411466		
Test Comment: ---			
Visual Description: Moist, olive gray silty sand with gravel			
Sample Comment: ---			

Particle Size Analysis - ASTM D422



% Cobble	% Gravel	% Sand	% Silt & Clay Size
---	18.5	54.0	27.5

Sieve Name	Sieve Size, mm	Percent Finer	Spec. Percent	Complies
1 in	25.00	100		
0.75 in	19.00	89		
0.5 in	12.50	87		
0.375 in	9.50	85		
#4	4.75	82		
#10	2.00	78		
#20	0.85	74		
#40	0.42	69		
#60	0.25	63		
#100	0.15	51		
#200	0.075	28		

Coefficients

D_{85} =8.8456 mm | D_{30} =0.0808 mm

D_{60} =0.2191 mm | D_{15} =N/A

D_{50} =0.1469 mm | D_{10} =N/A

C_u =N/A | C_c =N/A

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

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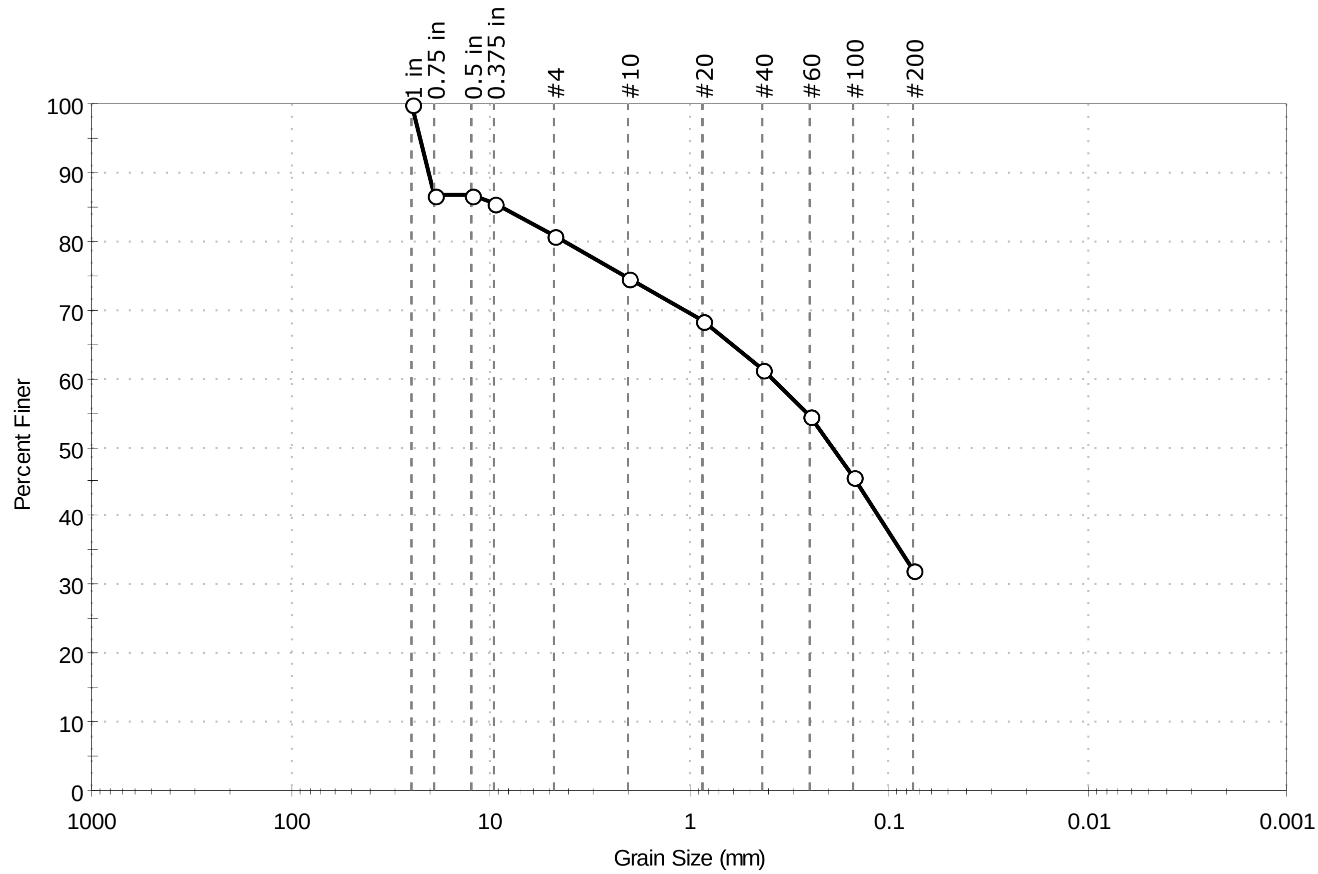
Client:	Geocomp Consulting				
Project:	Preston Bridge No. 02932				
Location:	Preston, CT			Project No:	GTX-305775
Boring ID:	B-2-3	Sample Type:	jar	Tested By:	jbr
Sample ID:	S-5	Test Date:	05/17/17	Checked By:	jdt
Depth :	20-22 ft	Test Id:	411467		

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

Particle Size Analysis - ASTM D422



% Cobble	% Gravel	% Sand	% Silt & Clay Size
---	19.2	48.7	32.1

Sieve Name	Sieve Size, mm	Percent Finer	Spec. Percent	Complies
1 in	25.00	100		
0.75 in	19.00	87		
0.5 in	12.50	87		
0.375 in	9.50	86		
#4	4.75	81		
#10	2.00	75		
#20	0.85	69		
#40	0.42	61		
#60	0.25	55		
#100	0.15	46		
#200	0.075	32		

Coefficients

D_{85} =8.6125 mm | D_{30} =N/A

D_{60} =0.3803 mm | D_{15} =N/A

D_{50} =0.1919 mm | D_{10} =N/A

C_u =N/A | C_c =N/A

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

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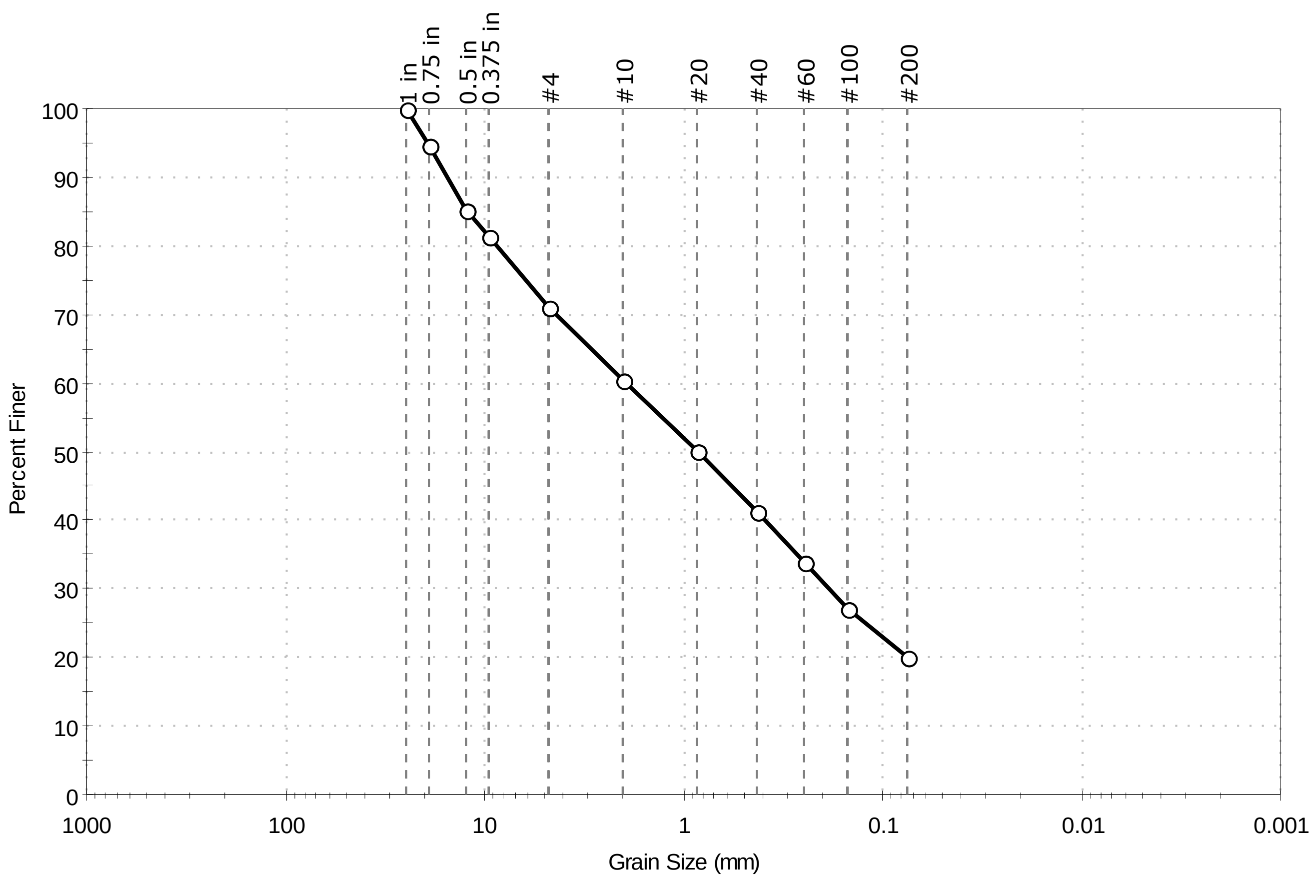
Client:	Geocomp Consulting				
Project:	Preston Bridge No. 02932				
Location:	Preston, CT			Project No:	GTX-305775
Boring ID:	B-2-5	Sample Type:	jar	Tested By:	jbr
Sample ID:	S-8	Test Date:	05/17/17	Checked By:	jdt
Depth :	35-35.5 ft	Test Id:	411468		

Test Comment: ---
Visual Description: Moist, olive brown silty sand with gravel
Sample Comment: ---

Particle Size Analysis - ASTM D422



% Cobble	% Gravel	% Sand	% Silt & Clay Size
---	29.0	50.9	20.1

Sieve Name	Sieve Size, mm	Percent Finer	Spec. Percent	Complies
1 in	25.00	100		
0.75 in	19.00	95		
0.5 in	12.50	85		
0.375 in	9.50	82		
#4	4.75	71		
#10	2.00	60		
#20	0.85	50		
#40	0.42	41		
#60	0.25	34		
#100	0.15	27		
#200	0.075	20		

Coefficients

D_{85} = 12.3505 mm D_{30} = 0.1852 mm
D_{60} = 1.9453 mm D_{15} = N/A
D_{50} = 0.8336 mm D_{10} = N/A
C_u = N/A C_c = N/A

Classification

ASTM N/A

AASHTO Stone Fragments, Gravel and Sand (A-1-b (0))

Sample/Test Description

Sand/Gravel Particle Shape : ANGULAR

Sand/Gravel Hardness : HARD

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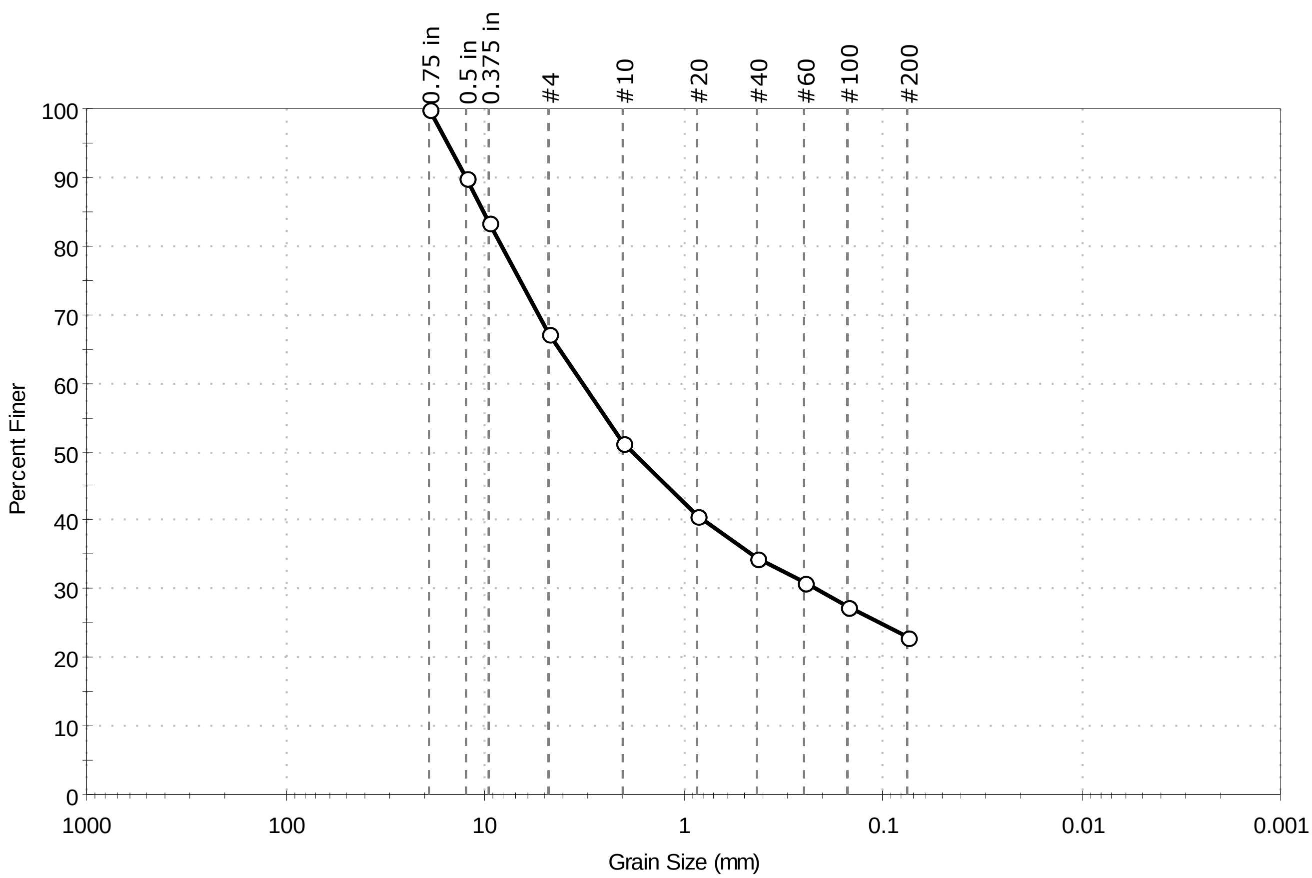
Client:	Geocomp Consulting		
Project:	Preston Bridge No. 02932		
Location:	Preston, CT	Project No:	GTX-305775
Boring ID: B-2-4D	Sample Type: jar	Tested By:	jbr
Sample ID: S-5	Test Date: 05/26/17	Checked By:	jdt
Depth : 40-42 ft	Test Id: 412467		

Test Comment: ---
Visual Description: Moist, very dark grayish brown silty sand with gravel
Sample Comment: ---

Particle Size Analysis - ASTM D422



% Cobble	% Gravel	% Sand	% Silt & Clay Size
---	32.8	44.1	23.1

Sieve Name	Sieve Size, mm	Percent Finer	Spec. Percent	Complies
0.75 in	19.00	100		
0.5 in	12.50	90		
0.375 in	9.50	84		
#4	4.75	67		
#10	2.00	51		
#20	0.85	41		
#40	0.42	35		
#60	0.25	31		
#100	0.15	28		
#200	0.075	23		

Coefficients

D_{85} =10.0862 mm
D_{30} =0.2177 mm
D_{60} =3.2048 mm
D_{15} =N/A
D_{50} =1.7978 mm
D_{10} =N/A
C_u =N/A
C_c =N/A

Classification

ASTM N/A

AASHTO Stone Fragments, Gravel and Sand (A-1-b (0))

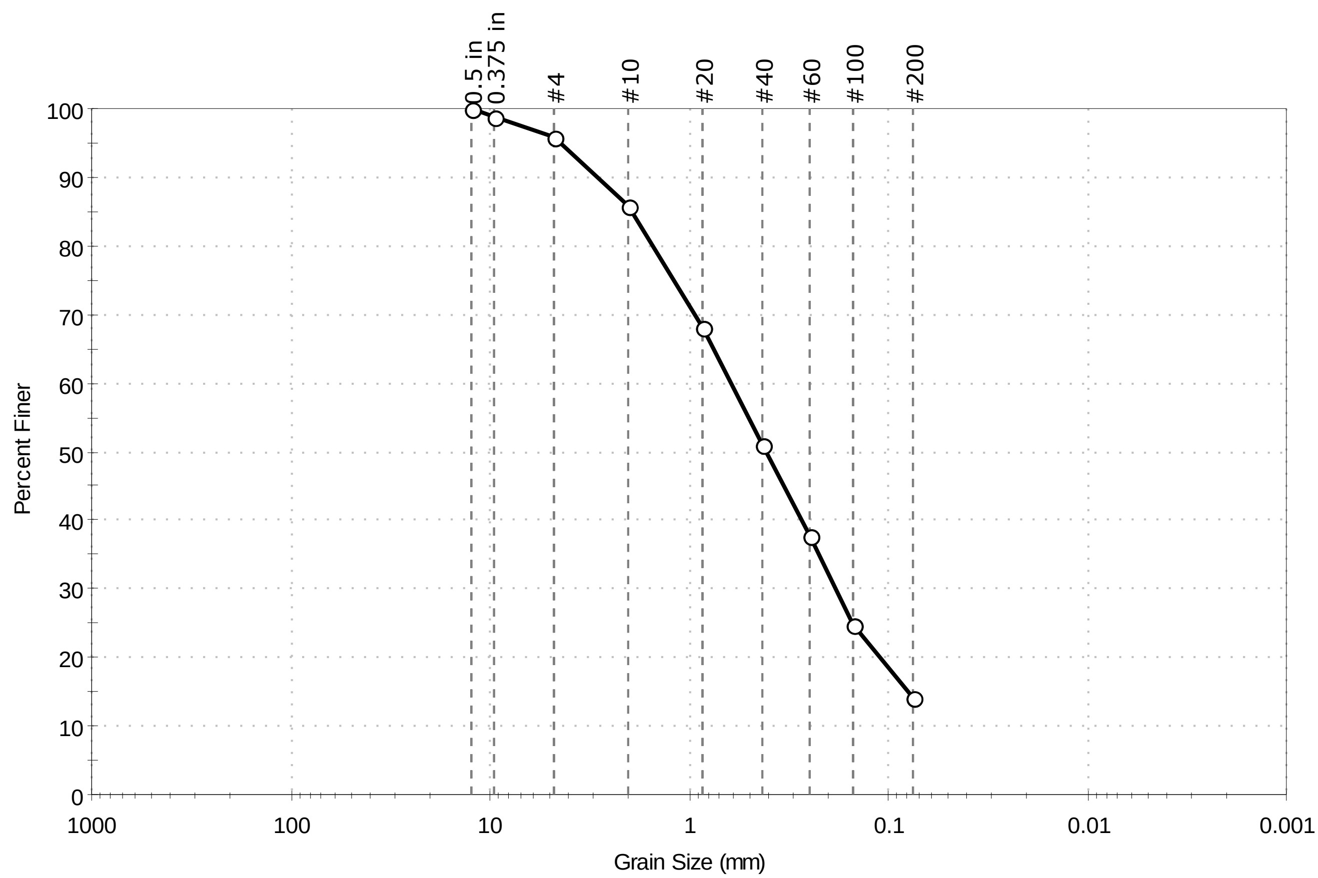
Sample/Test Description

Sand/Gravel Particle Shape : ANGULAR

Sand/Gravel Hardness : HARD

Client:	Geocomp Consulting				
Project:	Preston Bridge No. 02932				
Location:	Preston, CT			Project No:	GTX-305775
Boring ID:	B-2-4D	Sample Type:	jar	Tested By:	jbr
Sample ID:	S-7	Test Date:	05/26/17	Checked By:	jdt
Depth :	51.5-52.3 ft	Test Id:	412468		
Test Comment:	---				
Visual Description:	Moist, very dark grayish brown silty sand				
Sample Comment:	---				

Particle Size Analysis - ASTM D422



% Cobble	% Gravel	% Sand	% Silt & Clay Size
---	4.2	81.8	14.0

Sieve Name	Sieve Size, mm	Percent Finer	Spec. Percent	Complies
0.5 in	12.50	100		
0.375 in	9.50	99		
#4	4.75	96		
#10	2.00	86		
#20	0.85	68		
#40	0.42	51		
#60	0.25	38		
#100	0.15	25		
#200	0.075	14		

Coefficients

D_{85} =1.9134 mm | D_{30} =0.1846 mm

D_{60} =0.6116 mm | D_{15} =0.0799 mm

D_{50} =0.4082 mm | D_{10} =N/A

C_u =N/A | C_c =N/A

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

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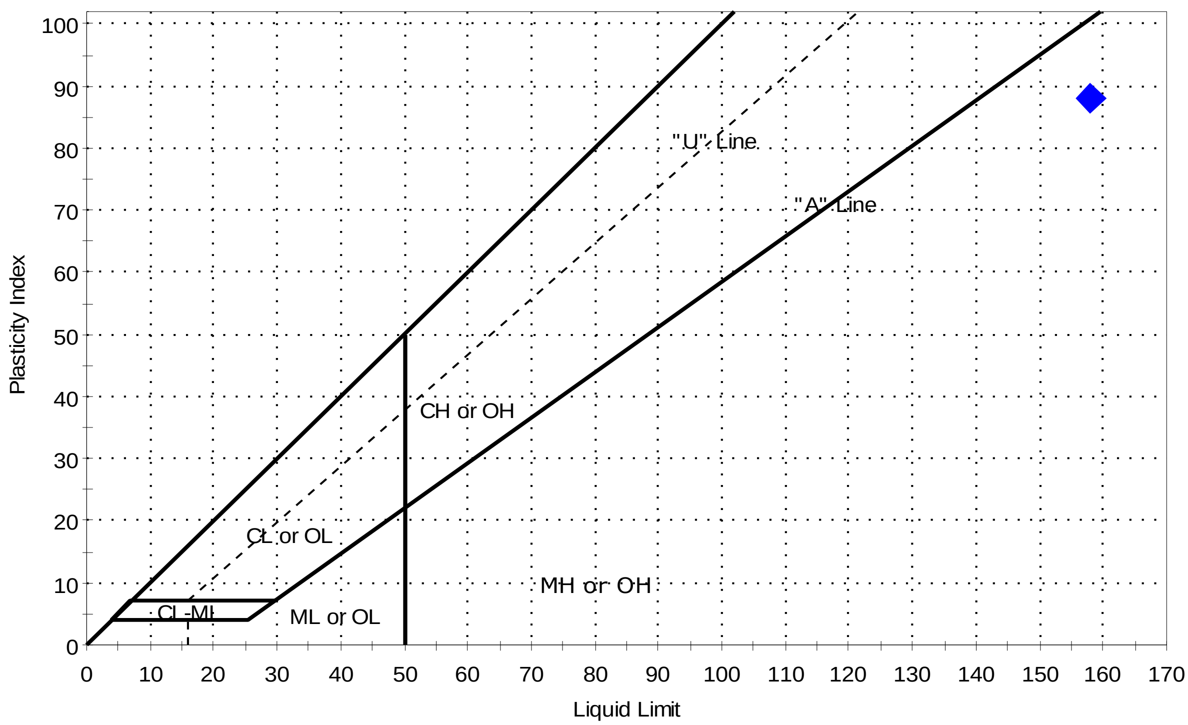
GeoTesting EXPRESS

Client:	Geocomp Consulting		
Project:	Preston Bridge No. 02932		
Location:	Preston, CT	Project No:	GTX-305775
Boring ID: B-2-4	Sample Type: jar	Tested By:	cam
Sample ID: S-4/S-5	Test Date: 06/01/17	Checked By:	jdt
Depth : 15-19 ft	Test Id: 412941		
Test Comment:	---		
Visual Description:	Moist, very dark grayish brown silt		
Sample Comment:	---		

Atterberg Limits - ASTM D4318

Plasticity Chart



Symbol	Sample ID	Boring	Depth	Natural Moisture Content,%	Liquid Limit	Plastic Limit	Plasticity Index	Liquidity Index	Soil Classification
◆	S-4/S-5	B-2-4	15-19 ft	117	158	70	88	0.5	

Sample Prepared using the WET method

Dry Strength: HIGH

Dilatancy: SLOW

Toughness: LOW

Appendix D

Barrier Wall Footing Bearing Resistance and Settlement Calculations

JOB	220693 - Bridge Replacement Bridge No. 02931, Preston, CT		
SHEET NO.	1	OF	1
CALCULATED BY	RTL	DATE:	3/18/2019
CHECKED BY	MGC	DATE:	3/18/2019
SCALE	N/A		

OBJECTIVE: Evaluate factored bearing resistance for proposed shallow foundation for the new barrier walls.

GIVEN: Proposed wall footing width ranges from 6 to 6.5 ft long according to 90% submission drawings from CME

REFERENCE: AASHTO LRFD Bridge Design Specifications, 2014 7th Edition

ASSUMPTIONS:

- Bearing surface is one foot of Compacted Granular Fill over existing Embankment Fill
- Footing embedment is at least 4 feet below ground surface
- Groundwater level is at a depth of four feet (bottom of footing)
- Footing assumed to have an eccentricity = B/6
- Estimated soil properties (Recent data, Geotechnical Literature, Table 10.4.6.2.4-1):

	γ (pcf)	ϕ
Med. Dense Silty Sand:	125	30

BEARING CAPACITY FACTORS (Table 10.6.3.1.2a-1)

	ϕ	N_c	N_q	N_γ
Med. Dense Silty Sand:	30	30.1	18.4	22.4

CALCULATE EFFECTIVE FOOTING WIDTH (B'):

$e < B/6$ (Resultant is assumed to be within middle 1/3 of footing as recommended in report)

where: B = footing width (ft) = 6
e = eccentricity (ft) 1.00 Assumed for this example

$B' = B-2e$ 4.00

NOMINAL BEARING RESISTANCE (q_n):

$$q_n = cN_{cm} + \gamma D_f N_{qm} C_{wq} + 0.5\gamma B' N_{\gamma m} C_{w\gamma}$$ (Eqn. 10.6.3.1.2a-1)

where:

c = cohesion = 0		
γ = total unit weight	125	
D_w = depth to water (ft) =	2	
D_f = depth of footing (ft) =	2	Assumed
B' = effective width of footing (ft) =	4.00	
L = length of footing (ft) =	175	between Sta 82+10 and 83+85 on 90% drawings
B'/L =	0.023	
D_f /B' =	0.50	
C_{wq} $C_{w\gamma}$ = groundwater correction factors		(using B')
C_{wq} = 0.7		(Table 10.6.3.1.2a-2)
$C_{w\gamma}$ = 0.5		(Table 10.6.3.1.2a-2)

N_{cm} N_{qm} $N_{\gamma m}$ = bearing capacity factors

$N_{qm} = N_q s_q d_q i_q$ (Eqn. 10.6.3.1.2a-3)

s_q = 1.01 (Table 10.6.3.1.2a-3)

d_q = 1.00 (Table 10.6.3.1.2a-4)

i_q = 1.0 Omitted (Comentary C10.6.3.1.2a)

N_{qm} = 18.6

$N_{\gamma m} = N_\gamma s_\gamma i_\gamma$

s_γ = 0.99 (Table 10.6.3.1.2a-3)

i_γ = 1.0 Omitted (Comentary C10.6.3.1.2a)

$N_{\gamma m}$ = 22.2

q_n = 6.0 ksf

STRENGTH LIMIT STATE FACTORED BEARING RESISTANCE (q):

$q_r = RF \times q_n$ (Eqn. 10.6.3.1.1-1)

where: RF = resistance factor = 0.45 (Table 10.5.5.2.2-1)

q_r = 2.7 ksf

use

q_r =	**2.7**	**ksf**
NET q_r =	**2.5**	**ksf**

EXTREME LIMIT STATE FACTORED NET BEARING RESISTANCE (q):

$q_r = RF \times q_n$ (Eqn. 10.6.3.1.1-1)

where: RF = resistance factor = 1.00 (Section 10.5.5.3.3 - Other Extreme Limit States)

q_r = 6.0 ksf

use

q_r =	**6.0**	**ksf**
NET q_r =	**5.8**	**ksf**

Client CME
Project Preston, CT Bridge No. 02931
Subject Barrier wall settlement calculation

Objective: Calculate settlement of Barrier Wall under maximum limiting Service Loads

Wall loading: Per Section 4.3 of Geotechnical Report maximum average design Service Loads imposed by Barrier wall foundations will be limited to 1.1 ksf

Maximum footing width is 6.5' as shown on 90% Submission Drawings, dated 2/28/19.

Subsurface conditions for calculations are based on Boring B-2-2A, performed west of existing bridge.

① Calculate settlement due to loading of roadway embankment fill.

$$S_e = \sum_{i=1}^{n} \Delta H_i$$ (AASHTO Bridge Design Specs 10.6.2.4.2-2)

where $\Delta H = H_c \frac{1}{C'} \log\left(\frac{\sigma_o' + \Delta\sigma_v}{\sigma_o'}\right)$

with $\bar{N}_1 = 16$, $C' = 50$ (Fig. 10.6.2.4.2-1)

σ_o' at center of layer = 0.92 ksf at depth 7.5'

$\Delta\sigma_v = 1.1\,ksf - 0.92\,ksf = 0.18\,ksf$

$H_c = 15' - 4'$ embedment $= 11'$

$$S_e = (11')\frac{1}{50}\log\left(\frac{0.92 + 0.18\,ksf}{0.92}\right) = 0.017' = 0.2''$$

Client	CME	Date	3/22/19
Project	Preston, CT Bridge No. 02931	Computed By	MC
Subject	Barrier wall settlement calculation	Checked By	RL

(2) Calculate settlement due to loading of organic silt

For calculation, organic silt layer is assumed to fully drain (full dissipation of excess pore pressures) during excavation for wall installation. → conservative

σ'_{v_c} = drained effective stress after excavation at midpoint of layer

σ'_{v_i} at midpoint of layer $= (15')(0.125\,kcf) + (3.5')(0.110\,kcf) - (11.5')(0.0624\,kcf) = 1.54\,ksf$

width of footing $= B = 6.5'$

From Boussinesq Stress Distribution for infinitely long footing, $\Delta\sigma_v$ at depth $2.2B \approx 0.28$ x change in load at footing bearing elevation

For 4' excavation, change in load at bearing elevation $= (4')(0.125\,kcf) = 0.5\,ksf$ unloading

$\therefore \Delta\sigma_v$ at center of organic silt $= (0.28)(0.5\,ksf) = 0.14\,ksf$

$\sigma'_{v_c} = \sigma'_{v_i} - \Delta\sigma_v = 1.54\,ksf - 0.14\,ksf = 1.4\,ksf$

σ'_{v_f} after wall construction and backfill $= 1.4\,ksf + (0.28)(1.1\,ksf) = 1.7\,ksf$

based on maximum design average bearing stress under footing

Geocomp **CALCULATIONS**

Client	CME	Job Number	220693
Project	Preston, CT Bridge No. 02931	Sheet	3 of 3
Subject	Barrier Wall Settlement Calculation	Date	3/22/19
		Computed By	MC
		Checked By	RL

From Holtz + Kovacs (1981), $C_c = (1.15 \times 10^{-2}) w_N$ for organic silts

From Index test data, $w_n = 117\%$

$\therefore C_c = (1.15 \times 10^{-2})(117) = 1.35$

$C_R = \frac{C_c}{1+e_0}$ where $e_0 = w_N G_S = (1.17)(2.7) = 3.2$

$\therefore C_R = \frac{1.35}{1+e_0} = 0.32$

From Holtz + Kovacs (1981), RR typically ranges from 5% to 10% of CR

$\longrightarrow$ Use 10%

$\therefore RR = 0.032$

Check if organic silt remains in recompression

$S_c = (H) RR \log\left(\frac{\sigma'_{vF}}{\sigma'_{vc}}\right) = (7')(0.032)\log\left(\frac{1.7}{1.4}\right) = 0.018' = 0.23''$

Check if organic silt become normally consolidated

$S_c = (H) RR \log\left(\frac{\sigma'_{vi}}{\sigma'_{vc}}\right) + HCR \log\left(\frac{\sigma'_{vF}}{\sigma'_{vi}}\right)$

$= (7')(0.032)\log\left(\frac{1.54}{1.4}\right) + (7')(0.32)\log\left(\frac{1.7}{1.54}\right)$

$= 0.105' = 1.3''$

③ Compute max total settlement $= S_e + S_c = 0.2'' + 1.3'' = 1.5''$

β_z = shape factor taken as specified in Table 10.6.2.4.2-1 (dim)

ν = Poisson's Ratio, taken as specified in Article 10.4.6.3 if direct measurements of ν are not available from the results of in situ or laboratory tests (dim)

Unless E_s varies significantly with depth, E_s should be determined at a depth of about 1/2 to 2/3 of B below the footing, where B is the footing width. If the soil modulus varies significantly with depth, a weighted average value of E_s should be used.

only a single value of soil modulus, and Young's modulus varies with depth as a function of overburden stress. Therefore, in selecting an appropriate value for soil modulus, consideration should be given to the influence of soil layering, bedrock at a shallow depth, and adjacent footings.

For footings with eccentric loads, the area, A', should be computed based on reduced footing dimensions as specified in Article 10.6.1.3.

Table 10.6.2.4.2-1—Elastic Shape and Rigidity Factors, EPRI (1983)

L/B	Flexible, β_z (average)	β_z Rigid
Circular	1.04	1.13
1	1.06	1.08
2	1.09	1.10
3	1.13	1.15
5	1.22	1.24
10	1.41	1.41

Estimation of spread footing settlement on cohesionless soils by the empirical Hough method shall be determined using Eqs. 10.6.2.4.2-2 and 10.6.2.4.2-3. *SPT* blow counts shall be corrected as specified in Article 10.4.6.2.4 for depth, i.e. overburden stress, before correlating the *SPT* blow counts to the bearing capacity index, C'.

$$S_e = \sum_{i=1}^{n} \Delta H_i \qquad (10.6.2.4.2\text{-}2)$$

in which:

$$\Delta H_i = H_c \frac{1}{C'} \log\left(\frac{\sigma'_o + \Delta\sigma_v}{\sigma'_o}\right) \qquad (10.6.2.4.2\text{-}3)$$

where:

n = number of soil layers within zone of stress influence of the footing

ΔH_i = elastic settlement of layer i (ft)

H_C = initial height of layer i (ft)

C' = bearing capacity index from Figure 10.6.2.4.2-1 (dim)

In Figure 10.5.2.4.2-1, N' shall be taken as $N1_{60}$, Standard Penetration Resistance, N (blows/ft), corrected for overburden pressure as specified in Article 10.4.6.2.4.

The Hough method was developed for normally consolidated cohesionless soils.

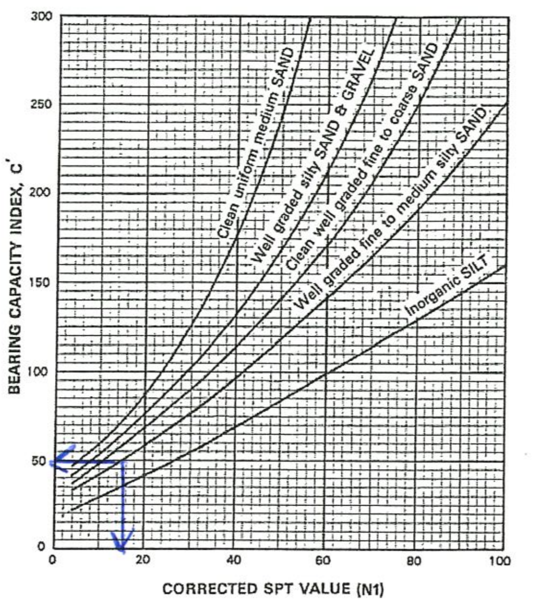
The Hough method has several advantages over other methods used to estimate settlement in cohesionless soil deposits, including express consideration of soil layering and the zone of stress influence beneath a footing of finite size.

The subsurface soil profile should be subdivided into layers based on stratigraphy to a depth of about three times the footing width. The maximum layer thickness should be about 10 ft.

While Cheney and Chassie (2000), and Hough (1959), did not specifically state that the SPT N values should be corrected for hammer energy in addition to overburden pressure, due to the vintage of the original work, hammers that typically have an efficiency of approximately 60 percent were in general used to develop the empirical correlations contained in the method. If using SPT hammers with efficiencies that differ significantly from this 60 percent value, the N values should also be corrected for hammer energy, in effect requiring that $N1_{60}$ be used.

σ'_o = initial vertical effective stress at the midpoint of layer i (ksf)

$\Delta\sigma_v$ = increase in vertical stress at the midpoint of layer i (ksf)



Reference: Hough, "Compressibility as a Basis for Soil Bearing Value" ASCE 1959

Figure 10.6.2.4.2-1—Bearing Capacity Index versus Corrected SPT (modified from Cheney and Chassie, 2000, after Hough, 1959)

The Hough method is applicable to cohesionless soil deposits. The "Inorganic Silt" curve should generally not be applied to soils that exhibit plasticity. The settlement characteristics of cohesive soils that exhibit plasticity should be investigated using undisturbed samples and laboratory consolidation tests as prescribed in Article 10.6.2.4.3.

10.6.2.4.3—Settlement of Footings on Cohesive Soils

Spread footings in which cohesive soils are located within the zone of stress influence shall be investigated for consolidation settlement. Elastic and secondary settlement shall also be investigated in consideration of the timing and sequence of construction loading and the tolerance of the structure to total and differential movements.

Where laboratory test results are expressed in terms of void ratio, e, the consolidation settlement of footings shall be taken as:

- For overconsolidated soils where $\sigma'_p > \sigma'_o$, see Figure 10.6.2.4.3-1:

$$S_c = \left[\frac{H_c}{1+e_o}\right]\left[C_r \log\left(\frac{\sigma'_p}{\sigma'_o}\right) + C_c \log\left(\frac{\sigma'_f}{\sigma'_p}\right)\right] \quad (10.6.2.4.3\text{-}1)$$

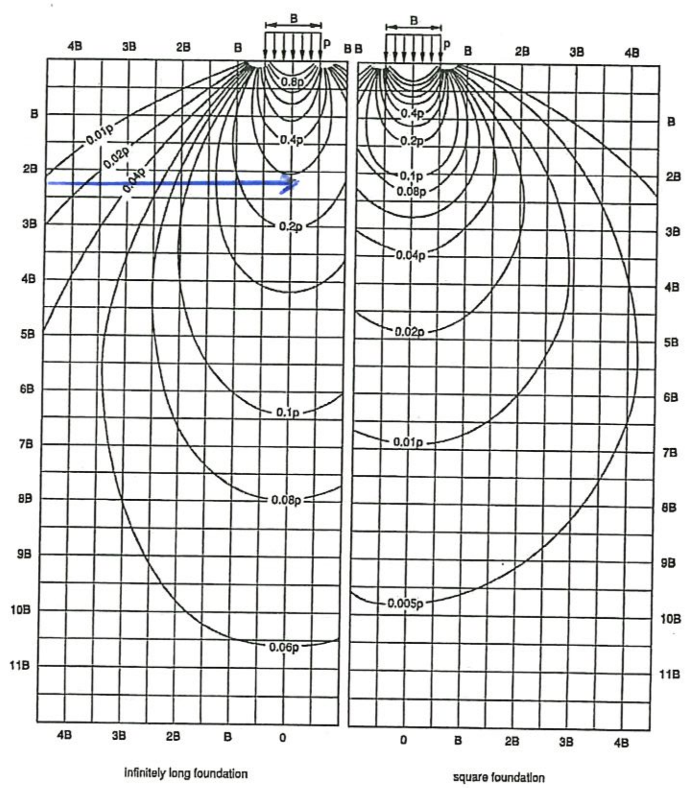
- For normally consolidated soils where $\sigma'_p = \sigma'_o$:

C10.6.2.4.3

In practice, footings on cohesive soils are most likely founded on overconsolidated clays, and settlements can be estimated using elastic theory (Baguelin et al., 1978), or the tangent modulus method (Janbu, 1963, 1967). Settlements of footings on overconsolidated clay usually occur at approximately one order of magnitude faster than soils without preconsolidation, and it is reasonable to assume that they take place as rapidly as the loads are applied. Infrequently, a layer of cohesive soil may exhibit a preconsolidation stress less than the calculated existing overburden stress. The soil is then said to be underconsolidated because a state of equilibrium has not yet been reached under the applied overburden stress. Such a condition may have been caused by a recent lowering of the groundwater table. In this case, consolidation settlement will occur due to the additional load of the structure and the settlement that is occurring to reach a state of equilibrium. The total consolidation settlement due to these two components can be estimated by Eq. 10.6.2.4.3-3 or Eq. 10.6.2.4.3-6.

BOUSSINESQ STRESS CONTOUR CHARTS FOR INFINITELY LONG AND SQUARE FOOTINGS

$p =$ uniform foundation pressure



8.11 APPROXIMATE METHODS AND TYPICAL VALUES OF COMPRESSION INDICES

Because of the time and expense involved in consolidation testing, it is sometimes desirable to be able to relate the compression indices to the simple classification properties of soils. These relationships are also commonly used for preliminary designs and estimates and for checking the validity of test results.

Table 8-2 is a list of some published equations for the prediction of compression indices (Azzouz, Krizek, and Corotis, 1976).

TABLE 8-2 Some Empirical Equations for C_c and $C_{c\epsilon}$*

Equation	Regions of Applicability
$C_c = 0.007\,(\mathrm{LL} - 7)$	Remolded clays
$C_{c\epsilon} = 0.208e_o + 0.0083$	Chicago clays
$C_c = 17.66 \times 10^{-5} w_n^2 + 5.93 \times 10^{-3}\, w_n - 1.35 \times 10^{-1}$	Chicago clays
$C_c = 1.15(e_o - 0.35)$	All clays
$C_c = 0.30(e_o - 0.27)$	Inorganic, cohesive soil; silt, some clay; silty clay; clay
$C_c = 1.15 \times 10^{-2} w_n$	Organic soils–meadow mats, peats, and organic silt and clay
$C_c = 0.75(e_o - 0.50)$	Soils of very low plasticity
$C_{c\epsilon} = 0.156e_o + 0.0107$	All clays
$C_c = 0.01w_n$	Chicago clays

*As summarized by Azzouz, Krizek, and Corotis (1976).
Note: w_n = natural water content.

Terzaghi and Peck (1967) proposed the following equation, based on research on undisturbed clays of low to medium sensitivity:

$$C_c = 0.009\,(\mathrm{LL} - 10) \tag{8-21}$$

which has a reliability range of about $\pm 30\%$. This equation is widely used, despite its wide reliability range, to make initial consolidation settlement estimates. The equation should not be used where the sensitivity of the clay is greater than 4, if the LL is greater than 100, or if the clay contains a high percentage of organic matter. Some typical values of the compression index, based on our experience and the geotechnical literature, are listed in Table 8-3.

Often, C_r is assumed to be 5% to 10% of C_c. Typical values of C_r range from 0.015 to 0.035 (Leonards, 1976). The lower values are for clays of lower plasticity and low OCR. Values of C_r outside the range of 0.005 to 0.05 should be considered questionable.

Appendix E

Drilled Pile Bearing Resistance and Settlement Calculations

Geocomp CONSULTING, INC.

PROJECT: Bridge No. 02931, Route 2A over Poquetanuck Cove, Preston, CT	**Calculated By:** RTL
PROJECT NO.: 220693	**Checked By:** MGC
CLIENT: CME	**Date:** 3/18/2019
SUBJECT: LPILE Pile Analysis	**Page No.:** 1 of 4

Objective: To evaluate the stresses and deflections within the proposed drilled pile due to the loading described for the re-aligned gas line utility.

References:
1. Drawings entitled "Connecticut State Highway Department, Town of Preston, Rehabilitation of Bridge 02931, Route 2A over Poquetanuck Cove, Section 01.05 - Structure", pages S-03, S-05, dated 2/28/2019. (See Appendix A)
2. Drawings entitled "Connecticut State Highway Department, Town of Preston, Rehabilitation of Bridge 02931, Route 2A over Poquetanuck Cove, Section 01.07 - Utility", pages "Gas Line Temporary Support Details", dated 2/28/2019. (See Appendix A)
3. AASHTO LRFD Bridge Design Specifications, 7th Edition.

Abutment Loading used for Analysis

	Loading @ Point A in 01.07 - Utility Drawings		
Load Case	Vertical Load (kips)	Horizontal Load (kips)	Overturning Moment (ft-kips)
1	6.1	2.5	30.0
2	6.1	2.5	-30.0
3	6.1	-2.5	30.0
4	6.1	-2.5	-30.0

Ground Slope Angle

Ground Slope Angle = 29 degrees

Pile Stick Up

Pile Stick Up = 5 feet

Geocomp CONSULTING, INC.

PROJECT: Bridge No. 02931, Route 2A over Poquetanuck Cove, Preston, CT	**Calculated By:** RTL
PROJECT NO.: 220693	**Checked By:** MGC
CLIENT: CME	**Date:** 3/18/2019
SUBJECT: LPILE Pile Analysis	**Page No.:** 2 of 4

Analysis Approach

1. LPILE 2012 software was used to perform soil-structure interaction analyses to estimate the resulting stresses and deformations in the piles for the analyzed loading conditions.
2. For lateral resistence and deformation of the pile, the Young's Modulus of the pile was re-calculated so that all loads go into an equivalent HP pile section.
3. The geometry, elevations, pile head loading conditions, and number of piles were based on information included in Reference 2 listed above. The groundwater information was based on information included in Reference 1 listed above.
4. The soil stratigraphy was based on information included in Attachment 5 listed above.
5. Pile embedment depth is equal to 33 feet. Pile stick up is set to 5 feet.

Pile Structural Properties used for Analysis

Concrete Diameter (in)	Concrete Cross Sectional Area (in^2)	Moment of Inertia about Strong Axis (Ixx) (in^4)	Moment of Inertia about Weak Axis (Ixx) (in^4)	28-day Compressive Strength (psi)	Young's Modulus (ksi)
24	452	16286	16286	4,000	3,605

HP 12x74 Cross Sectional Area (in^2)	Moment of Inertia about Strong Axis (Ix) (in^4)	Moment of Inertia about Weak Axis (Iy) (in^4)	Young's Modulus (ksi)
21.8	569	186	29,000

Composite Young's Modulus Concrete and Steel HP Pile

$EI_{STEEL} = E_{STEEL} \times I_{X,STEEL} =$ 1.6501E+07 k-in^2

$EI_{STEEL} = E_{COMPOSITE} \times I_{X,CONCRETE}$ (No flexural contribution from concrete)

$E_{COMPOSITE} = EI_{STEEL} / I_{X,CONCRETE} =$ 1.0132E+03 ksi

Soil/Bedrock Properties used for Analysis

The subsurface profile and soil properties used for analysis were based on borings B-2-1 through B-2-5. Refer to Reference 5 for the subsurface profile assumed for analysis and to the table below for the modeled soil and bedrock properties:

Stratum	LPILE P-Y Curve Model	Effective Unit Weight (pcf)	Friction Angle (ϕ)	P-Y Modulus (k) (pci)	Undrained Cohesion (psf)	Strain Factor ε_{50}
Fill above Groundwater	Sand (Reese)	125	30	25	---	---
Fill below Groundwater	Sand (Reese)	62.6	30	20	---	---
Organic Silt	Soft Clay (Matlock)	47.6	---	---	300	0.02
Terrace	Sand (Reese)	67.6	36	125	---	---

Geocomp CONSULTING, INC.

PROJECT: Bridge No. 02931, Route 2A over Poquetanuck Cove, Preston, CT	**Calculated By:** RTL
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SUBJECT: LPILE Pile Analysis	**Page No.:** 3 of 4

Analysis Results

	Load Case 1	**Load Case 2**	**Load Case 3**	**Load Case 4**
Vertical Load (kips)	6.1	6.1	6.1	6.1
Horizontal Load (kips)	2.5	2.5	-2.5	-2.5
Overturning Moment (ft-kips)	30	-30	30	-30
Maximum Pile Lateral Deflection (in)	0.5	-0.1	0.1	-0.5
Maximum Bending Moment (in-kip)	578	-360	360	-570
Depth to Fixity (ft)	23	21	21	23
Maximum Pile Shear (kips)	-5.5	2.5	-2.5	5.3

	Max Values	**Load Case**
Maximum Pile Lateral Deflection (in)	0.5	Case 1
Maximum Bending Moment (in-kip)	578	Case 1
Depth to Fixity (ft)	23	Case 1
Maximum Pile Shear (kips)	5.5	Case 1

PROJECT: Bridge No. 02931, Route 2A over Poquetanuck Cove, Preston, CT	Calculated By: RTL
PROJECT NO.: 220693	Checked By: MGC
CLIENT: CME	Date: 3/18/2019
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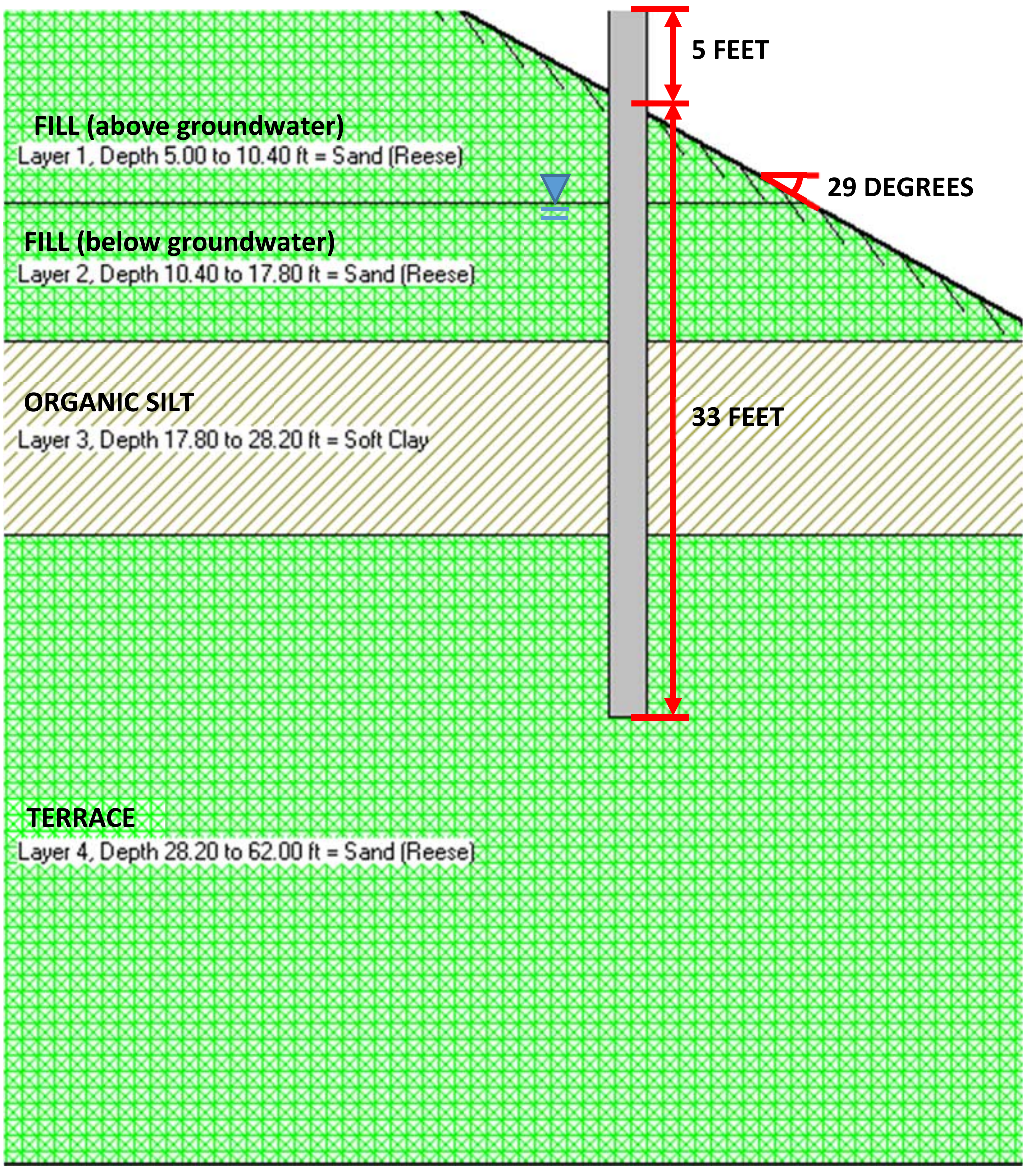
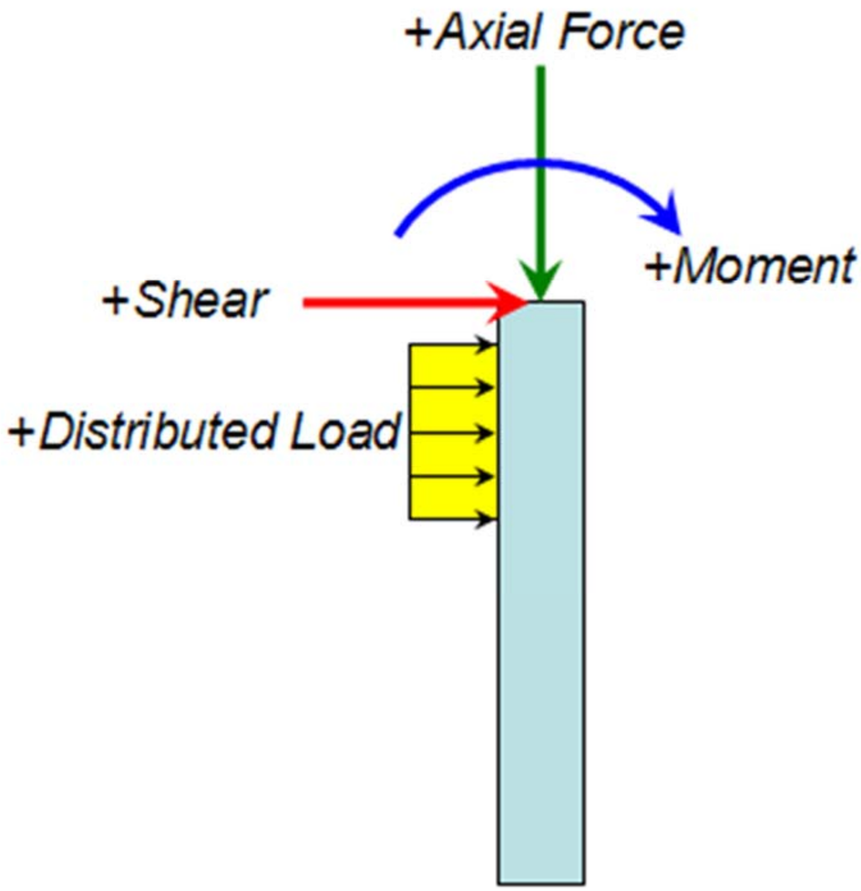
Attachments

Attachment 1 - Analyzed Pile Layout
Attachment 2 - Pile Loading Orientation
Attachment 3 - Analysis Results

ATTACHMENT 1 – ANALYZED PILE LAYOUT

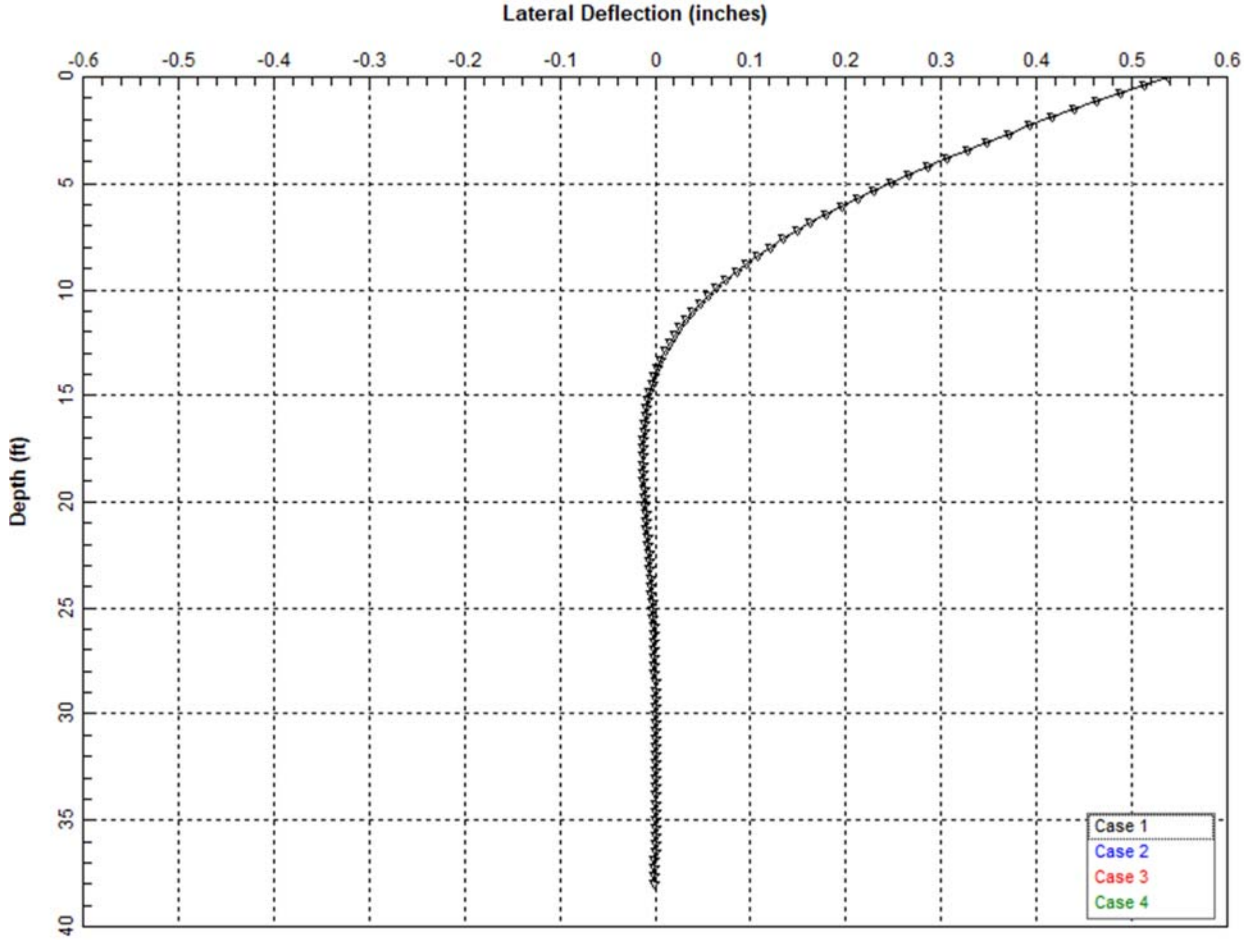


ATTACHMENT 2 – PILE LOADING ORIENTATION

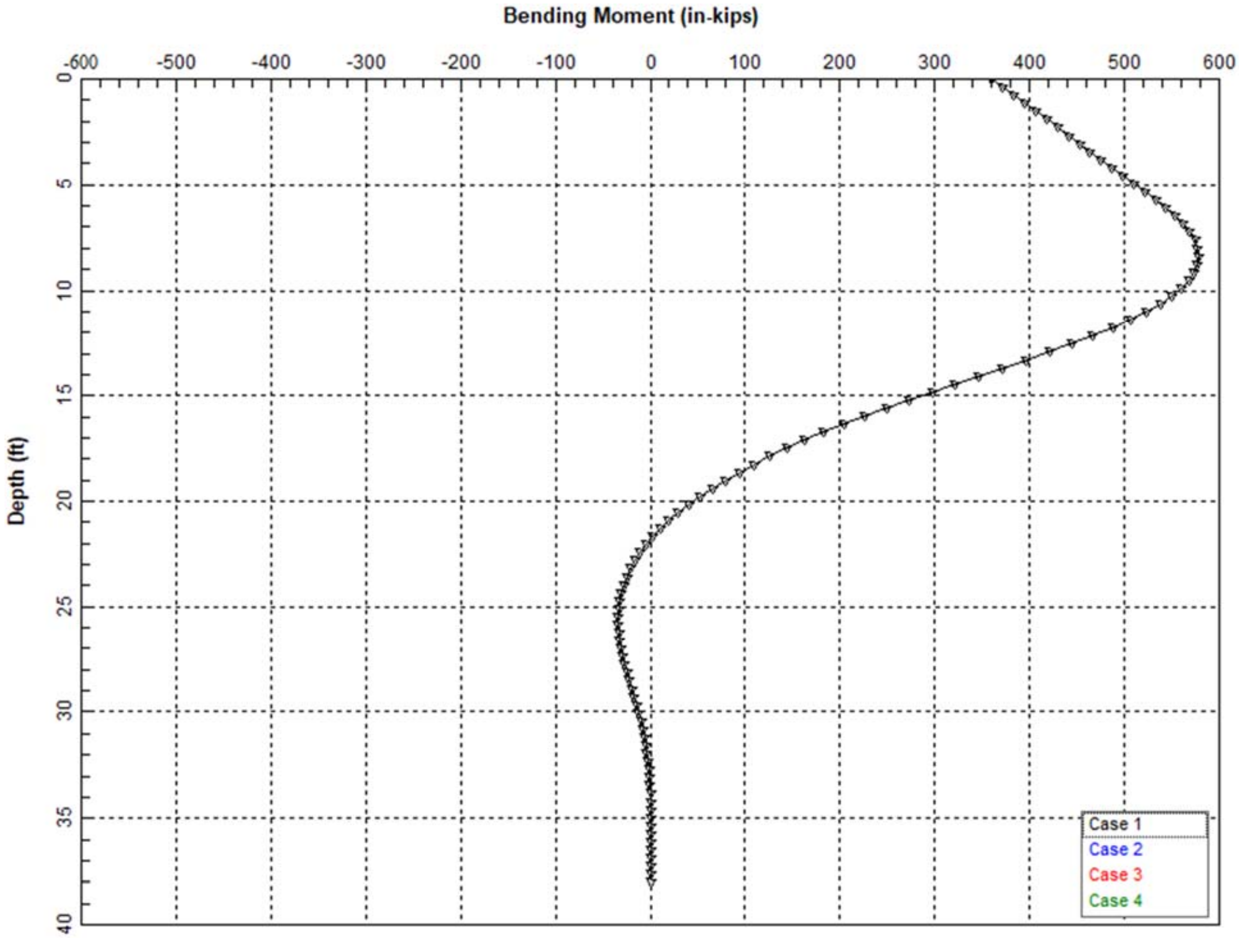


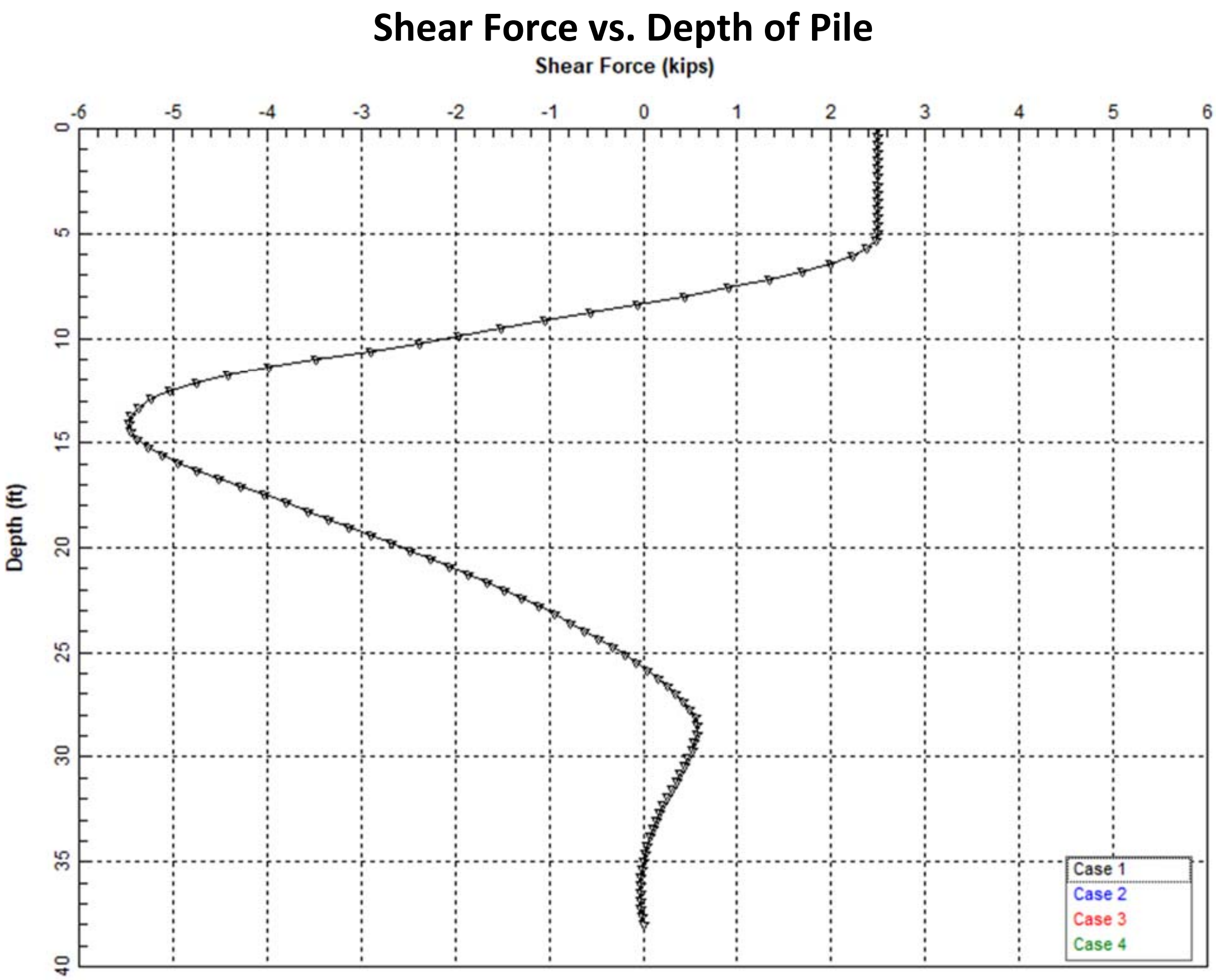
ATTACHMENT 3 – ANALYSIS

Lateral Pile Deflection vs. Depth of Pile



Bending Moment vs. Depth of Pile



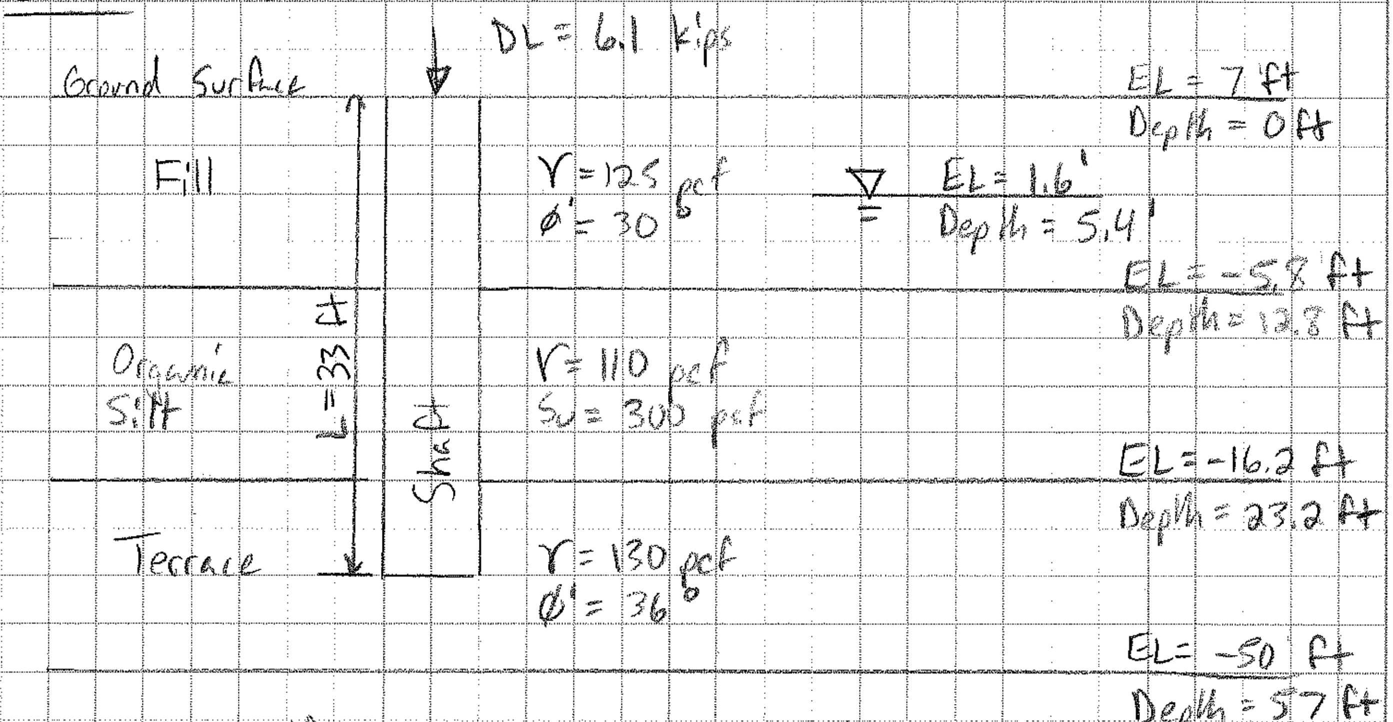

Shear Force vs. Depth of Pile
Shear Force (kips)
-6
-5
-4
-3
-2
-1
0
1
2
3
4
5
6
Depth (ft)
0
5
10
15
20
25
30
35
40
Case 1
Case 2
Case 3
Case 4

Geocomp

CALCULATIONS

Client	CME	Job Number	220693
Project	220693 – Bridge 02931	Sheet	1 of 5
Subject	Drilled Shaft Bearing Capacity & Settlement	Date	3/15/19
		Computed By	RTL
		Checked By	AVG

Given: Note: Not to Scale



Shaft = HP 12x74 within 2-ft diameter concrete shaft

Find: Bearing capacity + Settlement

Reference:

① AASHTO LRFD Bridge Design Specifications, 7th Ed, 2015-2016 Revisions

Bearing Capacity → Sections 10.8.3.5.2B, 10.8.3.5.2C
Settlement → Section 10.8.2.2.2

② Drilled Shafts: Construction Procedures and Design Methods, FHWA-IF-99-025

Settlement → Chapter 11

Geocomp **CALCULATIONS**

Client	CME	Job Number	220693
Project	220693 - Bridge 02931	Sheet	2 of 5
Subject	Drilled Shaft Bearing Capacity & Settlement	Date	3/18/19
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		Checked By	AVG

(3) Ground Surface Elevation ⇒ Drawing "SV_D2_170_3250F_PRESTON_CT 2A OVER POQUETANUCK COVE BR02931 AND DICKERMANS BROOK BR02932_GRN" dated 2/16/16

(4) Soil Layers ⇒ Borings B-2-1, B-2-2A/2B/2C

(5) Water Level ⇒ 90% Submission Drawings, Section 01.05 - Structural, drawing S-02

(6) Loads ⇒ 90% Submission Drawings, Section 01.07 - Utilities, Drawing UTL - X

Solution:

For finding capacity + settlement, assume only terrace deposit takes load

EL (ft)	Depth (ft)	Effective Stress (psf)
7	0	0
2	5	125 (5-0) = 625 psf
1.6	5.4	125 (5.4 - 0) = 675 psf
-5.8	12.8	125 (12.8 - 5.4) - 62.4 (12.8 - 5.4) = 1138 psf
-16.2	23.2	(110 - 62.4)(23.2 - 12.8) + 1138 = 1633 psf
-26	33	(130 - 62.4)(33 - 23.2) + 1633 = 2296 psf

Shaft Skin Stresses + Load

Depth 23.2' - 33'

Assume OCR ≈ 2

$\beta = (1-\sin\phi)(OCR^{\sin\phi})\tan\phi$ Eqn 10.8.3.5.2b-2 (?)

$\beta = (1-\sin(36))(2^{\sin(36)})\tan(36) = 0.450$

Geocomp	CALCULATIONS	Job Number 220693
		Sheet 3 of 5
Client CME		Date 3/18/15
Project 220693 – Bridge 02931		Computed By RTL
Subject Drilled Shaft Bearing Capacity & Settlement		Checked By AVG

$q_s = \beta \bar{\sigma}_v$ Eqn 10.8.3.5.2B-1 (1)

q_s @ 23.2' = 0.450(1633) = 735 psf

q_s @ 33' = 0.450(2296) = 1033 psf

$R_s = q_s A_s$ Eqn 10.8.3.5-3 (1)

Shaft Circumference = $\pi D = \pi(2) = 6.28$ ft

$R_s = \left(\frac{735 + 1033}{2}\right)(6.28)(33 - 23.2) = 54{,}404$ lbs

$\simeq 54$ kips

Nominal Bearing Resistance @ 33' in Terrace Deposit

$N_{60} \leq 50$, $q_p = 1.2 N_{60} \leq 60$ ksf Eqn 10.8.3.5.2c-1 (1)

$N_{60,AVG}$ of Terrace $\simeq 50$; use 50

$q_p = 1.2 N_{60} = 1.2(50) = 60$ ksf

Bearing Area $= \pi/4 (D^2) = \pi/4 (2^2) = 3.14$ ft^2

Nominal Tip Resistance $= q_p A_p$ Eqn 10.8.3.5-2 (1)

$= (60)(3.14) = 188.4$ kips

≈ 188 kips

Elastic Compression of Shaft

$\delta_s = k Q_{TD} L / AE$ Eqn 11.31 (2)

$k = 0.67$

$Q_{TD} = 6.1$ kips

$L = 33$ feet

Geocomp | **CALCULATIONS**

Job Number 220693
Sheet 4 of 5
Date 3/18/19
Computed By RTL
Checked By AVG

Client CME
Project 220693 - Bridge 02931
Subject Drilled Shaft Bearing Capacity & Settlement

	Area (in^2)	E (ksi)
Steel	21.8	29000
Concrete	452.4 − 21.8 = 430.6	$57\sqrt{4000} = 3605$
TOTAL	$\pi/4\,(24)^2 = 452.4$	

$$\Sigma(AE) = 29000(21.8) + 3605(430.6) = 2{,}184{,}513 \text{ kips}$$

$$\delta_s = (0.67)(6.1)(33)/(2184513) = 6.17\times10^{-5} \text{ ft}$$
$$= 7.41\times10^{-4} \text{ in}$$

Following trial + error method (Page 240 ②)

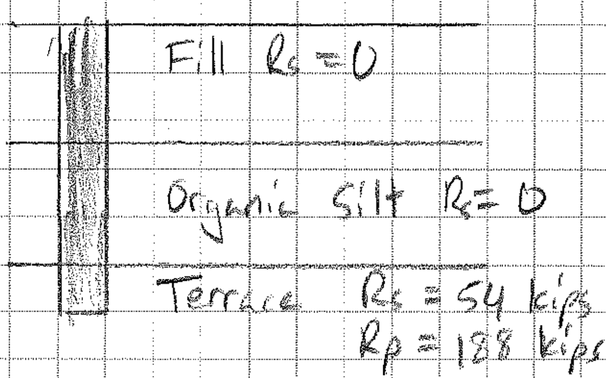
A. Trial deflection @ shaft head = 0.0055 in

B. Average deflection on sides, $w_s = w_T - \delta_s/2$

$$= 0.0055 - \frac{(7.41\times10^{-4})}{2}$$

$$= 0.0051 \text{ in}$$

C.



$\Sigma(R_s) = 0 + 0 + 54 = 54$ kips

$R_p = 188$ kips

$R_T = \Sigma(R_s) + R_p = 54 + 188$
$= 242$ kips

Ultimate Capacity > Applied Load

242 kips > 6.1 kips

Okay

Geocomp — **CALCULATIONS**

Job Number	220693
Sheet	5 of 5
Date	3/18/19
Computed By	RTL
Checked By	AVG

Client: CME

Project: 220693 - Bridge 02931

Subject: Drilled Shaft Bearing Capacity & Settlement

D. $W_s / B = \dfrac{0.0051}{24} \times 100\% = 0.021\%$

Using trendline for Terrace

* Figures 11.10 and 11.11 of Reference ② are the same as Figures 10.8.2.2.2-3 and 10.8.2.2.2-4 of Reference ①

Results

Side Load Transfer / Ultimate Side Load	Side Load Transfer
0.093	0.093 (54) = 5.0 kips

E. Average deflection @ base, $W_B = W_T - \delta_s$

$= 0.0055 - (7.41 \times 10^{-4})$

$= 0.0047$

F. $W_B / B = \dfrac{0.0047}{24} \times 100\% = 0.020\%$

Results

Tip Resistance / Ultimate Tip Resistance	Tip Resistance
0.006	0.006 (188) = 1.1 kips

Σ (Load Transfers) ≈ 5.0 + 1.1 ≈ 6.1 kips

6.1 kips calculated ≈ 6.1 kips applied ✓

SETTLEMENT ≈ 0.005 inches < 0.1 inches

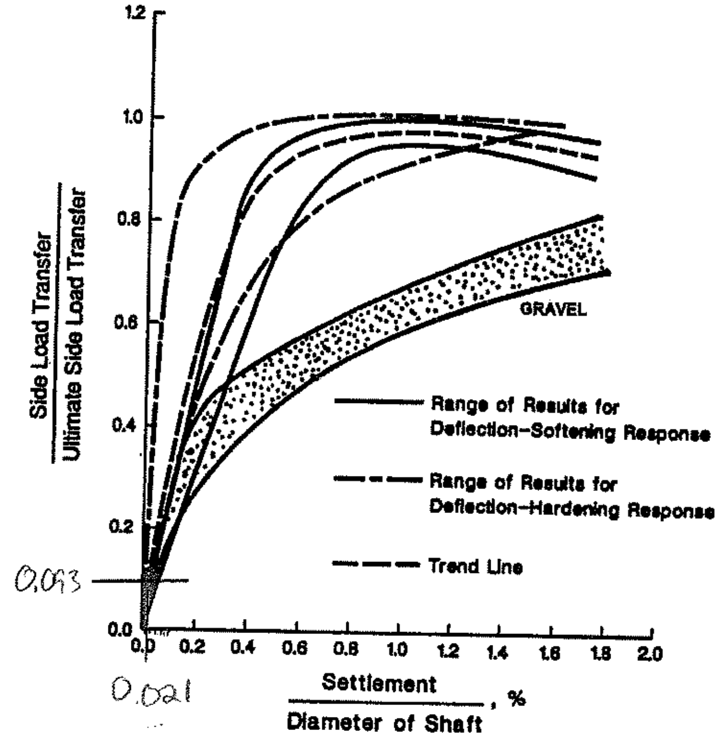


Figure 11.10. Normalized side load transfer for drilled shaft in cohesionless soil

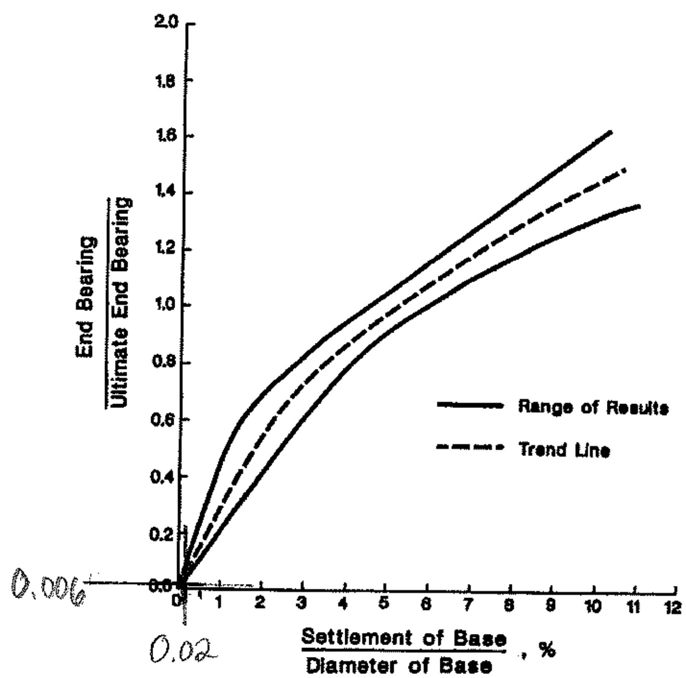


Figure 11.11. Normalized base load transfer for drilled shaft in cohesionless soil.

STEEL BEAM AND COLUMN ANALYSIS / CODE CHECK

Stress Code Check Per AISC 9th Edition Manual (ASD)
For W, S, M, and HP Shapes

Job Name:	220693 - Bridge 02931	Subject:	Drilled Shaft HP Pile Capacity		
Job Number:	220693	Originator:	RTL	Checker:	MC

Input Data:

Member Size:

Select:	HP12x74	

Member Loadings:

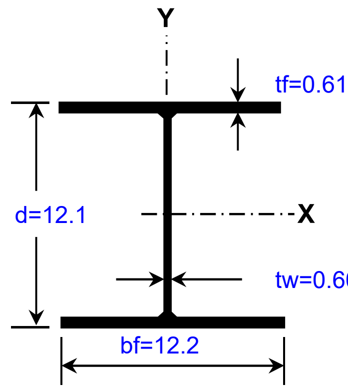
P =	6.10	kips
Mx =	48.00	ft-kips
My =	0.00	ft-kips

Design Parameters:

Fy =	50.00	ksi
Kx =	2.10	
Ky =	2.10	
Lx =	23.000	ft.
Ly =	23.000	ft.
Lb =	23.000	ft.
Cb =	1.00	
Cmx =	1.00	
Cmy =	1.00	
ASIF =	1.000	

Member Properties:

A =	21.80	in.^2
d =	12.100	in.
tw =	0.605	in.
bf =	12.200	in.
tf =	0.610	in.
rt =	3.260	in.
d/Af =	1.63	
Ix =	569.00	in.^4
Sx =	93.80	in.^3
rx =	5.110	in.
Iy =	186.00	in.^4
Sy =	30.40	in.^3
ry =	2.920	in.
J =	2.98	in.^4
Cw =	6170.0	in.^6
Ix =	0.027	ft^4
Iy =	0.009	ft^4
A =	0.410	ft^2



HP12x74 Section

Qs =	1.000
Qa =	1.000

Results:

For Axial Compression:

Kx*Lx/rx =	113.42	
Ky*Ly/ry =	198.49	
Cc =	107.00	
fa =	0.28	ksi
Fa =	3.79	ksi
Pa =	82.63	kips

For X-axis Bending:

Lc =	10.93	ft.
Lu =	20.45	ft.
Lb/rt =	84.66	
fbx =	6.14	ksi
Fbx =	26.67	ksi
Mrx =	208.50	ft-kips

For Y-axis Bending:

fby =	0.00	ksi
Fby =	36.07	ksi
Mry =	91.38	ft-kips

X-axis Euler Stress:

F'ex =	11.61	ksi

Y-axis Euler Stress:

F'ey =	3.79	ksi

Stress Ratio:

S.R. =	**0.304**	Eqn. H1-3

Comments:

Stress Ratio =	0.304	< 1.0 therefore OK	
Allowable B.M.=	208.50	ft-kips	
Aweb=	7.32	in.^2	
Allowable Shear=	146.41	kips	Spec Eq. G2-1 Vn=0.4FyAwCv (Cv=1.0)

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Appendix F

SlopeW Stability Results

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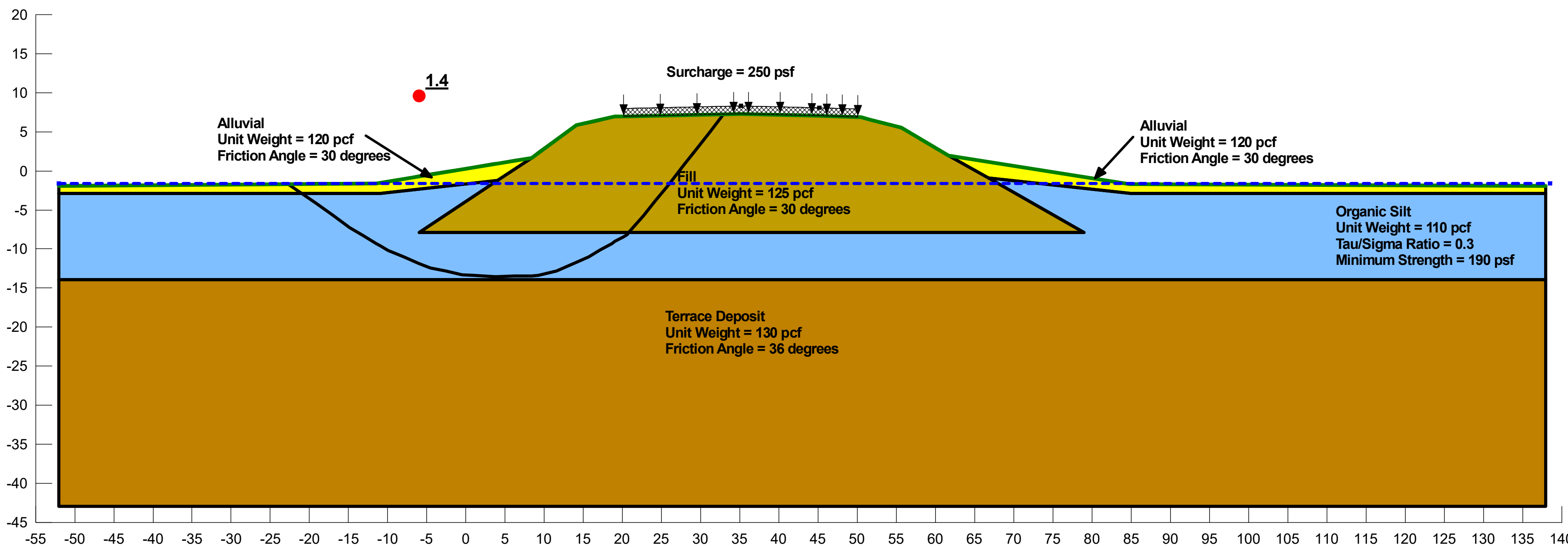
Bridge 02931
Preston, CT

Existing Condition
ST. 83+25



Geocomp CONSULTING, INC.

Bridge 02931
Preston, CT

Proposed Condition
ST. 83+25