Report on Subsurface Investigations and Geotechnical Design Recommendations

Preston Bridge 02932: Route 2A (Poquetanuck Road) over Dickerman's (Halsey) Brook

Preston, Connecticut

125 Nagog Park
Acton, MA 01720

Revision 1
Geocomp Project Number: 220693

March 25, 2019

Submitted to:
Mr. Donald Wurst, P.E.
CME Associates, Inc.
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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 Dickerman's (Halsey) Brook
Bridge No. 02932
Preston, Connecticut

Dear Mr. Wurst:

In accordance with the notice to proceed dated September 8, 2016, Geocomp Consulting, Inc. is pleased to submit this revised draft geotechnical report for the replacement of the Route 2A (Poquetanuck Road) Bridge (ConnDOT Bridge No. 02932) over Dickerman's (Halsey) Brook in Preston, Connecticut. This report supersedes our March 2, 2017 report and presents a summary of site subsurface conditions based on recent site-specific borings, laboratory test results from the recent investigation, available historical borings, and geologic maps of the surrounding area. This report contains geotechnical design 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. 02932 in Preston, CT prepared by CME for the State of Connecticut Department of Transportation (ConnDOT), dated July 2015;
- 90% Submission Design Drawings for Replacement of Bridge No. 02932, Route 2A over Dickerman's Brook, ConnDOT, dated November 11, 2018.
- 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. 02932 was constructed in 1928 and carries Route 2A (Poquetanuck Road) over Dickerman's (Halsey) Brook in Preston, Connecticut. For the remainder of this report, the brook near Bridge 02932 will be referred to as Dickerman's Brook. The current span length between abutments is approximately 12-feet. Available plans for the existing bridge plans are included in Appendix A and the bridge location is shown on Figure 1.

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 bridge is skewed at an angle of approximately 5° in relation to the substructure components and the current span length between abutments is approximately 12-feet.

The existing abutments are reinforced concrete abutments with flared wingwalls. The abutments are embedded in embankments that slope downwards towards Dickerman's Brook at approximately 1H:1V to 1.5H:1V. The existing abutments are supported on shallow foundations. Based on geometry, age of the structure, and subsurface soil conditions it is assumed that the wingwalls are also 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. The existing bridge abutments and foundation are to remain in place and will be used for support of the new bridge deck. 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 installing rip rap along the sides of the existing berm. A 4-foot diameter 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 both east and west of the bridge.

The proposed construction sequence shall be accomplished by utilizing staged construction with one-way alternating traffic. The first stage will be to relocate the existing underground gas line on the south side of the bridge and relocate the overhead utilities around the bridge. The overhead utilities will be relocated with new pole locations and the existing gas line will be rerouted away from the bridge and temporarily supported on a pile and strongback system. A temporary support of excavation system will be installed both east and west of the bridge along the centerline of the roadway to allow for the bridge and roadway rehabilitation work. A temporary water handline cofferdam and bypass pipe will also be installed. The south portion of the bridge deck will be removed, the abutment seat will be replaced, and the south portion of the new deck will then be installed. The new gas line will be connected to the rerouted portion of the gas line and the above-grade portions of temporary pile support system will be removed.

The second stage will be to reroute traffic over the completed southern half of the bridge. The existing HPFF line will be temporarily supported by the existing north wingwalls. The north portion of the bridge deck will be removed, the abutment seat will be replaced, and the north portion of the new deck will then be installed.

The third stage will include finishing roadway repaving work and placing load and seed on the roadway embankment slopes.

In addition to the bridge replacement work, we understand that the Route 2A roadway embankment will be raised by up to approximately 1 foot for a distance extending approximately 200 feet west and east of the bridge.

The proposed construction sequence is shown on the Structure Drawing Set of the 90% Submission Drawings for new bridge, included in Appendix B. The proposed embankment slopes are shown on the Highway Drawing Set of the 90% Submission 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 near 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;
- and older terrace deposits consisting of sand and gravel stream terraces, both cut and depositional terraces.

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 near the bridge site is part of the Proterozoic Sterling Plutonic Group and generally consists of light-pink

to gray Hope Valley Alaskite Gneiss. Bedrock is described as a fine- to medium-grained, equigranular gneiss, composed of quartz, microcline, and albite to sodic olgioclase, magnetite, biotite, and locally contains hornblende. The bedrock becomes increasing sheared towards the Honey Hill fault to the north. Bedrock outcrops are not observed near the bridge area.

Based on the results of recent test 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 Exploration

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 Contractors (NEBC) performed a subsurface exploration program consisting of two borings on the existing abutments and foundation elements between December 12, 2018 and December 14, 2018. The borings were drilled 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.
boring program consisted of two borings, with one boring to be performed within each of the previous northern two test pits, approximately 6 to 12 inches behind the bridge deck. The boring would advance to the top of the abutment foundation or on the abutment and core through the concrete. After the concrete was cored through, split spoon sampling or additional coring was performed to determine the materials beneath the abutment.

One boring (Boring B-1-5) was performed through the western abutment in the westbound lane. One boring (Boring B-1-6) was performed through the eastern abutment in the westbound lane.

These borings ranged in depth from approximately 23 to 31 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.

2.2.2 October 2018 Subsurface Exploration Program

Laydon Industries (Laydon) performed two 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 (T-1-1) was performed on the northwestern corner of the bridge, on top of and behind the existing bridge deck. One test pit (T-1-2) was performed on the northeastern corner of the bridge, on top of and behind the existing bridge deck.

2.2.3 December 2016 Subsurface Exploration Program

NEBC performed an initial subsurface exploration program consisting of four test borings adjacent to the existing abutments between December 1, 2016 and December 9, 2016. The borings were drilled using a Mobile B-53 truck-mounted drill rig.

Three borings (Borings B-1-1, B-1-3, and B-1-4) were performed on the westbound shoulder and within the eastbound lane of US Route 2A behind the existing eastern bridge abutment. One boring (B-1-2) was performed near the centerline of the westbound lane of US Route 2A behind the existing western bridge abutment. Boring B-1-2 was relocated several times due to auger or casing refusal during driving. The presence of an existing 12-inch diameter gas line within the eastbound lane behind the western abutment prevented performance of a boring in this area.

The test borings ranged in depth from approximately 7 to 65 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). In Borings B-1-2D, B-1-3, and B-1-4, 10 to 15 feet of rock core samples were collected using NQ-type core samplers.

The boring logs are included in Appendix B and the boring locations are shown in Figure 2.
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.

2.1.3 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 unconfined compression test on a bedrock sample, and one suite of corrosion potential tests (pH, soil resistivity, sulfate content, chloride content, and oxidation-reduction potential) on one combined soil sample. The gradation tests were used to complete visual field classifications and evaluate engineering properties of the soil. The unconfined compression test was used to determine the strength of the bedrock. All laboratory testing followed ASTM guidelines described in the 2005 Connecticut Geotechnical Engineering Manual. The results of the laboratory tests are included in Appendix C.

2.2 Subsurface Conditions

Based on the recent borings and test pits, subsurface conditions at the bridge site generally consisted of fill over native granular overburden material (coarse to fine sand, some gravel, some silt, and occasional cobbles) over bedrock. A subsurface profile based on the recent boring data is included as Figure 3.

2.2.1 Stratigraphy

A general description of the subsurface conditions encountered in the borings is summarized below. Refer to the boring logs in Appendix B for specific conditions in each boring.

Asphalt and Road Base – Approximately 6 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). The asphalt and road base material generally overlays the fill materials.

Fill – Fill material was found each boring. This material generally consisted of a brown to dark brown, fine to coarse sand with varying amounts of gravel, silt, and occasional traces of wood fragments or fibrous organic soil. The thickness of the fill ranged from approximately 15 to 17 feet. The density of the fill ranged from very loose to very dense with SPT N-values measured in the fill ranged from 1 to split spoon refusal. Excluding the split spoon refusal, the average N-value of the fill is 12. In each boring, occasional cobbles and boulders were encountered in this layer. Split spoon refusal was encountered three times in this soil. Auger refusal was encountered in the fill material at Borings B-1-2A and B-1-2B at depths of 3 feet and 11 feet below ground surface, respectively. The fill generally overlays the alluvial deposit and terrace deposit materials.

Terrace Deposits – Terrace deposits were encountered in all the 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 ranged from approximately 30 to 36 feet across the site. The terrace deposit ranged from dense to very dense with SPT N-values ranging from 11 to SPT-N refusal. Excluding the refusal SPT N-values, the average SPT N-value is 29. Split spoon refusal was encountered 23 times in this soil, two of which were at the interface between the terrace deposit and bedrock. Cobbles and possible boulders were encountered within the terrace soils in each boring. Boulders were encountered within the terrace deposit beneath the bottom of the existing concrete abutment in boring B-1-5. The total thickness of boulders encountered at this location is approximately 10 feet. The boulders consisted of gray and black granite with an RQDs ranging from 0% to 58%. The RQD of 58% was encountered in the top 5 feet of the boulders and an RQD of 0% was encountered in the bottom 5 feet of the cobbles and boulders.

Bedrock – Gneiss was encountered in borings B-1-2D, B-1-3, and B-1-4. Bedrock cores collected from the recent borings were classified as dark olivine to green, hard, crystalline, medium grained Gneiss with a Rock Quality Designation (RQD) ranging from 0% to 100%. The bulk density and unconfined compressive strengths of rock samples were determined in accordance with ASTM D7012. Table 1 summarizes the bulk density and compressive strength of the rock samples tested.

Table 1 – Summary of Bulk Density and Compressive Strength of Rock Samples

Boring #	Rock Type	Depth (ft.)	Bulk Density (pcf)	Compressive Strength (psi)
B-1-4	Gneiss	50	176	14,714

The top of rock elevation varies slightly across the site and generally slopes downwards from east to west. Table 2 shows a summary of the bedrock depths and approximate elevations from the recent subsurface exploration.

Table 2 – Summary of Bedrock Approximate Depths and Elevations

Boring #	Depth to Bedrock, feet [Approximate Elevation, feet]	Location
B-1-1	Bedrock not encountered	Behind North end of East Abutment
B-1-2A		Behind North end of West Abutment
B-1-2B		
B-1-2C	45 [-38.6]	
B-1-2D	Bedrock not encountered	
B-1-3	50 [-43.8]	30' Behind North end of East Abutment
B-1-4	50 [-42.8]	Behind South end of East Abutment
B-1-5	Bedrock Not Encountered	Behind northwest bridge deck and through existing abutment
B-1-6	Bedrock Not Encountered	Behind northeast bridge deck and through existing abutment

2.2.2 Groundwater Observations

Groundwater was encountered in the recent borings at depths below ground surface ranging from approximately five feet at boring B-1-3 to seven feet at boring B-1-1. Groundwater was not encountered in boring B-1-2A. The groundwater observations from the recent subsurface exploration are shown in Table 3.

Table 3 – Summary of 2016 Groundwater Observation

Boring #	Water Depth (feet below ground surface)	Location
B-1-1	7	North end of the Eastern Abutment
B-1-2A	groundwater not encountered	North end of the Western Abutment
B-1-2B	5.5	North end of the Western Abutment
B-1-2C	6	North end of the Western Abutment

B-1-2D	6	North end of the Western Abutment
B-1-3	5	North end of the Eastern Abutment
B-1-4	5.5	South end of the Eastern Abutment
B-1-5	Groundwater not measured due to the use of drilling fluid used during coring operations	North end of Western Abutment
B-1-6	Groundwater not measured due to the use of drilling fluid used during coring operations	North end of Eastern Abutment

Note that groundwater was observed in open borings and may not be stabilized values. Fluctuations in groundwater levels will occur due to variations in precipitation, tide, temperature, 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 east and west abutment foundation bear on different materials. The north side of the western abutment foundation was found to bear on boulders over the terrace deposits. 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 was found to bear directly on the terrace deposits. 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 -14.7 feet, and the elevation of the northwestern abutment is -9.7 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 128 feet and 29 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 Dickerman's Brook. 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 Dickerman's Brook. Therefore, a temporary water-

handling 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 corbel extension, and then disconnected from the existing bridge deck. Following construction, the HPFF line will be reconnected to the new bridge deck or wingwalls. The existing gas line will be temporarily supported by a strong-back system supported by drilled piles.

- **Cobbles and Boulders** – Cobbles and boulders up to approximately 3 feet in diameter were visible during the drilling program along the existing ground surface of Dickerman's Brook 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 temporary cofferdam or support of excavation systems.

- **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 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 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 -14.7 feet and is founded on the terrace deposits. The northern side of the western abutment bears at approximate elevation -9.7 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 new bridge superstructure will be less than the weight of existing superstructure. Provided that the new total dead weight of the superstructure is less than or equal to the existing dead loads on the bridge, 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 4 provides a summary of the laboratory test results.

Table 4 – 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-1-1	S-2	5-12*	4.06	424	1801	357	226
B-1-2C	S-1						
B-1-4	S-3						

*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 elevation and foundation bearing strata are not known for the wingwalls.

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

4.3 New Barrier Walls

We understand that new reinforced concrete barrier walls will be constructed along both the north and south sides of the roadway embankment. The walls are proposed to extend from Stations 61+20 to 61+31.5 on the northwestern corner, 61+63 to 61+95 on the northeastern corner, 60+00 to 61+27.7 on the southwestern corner, and 61+56.4 to 61+85 on the southeastern corner of the roadway embankment. 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 of Sections 5.1 and 5.5 of this report.

Bearing capacity and settlement analyses 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 is listed in Table 5. A minimum footing width of 6 feet was assumed for the barrier wall foundations.

Table 5 – Maximum Design Foundation Pressures for Barrier Wall Spread Footings

Limit State	Maximum Design Foundation Pressure
Service I	2.1 ksf
Strength I	3.3 ksf
Extreme Event II	7.2 ksf

Under these maximum service loads, foundation settlements are not anticipated to exceed 1.0” in total settlement and 0.5” in differential settlement. Most of this settlement will occur concurrently with the application of load to the footings. The potential impact of these anticipated settlements on adjacent utilities supported by the roadway embankment should be considered during barrier wall design.

The maximum net factored bearing resistance for service, strength, and extreme limit states should also not exceed the limits presented in the ConnDOT Bridge Design Manual Section 5.14.2 as shown below in Table 6 below. The maximum foundation pressures listed in Table 5 are for spread footings bearing on all soils.

Table 6 – Maximum Design Foundation Pressures for Spread Footing on Soil

Limit State	Maximum Design Foundation Pressure
Service I	5.6 ksf
Strength I	6.4 ksf
Extreme Event II	7.2 ksf

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 also 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 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 7 – 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 8:

Table 8 – 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.

4.5 Relocated Gas Line

Based on the Utilities Drawing Set of the 90% Submission Drawings dated 3/1/2019 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 north, off of the roadway 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 30 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 presence of cobbles, and boulders within the terrace deposit and the fill, and the potential for driven piles to disturb the existing wing wall and abutment foundations, 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 23 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 9. Calculations for the drilled pile lateral loading and geotechnical and structural capacity are reported in Appendix E.

Table 9 – Drilled Piles

Parameters	Values
Minimum Concrete Compressive Strength	4,000 psi
Minimum Section Modulus	93.8 $in.^3$
Minimum Embedment Depth	23 ft.
Minimum Borehole Diameter	24 in.
Minimum Concrete or Grout Cover	3 in.

4.6 Geotechnical Seismic Design Considerations

4.6.1 Seismic Site Class and Design Category

Based on the recent SPTs performed and Table 3.10.3.1-1 in the AASHTO specifications, this site is classified as a Site Class D. In accordance with AASHTO for Site Class D, 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:

$A_s = 0.16g$ $S_{DS} = 0.267g$ $S_{D1} = 0.144g$

where: A_s is the response spectral acceleration based on Site Class D 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 an $S_{D1} < 0.15$, the site is located in a Seismic Design Zone of 1.

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 02.02 – Highway, dated 3/1/2019, the western and eastern approach embankments between Stations 60+00 and 82+80 are proposed to be raised by up to approximately 1 foot. Both the southern and northern faces of the embankment behind the wingwalls will be armored with rip rap. In addition, existing slopes steeper than 2H:1V will be armored with rip rap. The material used to protection the slope 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. It is our understanding that no new slopes will be constructed with a slope exceeding 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 should be evaluated for external stability and internal stability.

5.0 CONSTRUCTION RECOMMENDATIONS

5.1 Excavation Requirements

Construction of the proposed new bridge seat, bridge deck, and barrier walls will require excavation through roadway asphalt and base and miscellaneous fills. 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 any support of excavation systems and pile foundations. The presence of boulders and cobbles could impact sheet pile and driven-pile installation at the site. Therefore, we recommend that only drilled piles be used for temporary support of the relocated gas line and support of excavation systems. The project specifications should contain provisions to contend with the anticipated boulders in advance of foundation and earth support installation.

5.3 Removal of Existing Structures

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

5.4 Subgrade Preparation, Protection, 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. 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 or unsuitable bearing materials observed at the subgrade elevation 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 material 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 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.

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

Extra care should be used when compacting adjacent to permanent walls including abutments and wingwalls. 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 wall for 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 dams 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 the top of the mudline, and installation of the proposed 4-foot diameter bypass pipe within the construction area beneath the existing bridge. The surface water level within the construction area will be lowered by as much as 6 to 7 feet, depending on the water level reference. Dams cannot 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 risks the stability of the abutments. Cobbles and boulders were also frequently encountered within the terrace deposits and may present obstacles and cause shortstopping of sheeting if driven into the terrace deposits.

Water-inflated temporary cofferdams 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.

5.6 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, observance 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 02932, US Route 2A over Dickerman's Brook, as understood by Geocomp at this time. If proposed bridge loading conditions are changed from those assumed in 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

125 Nagog Park | Acton, MA 01720 | Tel 978 635 0012 | Fax 978 635 0266

NO.	DATE	REVISIONS	INIT.
0	1/18/17	ISSUED	CG

GRAPHIC SCALE

1500 0 1250 1500 3000 6000

(IN FEET)

1 inch = 3000ft.

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CELEBRATING OVER 30 YEARS OF EXCELLENCE

SITE LOCUS PLAN

REPLACEMENT OF BRIDGE NO. 02932
US ROUTE 2A OVER DICKERMAN'S BROOK
PRESTON, CONNECTICUT

PROJECT NUMBER:	220693
DATE:	01-18-2017

DESIGNED	DRAWN	CHECKED
CG	CG	MC

FIGURE 1

D.R.M. RUINS
FR. CAP
CONC. PAD
14"PINE
30" OAK
CJL (2.3)
FIELD LOC. WETLANDS
DICKENMAN'S BROOK
END ANCHOR
SNET #1040
LOW CHORD EL.=3.98
SNET #1039
END ANCH
CHD (FND)
THRUST BLOCK
G.P.S.#2
POQUETANUCK ROAD
(BIT CONC. PAVEMENT)
TEST PIT T-1-1
TEST PIT T-1-2
A
A'
B-1-5
B-1-6
B-1-1
B-1-3
B A D C
B-1-2 Series
BRIDGE #02932
B-1-4
BRUSH
END ANCHOR
C.P.#7
10" TWIN CEDAR
LOW CHORD EL.=4.11
FIELD LOC. WETLANDS
CJL (2.3)

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. 02932
SUBSURFACE
INVESTIGATION PLAN

BRIDGE NO. 02932 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

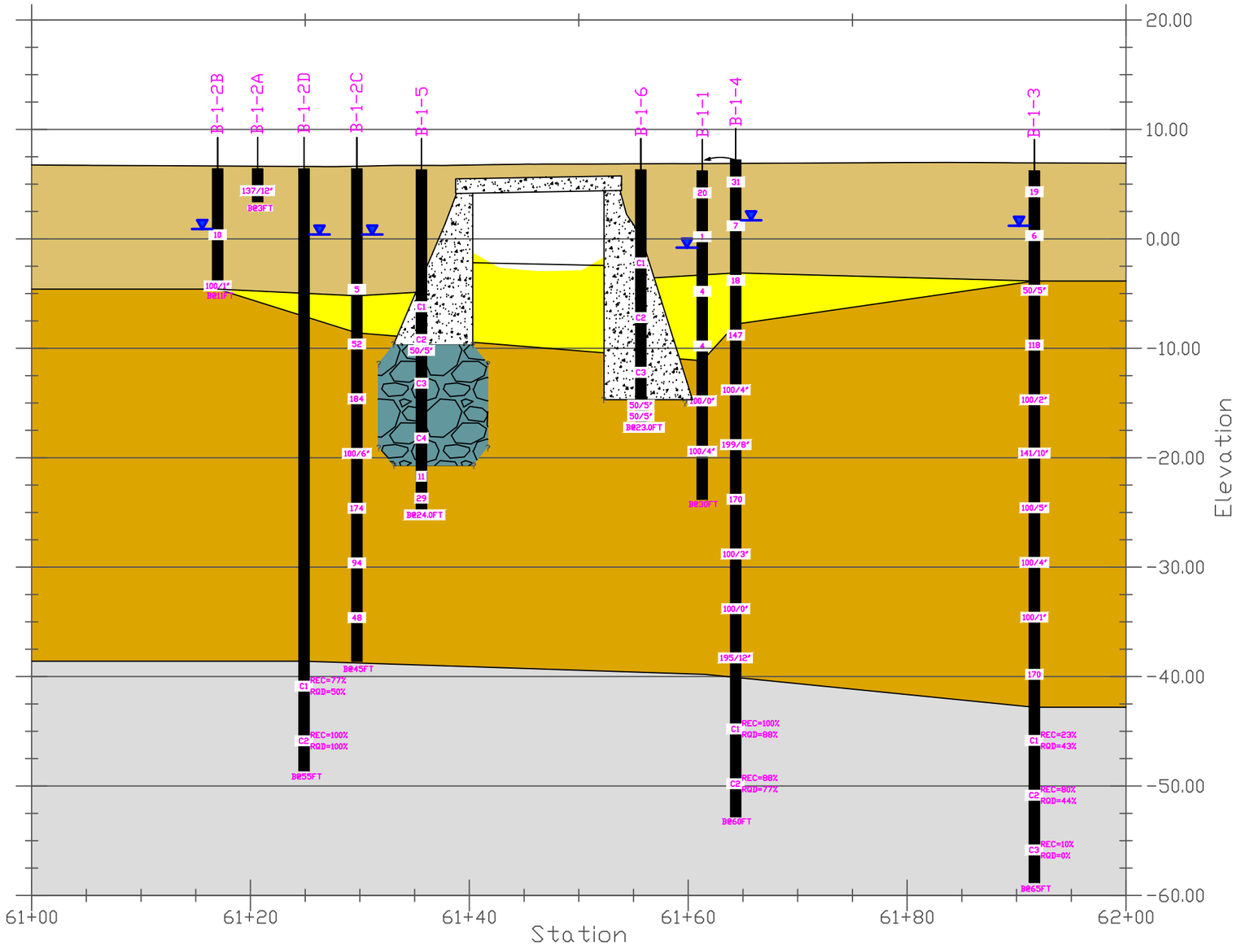
MATERIAL LEGEND

- FILL MATERIAL
- TERRACE MATERIAL
- BEDROCK
- CONCRETE
- BOULDERS
- ALLUVIAL DEPOSITS

NOTES:

1. STRATIFICATION LINES REPRESENT AN APPROXIMATE BOUNDARY BETWEEN SOIL TYPES. ACTUAL TRANSITIONS MAY VARY FROM THOSE SHOWN. REFER TO BORING LOGS FOR DETAILS.
2. B-1-1 THROUGH B-1-4 BORINGS WERE DRILLED BY NEW ENGLAND BORING CONTRACTORS FROM 12/01/2016 TO 12/09/2016.
3. B-1-5 THROUGH B-1-6 BORINGS WERE DRILLED BY NEW ENGLAND BORING CONTRACTORS ON 12/13/2019. 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-1 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. THE EXISTING BRIDGE STRUCTURE PROFILE WAS BASED ON INFORMATION COLLECTED FROM THE 2018 TEST PITS AND BORINGS.
7. WINGWALLS NOT SHOWN FOR CLARITY.

CROSS SECTION A-A'



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NO. | DESCRIPTION | DATE | DESIGNED BY: NB | DRAWN BY: MTH | CHECKED BY: MC

SUBSURFACE PROFILE

BRIDGE NO. 02932 IN PRESTON, CONNECTICUT
ROUTE 2A OVER DICKERMANS BROOK

PRESTON, CONNECTICUT

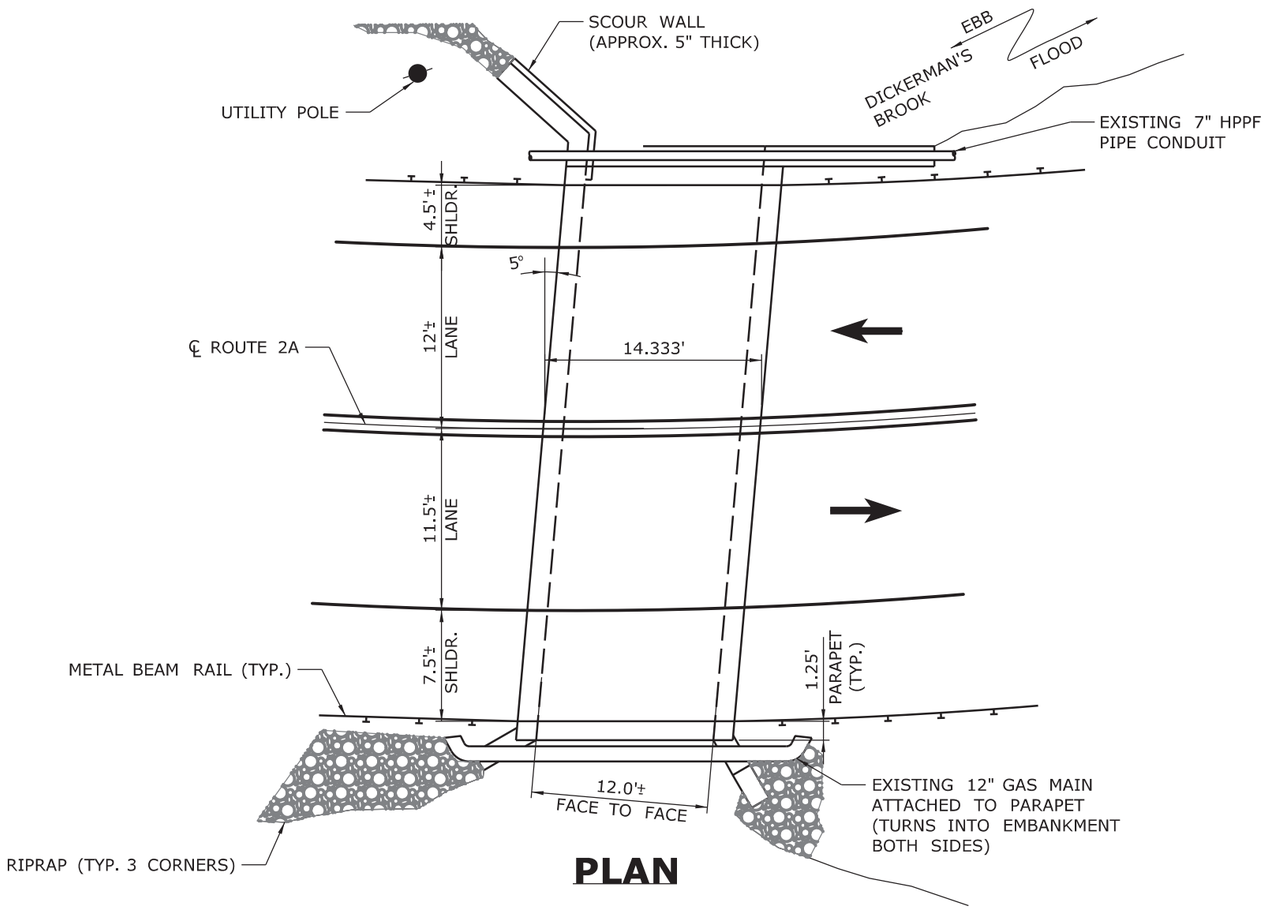
JOB #	220693
DATE:	1/16/2019
SCALE:	NTS
SHEET	3

Geocomp

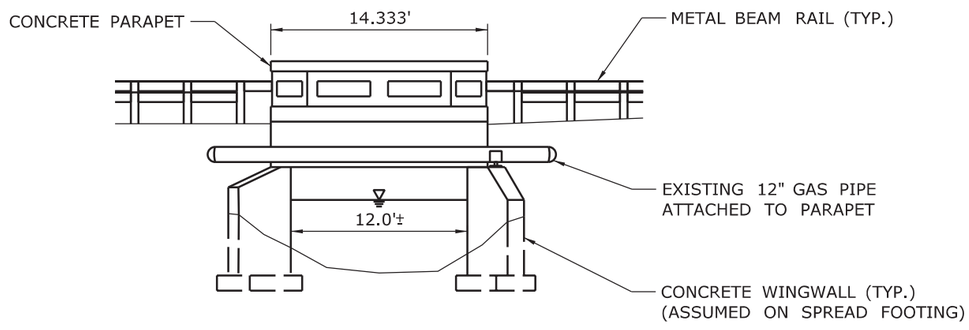
Appendix A

Existing and Proposed Bridge Drawings

125 Nagog Park | Acton, MA 01720 | Tel 978 635 0012 | Fax 978 635 0266

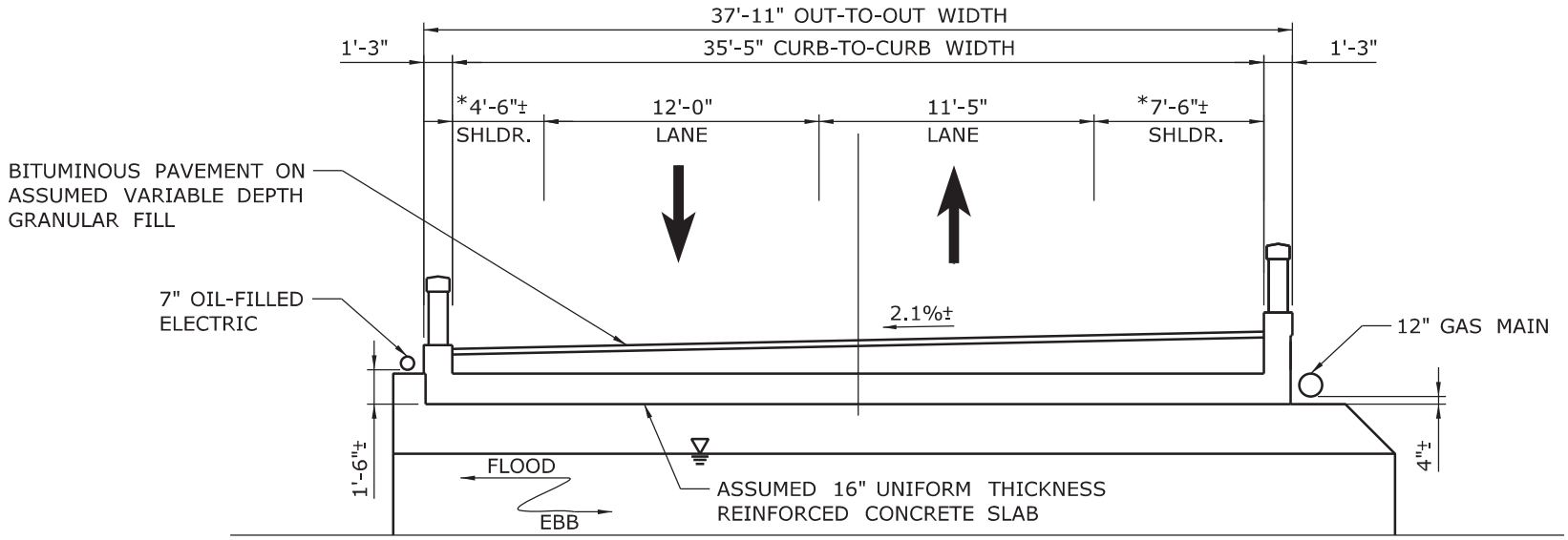


PLAN



ELEVATION

	STATE OF CONNECTICUT DEPARTMENT OF TRANSPORTATION		CME Associates, Inc. CONSULTING ENGINEERS & ENVIRONMENTAL PLANNERS 333 E. RIVER DR., SUITE 400 EAST HARTFORD, CT 06108	DRAWING TITLE: **EXISTING PLAN AND ELEVATION**	STATE PROJECT NO.: 113-108 DATE: 05/2015 SHEET NO.: 1 OF 2
	CITY/TOWN: PRESTON	BRIDGE NO.: 02932	SCALE: 1"=10'		



* SHOULDER WIDTH VARIES DUE TO ROADWAY HORIZONTAL CURVE

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

CITY/TOWN:	BRIDGE NO.:	SCALE:
PRESTON	02932	1/8" = 1'

DRAWING TITLE: **EXISTING SECTION**

STATE PROJECT NO.:	DATE:	SHEET NO.:
113-108	05/2015	2 OF 2

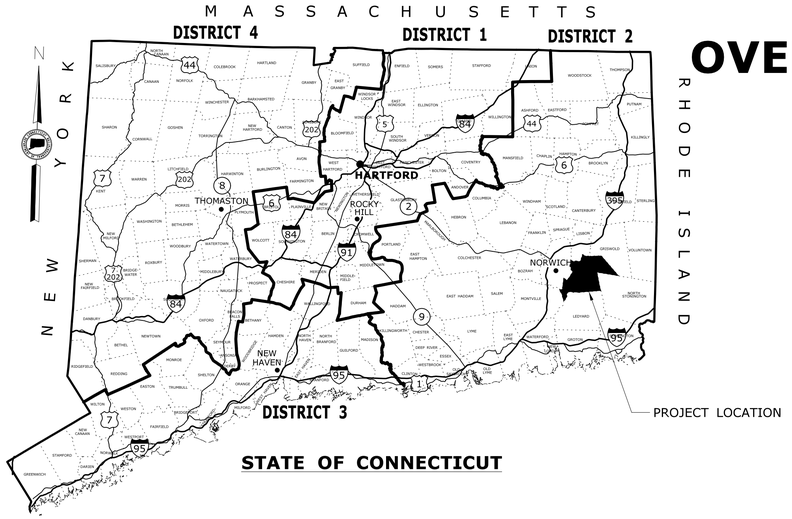
CONNECTICUT DEPARTMENT OF TRANSPORTATION

Plans For

REHABILITATION OF BRIDGE NO. 02932 ROUTE 2A OVER DICKERMANS (HALSEY) BROOK

Town of

PRESTON



STATE OF CONNECTICUT

ROAD	MAINTENANCE RESPONSIBILITY	LENGTH
BRIDGE NO. 02932 Route 2A (0113-0108)	STATE	580 FEET

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

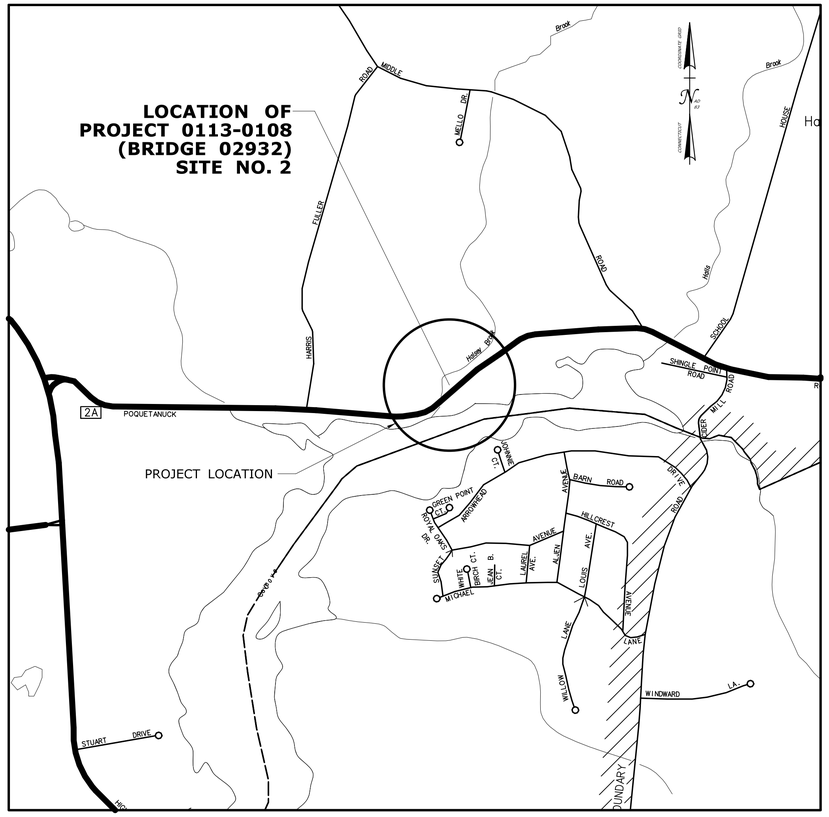
GENERAL NOTES:

1. FEDERAL AID PROJECT NO. TBD
2. CONSTRUCTION SPECIFICATIONS:
   Connecticut Department of Transportation, Standard Specifications for Roads, Bridges, Facilities and Incidental Construction, Form 817, dated 2016; Supplemental Specifications, dated July 2018; and Special Provisions.
3. 400 FOOT GRID BASED ON CONNECTICUT COORDINATE SYSTEM N.A.D. 1983 (2011 EPOCH 2010.00 GEOID 12A.
4. VERTICAL DATUM BASED ON NAVD 1988.
5. SURVEYED BY: CTDOT District No. 2, REV. 10-30-2018.

DESIGN CRITERIA

DESIGN STANDARD: CTDOT HIGHWAY DESIGN MANUAL, 2003 EDITION REV. 2013
ROUTE 2A:
FUNCTIONAL CLASSIFICATION: URBAN PRINCIPAL ARTERIAL - OTHER
POSTED SPEED: 25/30 MPH
DESIGN SPEED: 35 MPH
YEAR ADT: 13,100 VEHICLES (3% TRUCKS)

LOCATION PLAN
NOT TO SCALE



LOCATION PLAN
NOT TO SCALE

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.

LIST OF SUBSETS

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

SUBSET NO.	SUBSET TITLE	*SUBSET SHEET COUNT
02.01	GENERAL	3
02.02	HIGHWAY	13
02.03	STRUCTURE	15
02.04	TRAFFIC	10
02.05	UTILITY	8
	CTDOT HIGHWAY STANDARD DETAILS	14
	CTDOT TRAFFIC STANDARD DETAILS	

LIST OF DRAWINGS
SUBSET 02.01 - GENERAL

DRAWING TITLE	DRAWING NO.
TITLE SHEET	G-01
DETAILED ESTIMATE	G-02
DETAILED ESTIMATE	G-03

STANDARD CONVENTIONS

North Arrow W/No. Coor.
Grid Arrow
Edge Of Road
Concrete Pavement
Dirt Road
B.C.L.C.
Granite Curb
Guide Rail
Concrete Median Barrier
Bit. Walk
Conc. Sidewalk
Railroad Tracks
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. 02932 ROUTE 2A
OVER DICKERMANS (HALSEY) BROOK

Town
PRESTON

STATE PROJECT NO.
0113-0108

DRAWING NO.
G-01

SHEET NO.

HIGHWAY ITEMS

ITEM NUMBER	0201001	0202000	0202100	0202216A	0202529	0209001	0212000	0213100	0219001	0305000	0404101A	0406170	0406171	0406236	0406275A	0703012	0755014	0910136	0910173	0910300	0911924	0912503	0922501	0939001	0942001	0943001	0944000	0950005	0950202A	0969062A	0975004	0980001	1803300	
ITEM	CLEARING AND GRUBBNG	EARTH EXCAVATION	ROCK EXCAVATION	EXCAVATION AND REUSE OF EXISTING CHANNEL BOTTOM MTERIAL	CUT BITUMINOUS CONCRETE PAVEMENT	FORMATION OF SUBGRADE	SUBBASE	GRANULAR FILL	SEDIMENTATION CONTROL SYSTEM	PROCESSED AGGREGATE	BITUMINOUS CONCRETE PATCHING-PARTIAL DEPTH	HMA S1	HMA S0.5	MATERIAL FOR TACK COAT	FINE MILLING OF BITUMINOUS CONCRETE (0 TO 4 INCHES)	MODIFIED RIPRAP	GEOTEXTILE (SEPARATION - HIGH SURVIVABILITY)	8'-6" CURVED GUIDERAIL TREATMENT	R-B 350 BRIDGE ATTACHMENT - VERTICAL SHAPED PARAPET	METAL BEAM RAIL (R-B MASH)	R-B END ANCHORAGE - TYPE II	REMOVE METAL BEAM RAIL	BITUMINOUS CONCRETE DRIVEWAY	SWEEPING FOR DUST CONTROL	CALCIUM CHLORIDE FOR DUST CONTROL	WATER FOR DUST CONTROL	FURNISHING AND PLACING TOPSOIL	TURF ESTABLISHMENT	SHORELINE GRASS ESTABLISHMENT	CONSTRUCTION FIELD OFFICE, MEDIUM	MOBILIZATION AND PROJECT CLOSEOUT	CONSTRUCTION STAKING	IMPACT ATTENUATION SYSTEM (TANGENTIAL)	
UNIT	L.S.	C.Y.	C.Y.	C.Y.	L.F.	S.Y.	C.Y.	C.Y.	L.F.	TON	SY	TON	TON	GAL.	S.Y.	C.Y.	S.Y.	EA.	EA.	L.F	EA.	L.F	S.Y.	HR	TON	M.GA.	S.Y.	S.Y.	S.Y.	MO.	L.S.	L.S.	EA.	
BRIDGE NO. 02932	1	595	30	10	450	1020	345	40	1235	195	20	215	500	215	1105	165	244	1	4	950	1	664	255	160	1.0	7	405	405	320	12	1	1	2	
SUBTOTAL	1	595	30	10	450	1020	345	40	1235	195	20	215	500	215	1105	165	244	1	4	950	1	664	255	160	1	7	405	405	320	12	1	1	2	
UNASSIGNED																																		
TOTAL	1	595	30	10	450	1020	345	40	1235	195	20	215	500	215	1105	165	244	1	4	950	1	664	255	160	1	7	405	405	320	12	1	1	2	

STRUCTURE ITEMS

ITEM NUMBER	0203000	0204402A	0213100	0216000	0402401A	0406171	0406173	0503152A	0514201	0514217	0521001	0601070A	0601201	0601504	0602000	0602006	0602910A	0707009A	0708001	0714050A	0715050A	0721821	0819002A	0822005A	0822006A	0904990A	0974001A	1504010A	1507000	0601OXX	
ITEM	STRUCTURE EXCAVATION - EARTH (COMPLETE)	HANDLING WATER (SITE NO. 2)	GRANULAR FILL	PERVIOUS STRUCTURE BACKFILL	SAWING AND SEALING JOINTS IN BITUMINOUS CONCRETE PAVEMENT	HMA S0.5	HMA S0.25	REMOVAL OF SUPERSTRUCTURE (SITE NO. 2)	PRESTRESSED DECK UNITS (3'-0" x 1'-0")	PRESTRESSED DECK UNITS (4'-0" x 1'-0")	ELASTOMERIC BEARING PADS	CLASS "S" CONCRETE	CLASS "F" CONCRETE	1" PERFORMED EXPANSION JOINT FILLER FOR BRIDGES	DEFORMED STEEL BARS	DEFORMED STEEL BARS - EPOXY COATED	DRILLING HOLES AND GROUTING DOWELS	MEMBRANE WATERPROOFING (COLD LIQUID ELASTOMERIC)	DAMPPROOFING	TEMPORARY EARTH RETAINING SYSTEM	EARTH RETAINING SYSTEM LEFT IN PLACE	STRUCTURAL UNDEREDRAIN	PENETRATING SEALER PROTECTIVE COMPOUND	TEMPORARY PRECAST CONCRETE BARRIER CURB (STRUCTURE)	RELOCATED TEMPORARY PRECAST CONCRETE BARRIER CURB (STRUCTURE)	METAL BRIDGE RAIL	REMOVAL OF EXISTING MASONRY	TEMPORARY SUPPORT OF UTILITIES	PROTECTION AND SUPPORT OF EXISTING UTILITIES	ULTRA HIGH PERFORMANCE CONCRETE KEYWAYS	
UNIT	C.Y.	L.S.	C.Y.	C.Y.	L.F.	TON	TON	L.S.	L.F.	L.F.	C.I.	C.Y.	C.Y.	S.F.	LB.	LB.	L.F.	S.Y.	S.Y.	S.F.	S.F.	L.F.	S.Y.	L.F.	L.F.	L.F.	C.Y.	L.S.	L.S.	C.Y.	
BRIDGE NO. 02932	342	1	71	197	68	8	12	1	46	108	3960	3	169	85	12771	806	228	79	334	1211	606	224	84	20	20	181	3	1	1	2	
SUBTOTAL	342	1	71	197	68	8	12	1	46	108	3960	3	169	85	12771	806	228	79	334	1211	606	224	84	20	20	181	3	1	1	2	
UNASSIGNED																															
TOTAL	342	1	71	197	68	8	12	1	46	108	3960	3	169	85	12771	806	228	79	334	1211	606	224	84	20	20	181	3	1	1	2	

FINAL DESIGN REVIEW

REV.	DATE	REVISION DESCRIPTION	SHEET NO.

Plotted Date: 3/1/2019

DESIGNER/DRAFTER: KM

CHECKED BY: SG

STATE OF CONNECTICUT
DEPARTMENT OF TRANSPORTATION

Filename: ...\HW_MSH_0113_0108_G-2.dgn

SIGNATURE/ BLOCK:

PROJECT TITLE:
REHABILITATION OF BRIDGE NO. 02932 ROUTE 2A OVER HALSEY BROOK

TOWN: **PRESTON**

DRAWING TITLE: **DETAILED ESTIMATE SHEET - 1**

PROJECT NO. **0113-0108**

DRAWING NO. **G-02**

SHEET NO.

TRAFFIC ITEMS

ITEM NUMBER	0822001	0822002	0970007A	0971001A	0976002	0978002	0979003	0981100	1020030	1118101	1205217	1206013	1208931	1209114	1209124	1209131	1210101	1210102	1216020	1220013	1220027	1802210.04	1802210.07	1802210.14	1802210.21	1802211.04	1802211.07	1802211.14	1802211.21	
ITEM	TEMPORARY PRECAST CONCRETE BARRIER CURB	RELOCATED TEMPORARY PRECAST CONCRETE BARRIER CURB	TRAFFICPERSON (UNIFORMED FLAGGER)	MAINTENANCE AND PROTECTION OF TRAFFIC	BARRICADE WARNING LIGHTS - HIGH INTENSITY	TRAFFIC DRUM	CONSTRUCTION BARRICADE TYPE III	42" TRAFFIC CONE	TEMPORARY ILLUMINATION UNIT	TEMPORARY SIGNALIZATION	TYPE DE-7D DELINEATOR	REMOVAL OF EXISTING SIGNING	SIGN FACE SHEET ALUMINUM (TYPE IX RETROREFLECTIVE SHEETING)	HOT-APPLIED PAINTED PAVEMENT MARKINGS 4" YELLOW	HOT-APPLIED PAINTED PAVEMENT MARKINGS 4" WHITE	HOT-APPLIED PAINTED LEGEND, ARROWS AND MARKINGS	4" WHITE EPOXY RESIN PAVEMENT MARKINGS	4" YELLOW EPOXY RESIN PAVEMENT MARKINGS	4" BLACK AGGREGATE COVER UP	CONSTRUCTION SIGNS - BRIGHT FLUORESCENT SHEETING	CONSTRUCTION SIGNS	TEMPOARARY SAND BARREL (400 LB)	TEMPORARY SAND BARREL (700 LB)	TEMPORARY SAND BARREL (1400 LB)	TEMPORARY SAND BARREL (2100 LB)	RELOCATION OF TEMPORARY SAND BARREL (400 LB)	RELOCATION OF TEMPORAR YSAND BARREL (700 LB)	RELOCATION OF TEMPORARY SAND BARREL (1400 LB)	RELOCATION OF TEMPORARY SAND BARREL (2100 LB)	
UNIT	L.F.	L.F.	HR.	L.S.	DAY	EA.	EA.	EA.	EA.	L.S.	EA.	L.S.	S.F.	L.F.	L.F.	S.F.	L.F.	L.F.	L.F.	SF	S.F.	EA.	EA.	EA.	EA.	EA.	EA.	EA.	EA.	
BRIDGE NO. 02932	380	360	1268	1	1500	25	8	25	2	1	19	1	70	5000	5000	112	1220	1220	2000	230	500	2	6	8	4	2	6	8	4	
SUBTOTAL	380	360	1268	1	1500	25	8	25	2	1	19	1	70	5000	5000	112	1220	1220	2000	230	500	2	6	8	4	2	6	8	4	
UNASSIGNED																														
TOTAL	380	360	1268	1	1500	25	8	25	2	1	19	1	70	5000	5000	112	1220	1220	2000	230	500	2	6	8	4	2	6	8	4	

FINAL DESIGN REVIEW

REV.	DATE	REVISION DESCRIPTION	SHEET NO.

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CHECKED BY: SG

STATE OF CONNECTICUT
DEPARTMENT OF TRANSPORTATION

Filename: ...\HW_MSH_0113_0108_G-3.dgn

SIGNATURE/ BLOCK:

PROJECT TITLE:
REHABILITATION OF BRIDGE NO. 02932 ROUTE 2A OVER DICKERMANS BROOK

TOWN: **PRESTON**

DRAWING TITLE: **DETAILED ESTIMATE SHEET - 2**

PROJECT NO. **0113-0108**

DRAWING NO. **G-03**

SHEET NO.

02.02 - HIGHWAY
INDEX OF DRAWINGS

DRAWING NUMBER	DRAWING TITLE	DRAWING NUMBER	DRAWING TITLE
INX-01	HIGHWAY - INDEX OF DRAWINGS		
TYP-01	TYPICAL SECTIONS 1		
TYP-02	TYPICAL SECTIONS 2		
MDS-01	MISCELLANEOUS DETAILS		
HWY-01	HIGHWAY PLAN		
PRO-01	HIGHLAND PROFILE		
ROW-01	RIGHT OF WAY PLAN		
SED-01	SEDIMENTATION AND EROSION CONTROL PLAN		
XSC-01 TO XSC-05	CROSS SECTIONS		

DESIGNED BY:
AI ENGINEERS, INC.

FINAL DESIGN REVIEW

REV.	DATE	REVISION DESCRIPTION	SHEET NO.

Plotted Date: 3/1/2019

DESIGNER/DRAFTER: KM
CHECKED BY: SG

STATE OF CONNECTICUT
DEPARTMENT OF TRANSPORTATION

Filename: ...\01 SB_MSH_113-108_HWY INDEX.dgn

SIGNATURE/ BLOCK:

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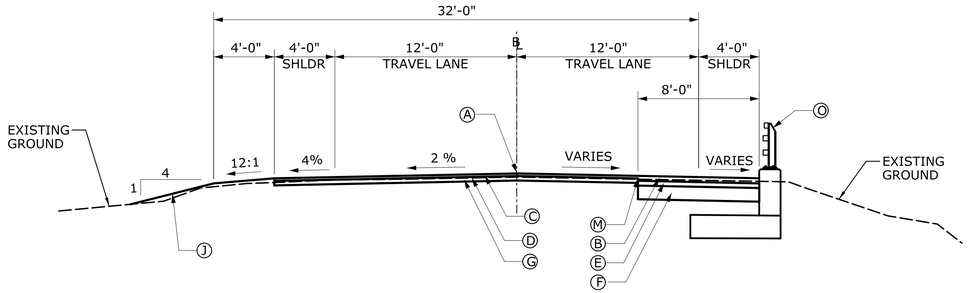
PROJECT TITLE:
REHABILITATION OF BRIDGE NO. 02932 ROUTE 2A OVER HALSEY BROOK

TOWN: **PRESTON**

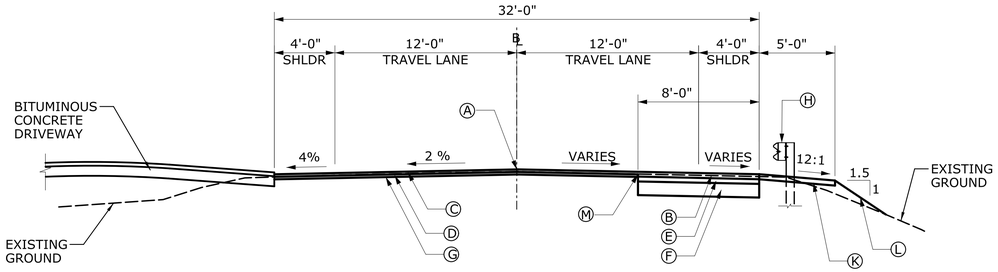
DRAWING TITLE: **HIGHWAY INDEX OF DRAWINGS**

PROJECT NO. **0113-0108**
DRAWING NO. **INX-01**
SHEET NO.



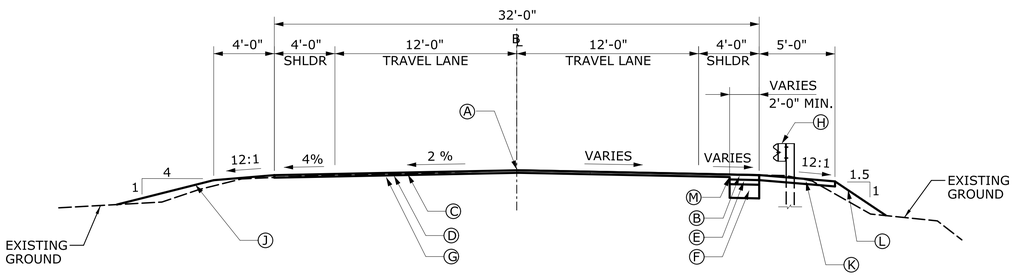
TYPICAL CROSS SECTION ROUTE 2A

STA. 60+00 TO STA. 60+40
NOT TO SCALE



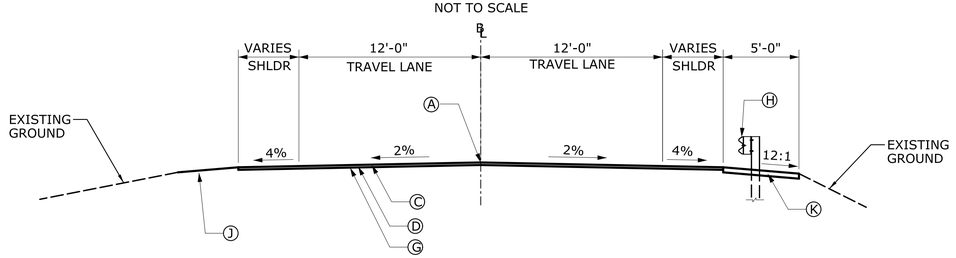
TYPICAL CROSS SECTION ROUTE 2A

STA. 59+98 TO STA. 60+00
NOT TO SCALE



TYPICAL CROSS SECTION ROUTE 2A

STA. 59+50 TO STA. 59+98
NOT TO SCALE



TYPICAL CROSS SECTION ROUTE 2A

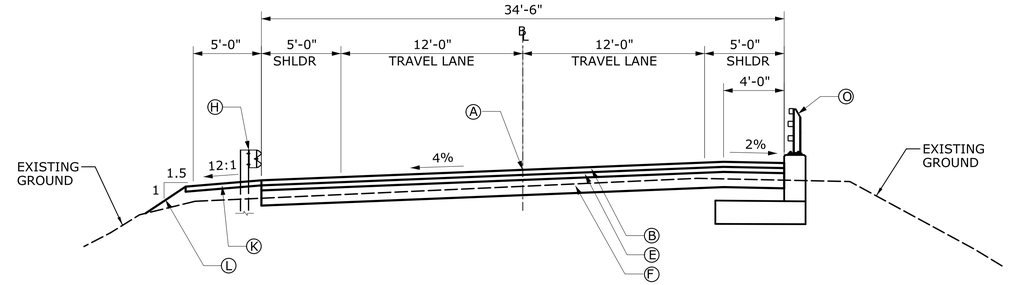
STA. 59+20 TO STA. 59+50
NOT TO SCALE

LEGEND

- Ⓐ POINT OF APPLICATION OF GRADE
- Ⓑ 4" HMA S0.5 TRAFFIC LEVEL 2 (PLACED IN TWO EQUAL LIFTS)
- Ⓒ 2" HMA S0.5 TRAFFIC LEVEL 2
- Ⓓ HMA S0.5 TRAFFIC LEVEL 2 WEDGE COURSE (PLACED IN MULTIPLE LIFTS, 1" MIN, 3 1/2" MAX)
- Ⓔ 4" HMA S1.0 TRAFFIC LEVEL 2
- Ⓕ 12" SUBBASE
- Ⓖ 2" FINE MILLING DEPTH FROM EXISTING
- Ⓗ METAL BEAM RAIL (R-B MASH)
- Ⓘ 4" TOPSOIL AND SHORELINE GRASS ESTABLISHMENT
- Ⓙ 4" TOPSOIL AND TURF ESTABLISHMENT
- Ⓚ PROCESSED AGGREGATE
- Ⓛ STEEPENED SLOPE PROTECTION
- Ⓜ SAW CUT PAVEMENT
- Ⓞ METAL BRIDGE RAIL

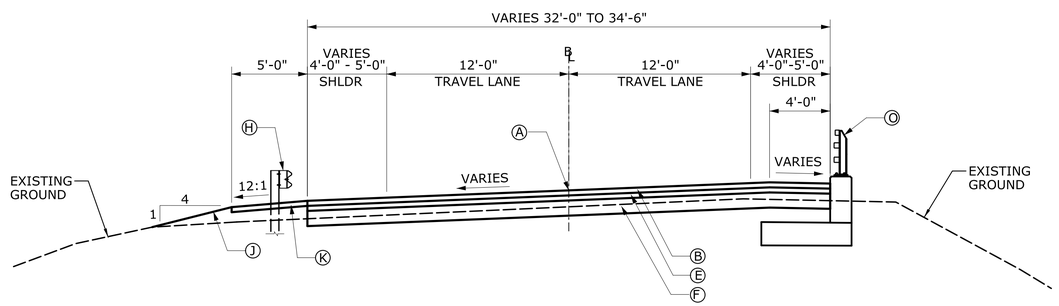
GENERAL NOTES:

1. SURVEY INFORMATION IS BASED UPON FIELD SURVEY PERFORMED BY CONNDOT DISTRICT 2. 400 FOOT GRID BASED ON CONNECTICUT COORDINATE SYSTEM N.A.D. 1983. ALL ELEVATIONS REFER TO THE NORTH AMERICAN VERTICAL DATUM OF 1988. RIGHT OF WAY AND PROPERTY LINE INFORMATION AND ABUTTERS HAVE BEEN SHOWN ON THE PLANS BASED UPON INFORMATION FURNISHED BY THE CONNDOT DISTRICT 2.
2. INFORMATION REGARDING THE LOCATION OF EXISTING UTILITIES HAS BEEN BASED UPON AVAILABLE INFORMATION AND MAY BE INCOMPLETE, AND WHERE SHOWN SHOULD BE CONSIDERED APPROXIMATE. THE LOCATION OF ALL EXISTING UTILITIES SHOULD BE CONFIRMED PRIOR TO THE BEGINNING OF CONSTRUCTION. CALL "CALL BEFORE YOU DIG", 1-800-922-4455. ALL UTILITY LOCATIONS THAT DO NOT MATCH THE VERTICAL OR HORIZONTAL CONTROL SHOWN ON THE PLANS SHALL IMMEDIATELY BE BROUGHT TO THE ATTENTION OF THE ENGINEER FOR RESOLUTION.
3. ALL DIMENSIONS AND ELEVATIONS SHALL BE VERIFIED IN THE FIELD BY THE CONTRACTOR, PRIOR TO CONSTRUCTION. ANY DISCREPANCIES SHALL BE BROUGHT TO THE ATTENTION OF THE ENGINEER IMMEDIATELY FOR DETERMINATION.
4. SEDIMENT AND EROSION CONTROL MEASURES AS DEPICTED ON THESE PLANS SHALL BE IMPLEMENTED 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.
5. THE CONTRACTOR SHALL COORDINATE CONSTRUCTION WITH APPROPRIATE UTILITY COMPANIES REGARDING RELOCATIONS OF THEIR FACILITIES AND SCHEDULING OF SUCH WORK.
6. THE CONTRACTOR SHOULD 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.
7. ALL SLOPES OR DISTURBED AREAS ARE TO BE STABILIZED WITH 4" TOPSOIL AND SHORELINE GRASS 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".
8. 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 SEPARATE 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.



TYPICAL CROSS SECTION ROUTE 2A

STA. 61+11 TO STA. 61+20
NOT TO SCALE



TYPICAL CROSS SECTION ROUTE 2A

STA. 60+40 TO STA. 61+11
NOT TO SCALE

FINAL DESIGN REVIEW

REV.	DATE	REVISION DESCRIPTION	SHEET NO.

Plotted Date: 3/1/2019

DESIGNER/DRAFTER: ML
CHECKED BY: SG
SCALE AS NOTED

STATE OF CONNECTICUT
DEPARTMENT OF TRANSPORTATION

Filename: ...\HW_MSH_0113_0108_TYP-1.dgn

SIGNATURE/ BLOCK:

AI Engineers, Inc.
919 MIDDLE STREET
MIDDLETOWN, CT 06457
Phone: (860) 635-7740
Fax: (860) 635-7312

PROJECT TITLE:
REHABILITATION OF BRIDGE NO. 02932 ROUTE 2A OVER DICKERMANS BROOK

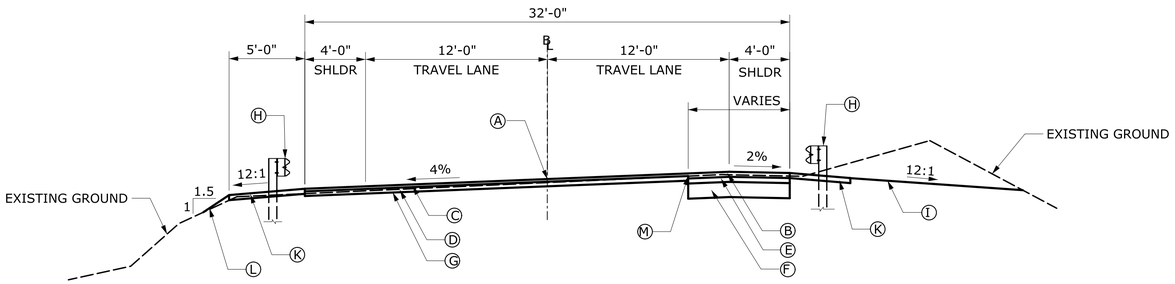
TOWN: **PRESTON**

DRAWING TITLE: **TYPICAL SECTIONS 1**

PROJECT NO. **0113-0108**

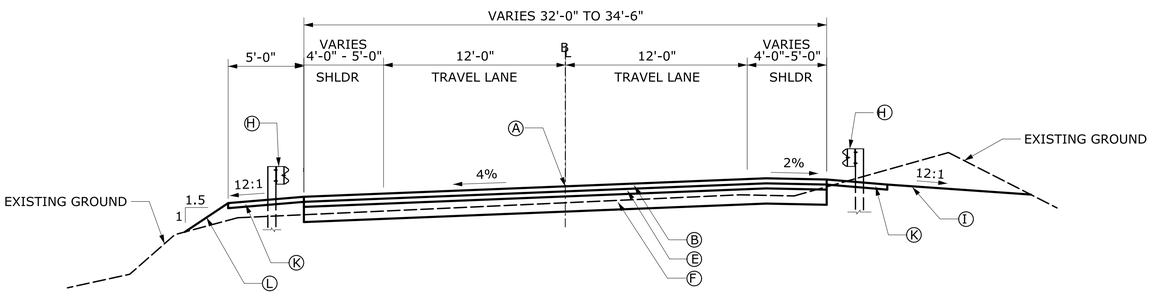
DRAWING NO. **TYP-01**

SHEET NO.



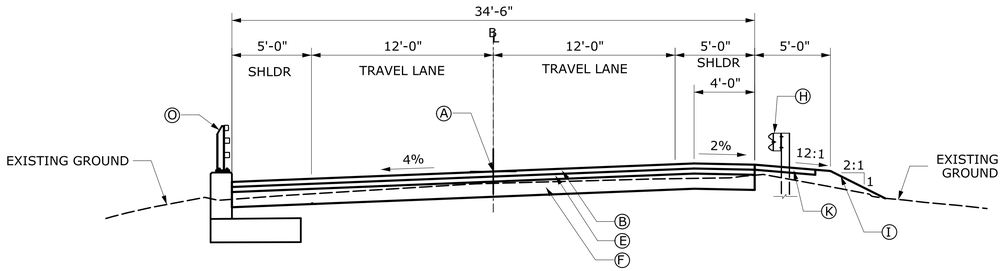
TYPICAL CROSS SECTION ROUTE 2A

STA. 62+50 TO STA. 63+43
NOT TO SCALE



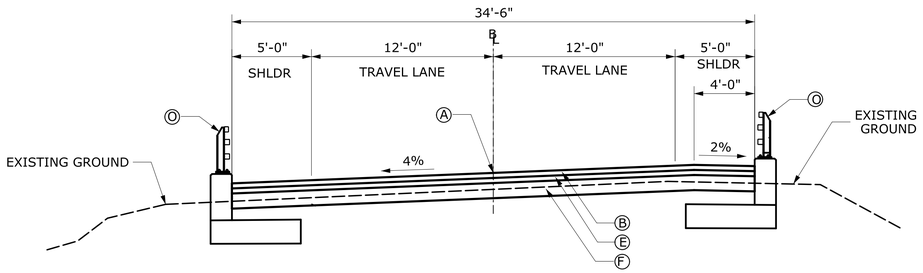
TYPICAL CROSS SECTION ROUTE 2A

STA. 61+95 TO STA. 62+50
NOT TO SCALE



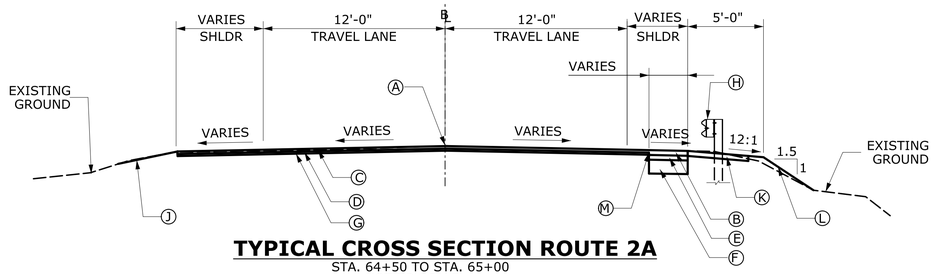
TYPICAL CROSS SECTION ROUTE 2A

STA. 61+85 TO STA. 61+95
NOT TO SCALE



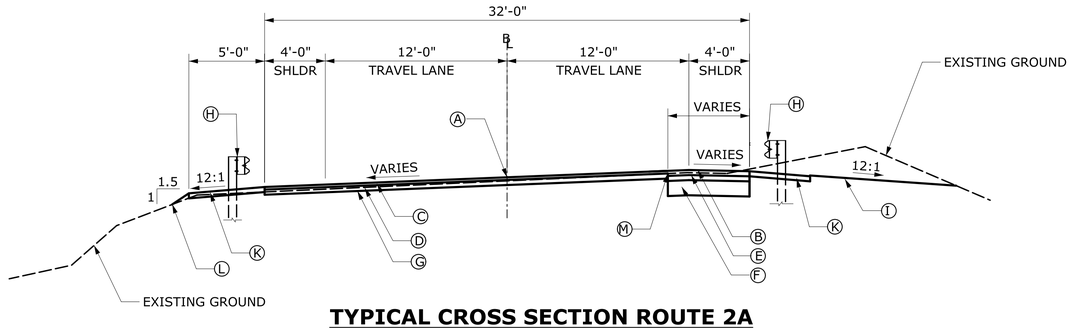
TYPICAL CROSS SECTION ROUTE 2A

STA. 61+20 TO STA. 61+85
NOT TO SCALE



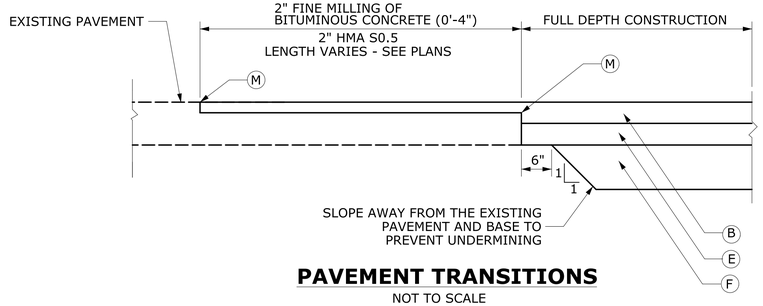
TYPICAL CROSS SECTION ROUTE 2A

STA. 64+50 TO STA. 65+00
NOT TO SCALE



TYPICAL CROSS SECTION ROUTE 2A

STA. 63+43 TO STA. 64+50
NOT TO SCALE



PAVEMENT TRANSITIONS

NOT TO SCALE

LEGEND

- (A) POINT OF APPLICATION OF GRADE
- (B) 4" HMA S0.5 TRAFFIC LEVEL 2 (PLACED IN TWO EQUAL LIFTS)
- (C) 2" HMA S0.5 TRAFFIC LEVEL 2
- (D) HMA A0.5 TRAFFIC LEVEL 2 WEDGE COURSE (PLACED IN MULTIPLE LIFTS 1" MIN, 3 1/2" MAX)
- (E) 4" HMA S1.0 TRAFFIC LEVEL 2
- (F) 12" SUBBASE
- (G) 2" FINE MILLING DEPTH FROM EXISTING
- (H) METAL BEAM RAIL (R-B MASH)
- (I) 4" TOPSOIL AND SHORELINE GRASS ESTABLISHMENT
- (J) 4" TOPSOIL AND TURF ESTABLISHMENT
- (K) PROCESSED AGGREGATE
- (L) STEEPENED SLOPE PROTECTION
- (M) SAW CUT PAVEMENT
- (O) METAL BRIDGE RAIL

FINAL DESIGN REVIEW

REV.	DATE	REVISION DESCRIPTION	SHEET NO.

Plotted Date: 3/1/2019

DESIGNER/DRAFTER: ML
CHECKED BY: SG
SCALE AS NOTED

STATE OF CONNECTICUT
DEPARTMENT OF TRANSPORTATION

Filename: ...\HW_MSH_0113_0108_TYP-2.dgn

SIGNATURE/ BLOCK:

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919 MIDDLE STREET
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Phone: (860) 635-7740
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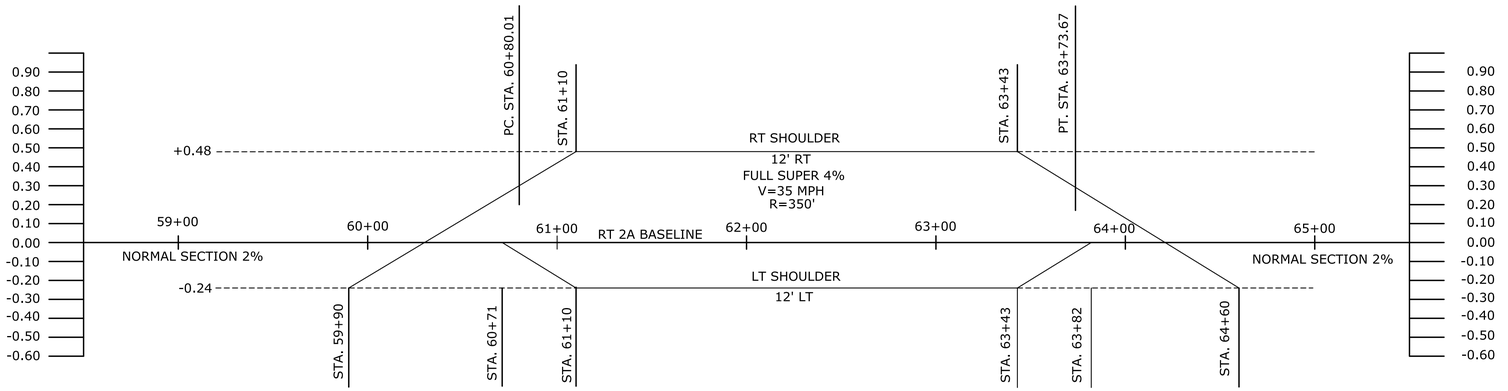
PROJECT TITLE:
REHABILITATION OF BRIDGE NO. 02932 ROUTE 2A OVER HALSEY BROOK

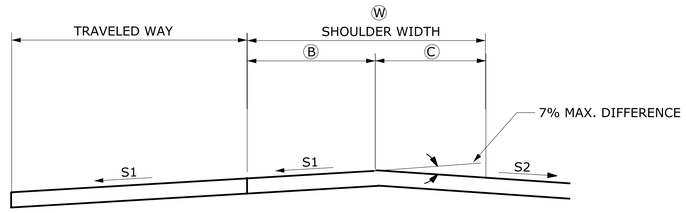
TOWN: **PRESTON**

DRAWING TITLE: **TYPICAL SECTIONS 2**

PROJECT NO. **0113-0108**
DRAWING NO. **TYP-02**
SHEET NO.



SUPERELEVATION DIAGRAM

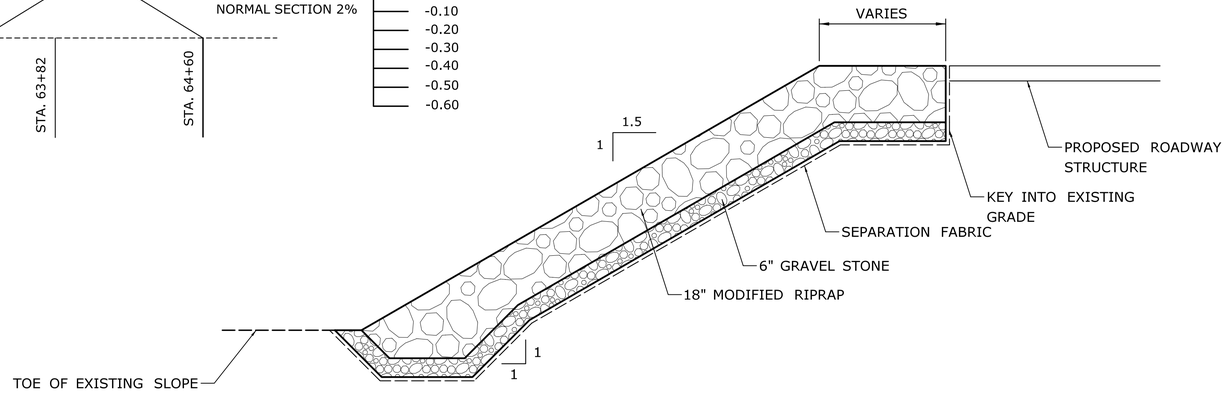


Ⓦ	Ⓑ	Ⓒ
< 4'	0' TO 4'	0'
4' TO < 8'	0' TO 4'	4'
≥ 8'	0'	≥ 8'

GENERAL NOTES:

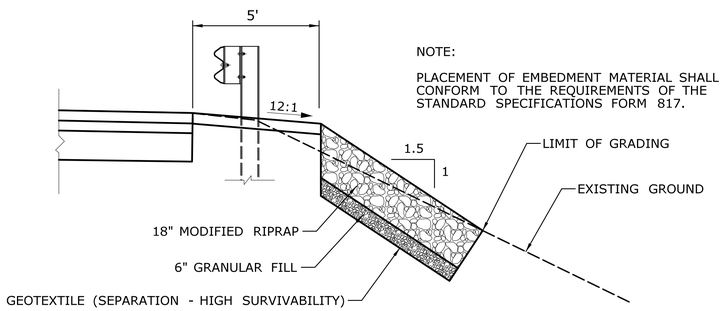
1. MAY REQUIRE ATTACHABLE EXTENSIONS OR CUTOFF PLATES ON PAVING EQUIPMENT.
2. S2 SHALL BE 1% MINIMUM.
3. DO NOT PROVIDE CURBING ON 4' SHOULDERS WITH SUPERELEVATION > 4%.
4. ALL OTHER TREATMENTS SHALL BE USED ONLY WITH PRIOR APPROVAL FROM HYDRAULICS AND DRAINAGE, PROJECT DEVELOPMENT, AND PAVEMENT MANAGEMENT UNITS.

SHOULDER TREATMENT HIGH SIDE OF BANK



RIPRAP SLOPE PROTECTION (AT END OF BARRIER WALLS)

N.T.S.



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

N.T.S.

FINAL DESIGN REVIEW

REV.	DATE	REVISION DESCRIPTION	SHEET NO.

Plotted Date: 3/1/2019

DESIGNER/DRAFTER: KM
CHECKED BY: SG
SCALE IN FEET 0 40 80
SCALE 1"=40'

STATE OF CONNECTICUT
DEPARTMENT OF TRANSPORTATION

Filename: ...\HW_MSH_0113_0108_MDS-1.dgn

SIGNATURE/ BLOCK:

AI Engineers, Inc.
919 MIDDLE STREET
MIDDLETOWN, CT 06457
Phone: (860) 635-7740
Fax: (860) 635-7312

PROJECT TITLE:
REHABILITATION OF BRIDGE NO. 02932 ROUTE 2A OVER HALSEY BROOK

TOWN: **PRESTON**

DRAWING TITLE: **MISCELLANEOUS DETAILS**

PROJECT NO. **0113-0108**
DRAWING NO. **MDS-01**
SHEET NO.

BEGIN STATE PROJECT
NO. 0113-0108
ROUTE 2A
STA. 59+20
N 738,384.93
E 1,190,894.34
MATCH EXISTING

END STATE PROJECT
NO. 0113-0108
STA. 65+00
ROUTE 2A
N 738,519.36
E 1,191,424.37
MATCH EXISTING

G.P.S. #1 (STEEL PIN)
N=738,465.84
E=1,190,458.70

C.P. #3 (STEEL PIN)
N=738,426.26
E=1,191,271.46

C.P. #4 (STEEL PIN)
N=738,546.03
E=1,191,429.19

C.P. #5 (MAG NAIL)
N=738,702.63
E=1,191,615.91

G.P.S. #2 (CONTROL NAIL)
N=738,387.56
E=1,191,043.42

COORDINATE GRID
NAD 83
CONNECTICUT

REMOVE METAL BEAM RAIL STA. 61+10 TO STA. 61+38
BARRIER WALL STA. 61+20 TO STA. 61+31.5
R-B 350 BRIDGE ATTACHMENT VERTICAL SHAPED PARAPET
STEEPENED SLOPE PROTECTION STA. 61+10 TO STA. 61+20
REMOVE CONCRETE END ANCHORAGE
METAL BEAM TRANSITION 350 TO MASH
75' - METAL BEAM RAIL (R-B MASH)
REMOVE BIT. PAVEMENT
TOPSOIL AND TURF ESTABLISHMENT (TYP.)
R-B END ANCHORAGE TYPE II
8'-6" CURVED GUIDERAIL TREATMENT
CUT BIT. CONC. PAVEMENT
BIT. CONC. DRIVEWAY
SEDIMENTATION CONTROL SYSTEM (TYP.)
BEGIN MILL AND OVERLAY STA. 59+20 CUT BIT. CONC. PAVEMENT MATCH EXISTING
IMPACT ATTENUATION SYSTEM (TANGENTIAL) STA. 57+00
REMOVE CONCRETE END ANCHORAGE
275' - METAL BEAM RAIL (R-B MASH)
REMOVE METAL BEAM RAIL STA. 57+35 TO STA. 61+35
STEEPENED SLOPE PROTECTION STA. 59+20 TO STA. 60+10
METAL BEAM TRANSITION 350 TO MASH
R-B 350 BRIDGE ATTACHMENT VERTICAL SHAPED PARAPET
END BEGIN MILL AND OVERLAY, BEGIN FULL DEPTH RECONSTRUCTION, CUT BIT. CONC. PAVEMENT STA. 60+40
BARRIER WALL STA. 60+00 TO STA. 61+27.7

CONSTRUCTION EASEMENT

BARRIER WALL STA. 61+63 TO STA. 61+95
R-B 350 BRIDGE ATTACHMENT VERTICAL SHAPED PARAPET
METAL BEAM TRANSITION 350 TO MASH
STEEPENED SLOPE PROTECTION STA. 61+73 TO 63+25
REMOVE METAL BEAM RAIL STA. 61+57 TO STA. 63+11
250' - METAL BEAM RAIL (TYPE R-B MASH)
CURVE NO. 1
REMOVE CONCRETE END ANCHORAGE
REMOVE METAL BEAM RAIL STA. 61+50 TO STA 61+99
BARRIER WALL STA. 61+56.4 TO STA. 61+85

CONSTRUCTION EASEMENT

BRIDGE NO. 02932

IMPACT ATTENUATION SYSTEM (TANGENTIAL) STA. 64+50
300' - METAL BEAM RAIL (R-B MASH)
END FULL DEPTH RECONSTRUCTION, BEGIN MILL AND OVERLAY, CUT BIT. CONC. PAVEMENT STA. 62+50
METAL BEAM TRANSITION 350 TO MASH
R-B 350 BRIDGE ATTACHMENT VERTICAL SHAPED PARAPET
STEEPENED SLOPE PROTECTION STA. 61+85 TO STA. 61+95
REMOVE METAL BEAM RAIL STA. 61+50 TO STA 61+99
BARRIER WALL STA. 61+56.4 TO STA. 61+85

CONSTRUCTION EASEMENT

END MILL AND OVERLAY STA. 65+00 CUT BIT. CONC. PAVEMENT MATCH EXISTING
CONNECT METAL BEAM RAIL (R-B MASH) TO EXISTING
METAL BEAM TRANSITION RB TO MASH
APPROXIMATE SLOPE LIMITS (TYP.)
SEDIMENTATION CONTROL SYSTEM (TYP.)
COASTAL JURISDICTION LINE (TYP.) EL=2.3+1=3.3
MEAN HIGH WATER LINE (TYP.) EL=0.92

56+00 57+00 58+00 59+00 60+00 61+00 62+00 63+00 64+00 65+00 66+00 67+00 68+00 69+00 70+00

S81° 59'00.76"E CONSTRUCTION ℄ 58+00 CT ROUTE 2A (POQUETANUCK ROAD)
S81° 37'59.07"E
N50° 11'23.09"E 66+00 CONSTRUCTION ℄ 67+00 CT ROUTE 2A (POQUETANUCK ROAD)

PC 60+80.01 N 738361.64 E 1191052.65
PT 59+00.00 N 738387.84 E 1190874.56
PT 63+73.67 N 738418.05 E 1191327.18
PC 67+67.77 N 738690.79 E 1191630.06

EBB FLOOD

CURVE NO. 1		
U.S. ROUTE 2A		
P.C.	STA.	60+80.01
	N	738,361.64
	E	1,191,052.65
C.C.	N	738,707.92
	E	1,191,103.58
P.T.	STA.	63+73.67
	N	738,438.65
	E	1,191,327.18
△		48° 04'22.4" LT
T		156.10'
L		293.66'
R		350.00'

LEGEND
- MILLING AND OVERLAY
- FULL DEPTH RECONSTRUCTION
- PAVEMENT REMOVAL

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: 3/1/2019

DESIGNER/DRAFTER: ML
CHECKED BY: SG
SCALE IN FEET 0 40 80
SCALE 1"=40'

STATE OF CONNECTICUT
DEPARTMENT OF TRANSPORTATION

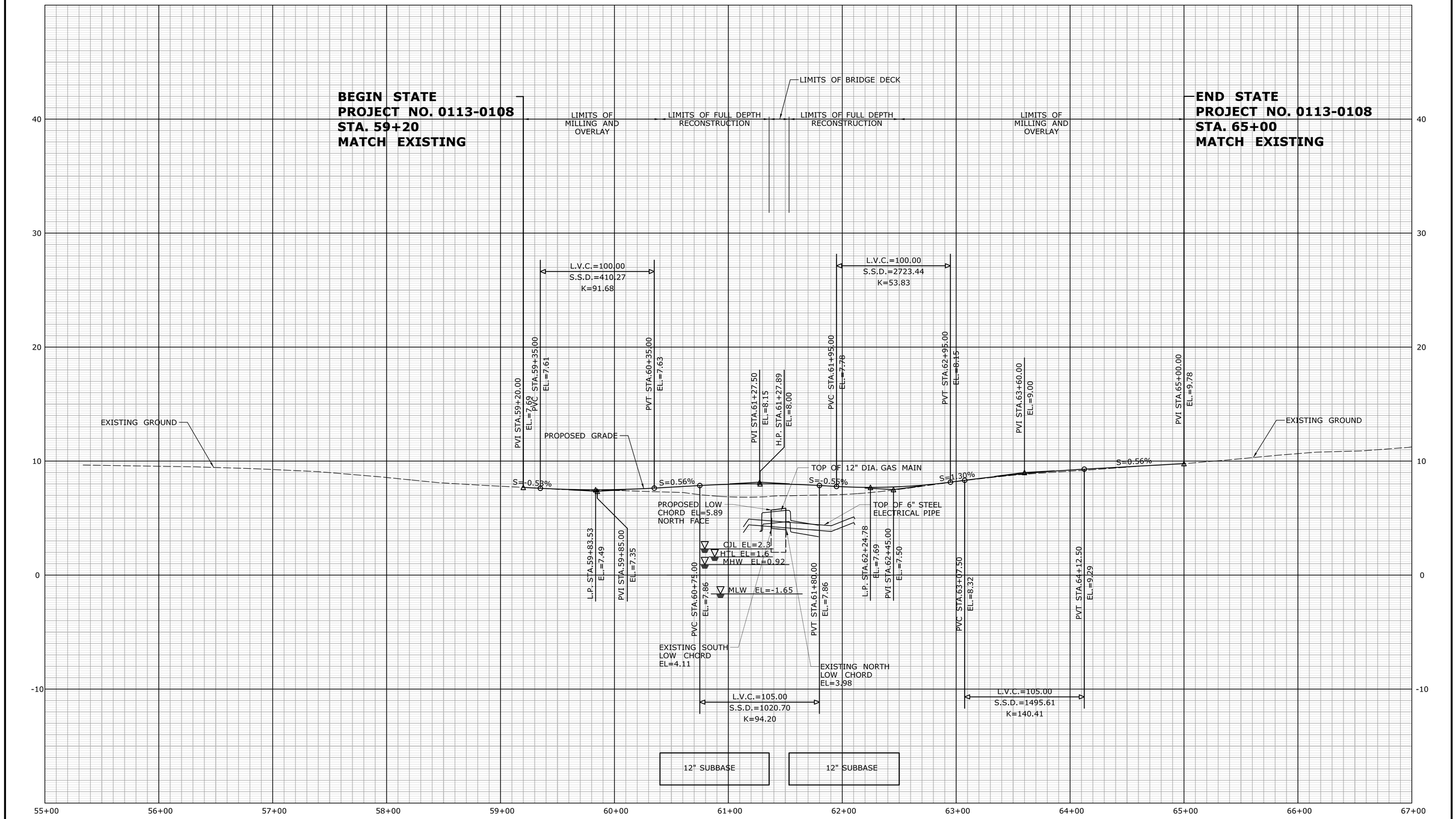
Filename: ...\HW_MSH_0113_0108_HWY-1.dgn

SIGNATURE/ BLOCK:

AI Engineers, Inc.
919 MIDDLE STREET
MIDDLETOWN, CT 06457
Phone: (860) 635-7740
Fax: (860) 635-7312

PROJECT TITLE:
REHABILITATION OF BRIDGE NO. 02932 ROUTE 2A OVER HALSEY BROOK

TOWN: **PRESTON**
DRAWING TITLE: **HIGHWAY PLAN**
PROJECT NO. **0113-0108**
DRAWING NO. **HWY-01**
SHEET NO.



FINAL DESIGN REVIEW

REV.	DATE	REVISION DESCRIPTION	SHEET NO.

Plotted Date: 3/1/2019

DESIGNER/DRAFTER: ML
CHECKED BY: SG
HORIZ. SCALE IN FEET 0 40 80
VERT. SCALE IN FEET 0 4 8

STATE OF CONNECTICUT
DEPARTMENT OF TRANSPORTATION

Filename: ...\HW_MSH_0113_0108_PROF-1.dgn

SIGNATURE/ BLOCK:

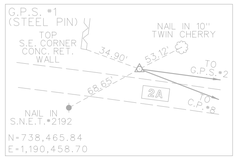
AI Engineers, Inc.
919 MIDDLE STREET
MIDDLETOWN, CT 06457
Phone: (860) 635-7740
Fax: (860) 635-7312

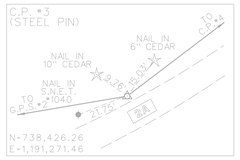
PROJECT TITLE:
REHABILITATION OF BRIDGE NO. 02932 ROUTE 2A OVER HALSEY BROOK

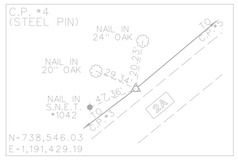
TOWN: **PRESTON**

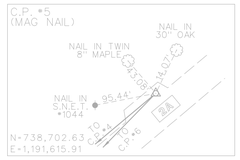
DRAWING TITLE: **HIGHWAY PROFILE**

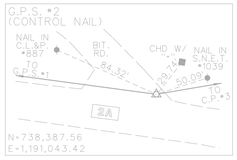
PROJECT NO. **0113-0108**
DRAWING NO. **PRO-01**
SHEET NO.

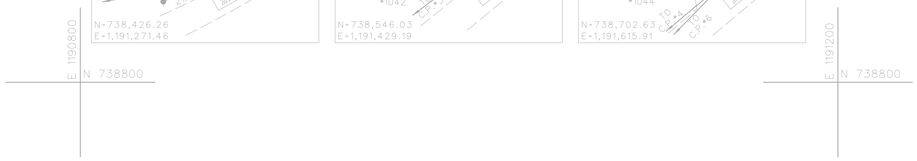








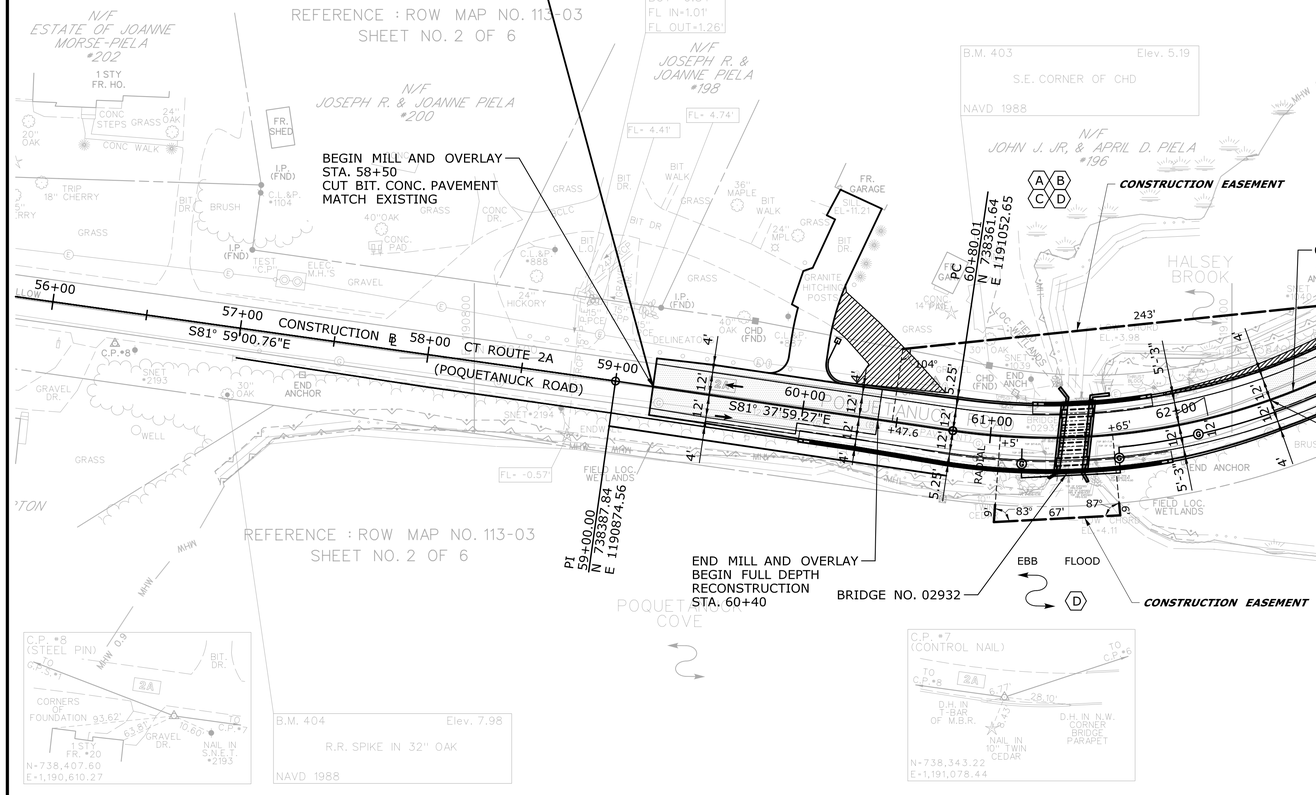


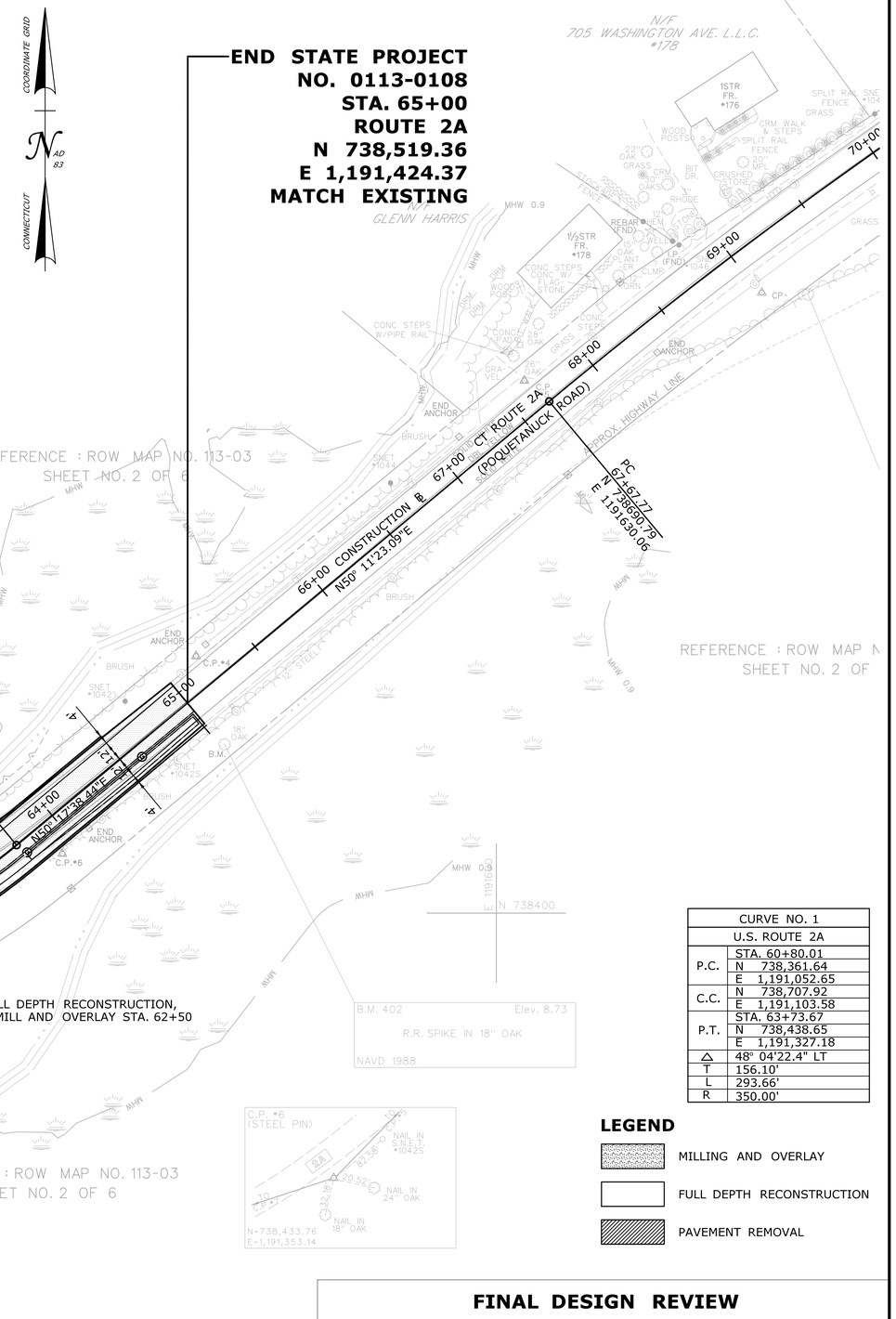


BEGIN STATE PROJECT
NO. 0113-0108
ROUTE 2A
STA. 59+20
N 738,384.93
E 1,190,894.34
MATCH EXISTING

RIGHTS OF WAY LEGEND

- (A) RIGHT TO GRADE REQUIRED
- (B) RIGHT TO CONSTRUCT DRIVEWAY REQUIRED
- (C) RIGHT TO INSTALL SEDIMENTATION CONTROL SYSTEM REQUIRED
- (D) EASEMENT FOR TEMPORARY WORK AREA FOR THE PURPOSE OF CONSTRUCTING TEMPORARY WATER HANDLING SYSTEMS, SEDIMENTATION CONTROL SYSTEM, INSTALLING, MAINTAINING AND REMOVAL OF TEMPORARY UTILITY POLE WITH ANCHOR AND AERIAL LINES, INSTALLING, MAINTAINING AND REMOVAL OF TEMPORARY GAS MAIN LINE, DURING THE IMPROVEMENTS TO CT ROUTE 2A REQUIRED. SAID EASEMENT TO AUTOMATICALLY TERMINATE UPON COMPLETION OF BRIDGE CONSTRUCTION UNLESS SOONER RELEASED BY THE STATE. TEMPORARY EASEMENT TAKEN BY THIS PARAGRAPH WILL BE RESTORED BY RETURNING THE AREA TO ITS ORIGINAL CONDITION.





CURVE NO. 1		
U.S. ROUTE 2A		
P.C.	STA.	60+80.01
	N	738,361.64
	E	1,191,052.65
C.C.	N	738,707.92
	E	1,191,103.58
P.T.	STA.	63+73.67
	N	738,438.65
	E	1,191,327.18
△		48° 04'22.4" LT
T		156.10'
L		293.66'
R		350.00'

LEGEND

- MILLING AND OVERLAY
- FULL DEPTH RECONSTRUCTION
- PAVEMENT REMOVAL

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: 3/1/2019

DESIGNER/DRAFTER: ML
CHECKED BY: SG
SCALE IN FEET
0 40 80
SCALE 1"=40'

STATE OF CONNECTICUT
DEPARTMENT OF TRANSPORTATION

Filename: ...\HW.MSH.0113.0108.ROW-1.dgn

SIGNATURE/ BLOCK:

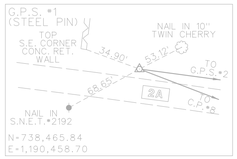
AI Engineers, Inc.
919 MIDDLE STREET
MIDDLETOWN, CT 06457
Phone: (860) 635-7740
Fax: (860) 635-7312

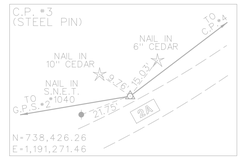
PROJECT TITLE:
REHABILITATION OF BRIDGE NO. 02932 ROUTE 2A OVER HALSEY BROOK

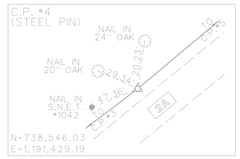
TOWN: **PRESTON**

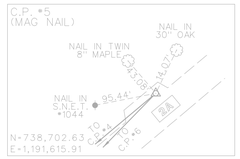
DRAWING TITLE: **RIGHT OF WAY PLAN**

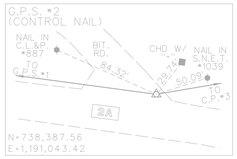
PROJECT NO. **0113-0108**
DRAWING NO. **ROW-01**
SHEET NO.

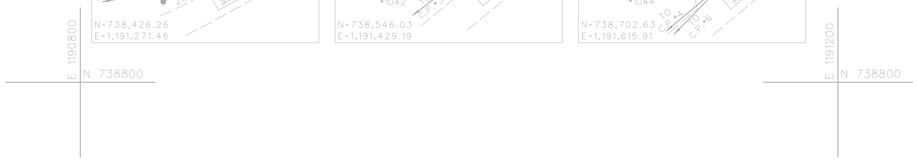










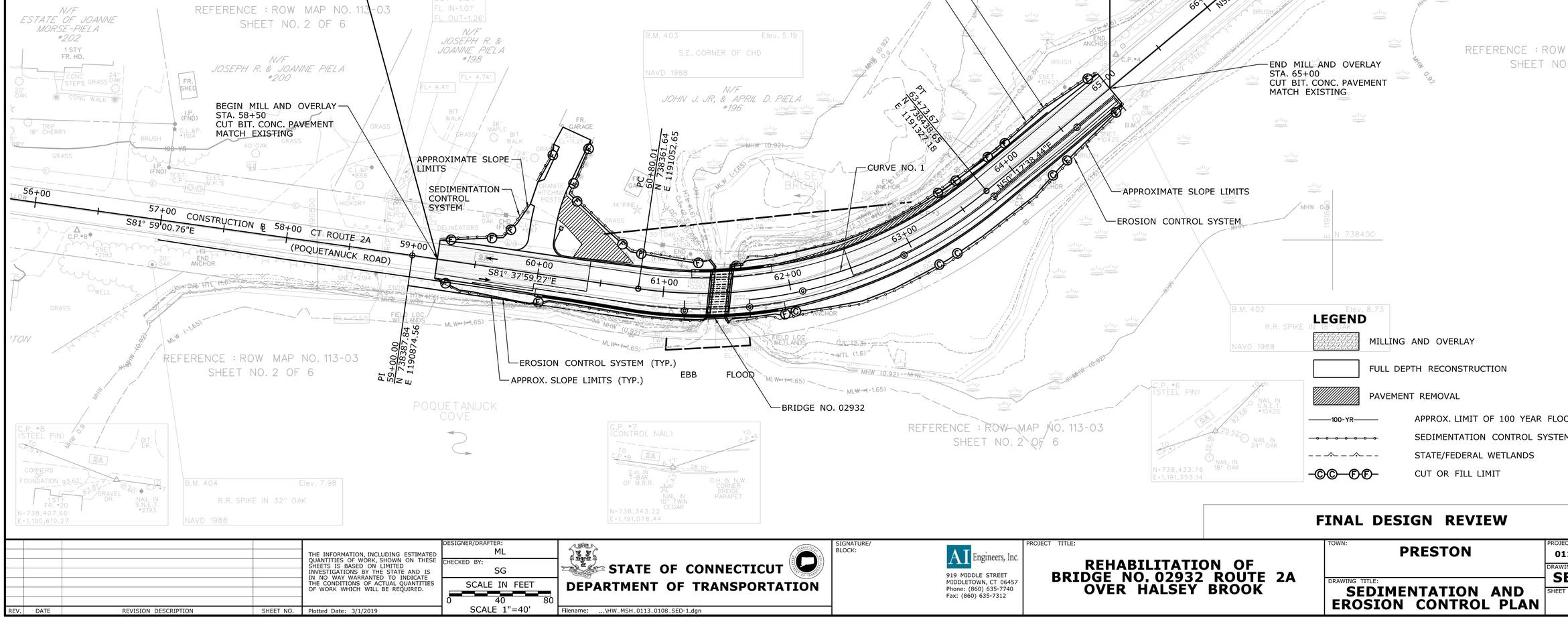


SEDIMENT CONTROL NOTES

1. THE CONTRACTOR SHALL PROPOSE CONSTRUCTION ENTRANCES TO THE ENGINEER FOR APPROVAL PRIOR TO START OF ANY CLEARING OPERATION. CONSTRUCTION ENTRANCES SHALL BE GRADED TO PREVENT RUNOFF FROM ENTERING THE ROADWAY LOCATION. LOCATION OF CONSTRUCTION ENTRANCES ARE SUBJECT TO APPROVAL BY THE ENGINEER.
2. ALL DISTURBED AREAS SHALL BE STABILIZED WITH TOPSOIL AND SEEDING.
3. ANY REMOVAL OF SEDIMENT SHALL MEET THE REQUIREMENTS OF SECTION 2.19 OF CONNDOT FORM 817.

BEGIN STATE PROJECT
NO. 0113-0108
ROUTE 2A
STA. 59+20
N 738,384.93
E 1,190,894.34
MATCH EXISTING

END STATE PROJECT
NO. 0113-0108
STA. 65+00
ROUTE 2A
N 738,519.36
E 1,191,424.37
MATCH EXISTING



LEGEND

- MILLING AND OVERLAY
- FULL DEPTH RECONSTRUCTION
- PAVEMENT REMOVAL
- 100-YR — APPROX. LIMIT OF 100 YEAR FLOODPLAIN
- SEDIMENTATION CONTROL SYSTEM
- STATE/FEDERAL WETLANDS
- CUT OR FILL LIMIT

FINAL DESIGN REVIEW

REV.	DATE	REVISION DESCRIPTION	SHEET NO.

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Plotted Date: 3/1/2019

DESIGNER/DRAFTER: ML
CHECKED BY: SG
SCALE IN FEET
0 40 80
SCALE 1"=40'

STATE OF CONNECTICUT
DEPARTMENT OF TRANSPORTATION

Filename: ...\HW_MSH_0113_0108_SED-1.dgn

SIGNATURE/ BLOCK:

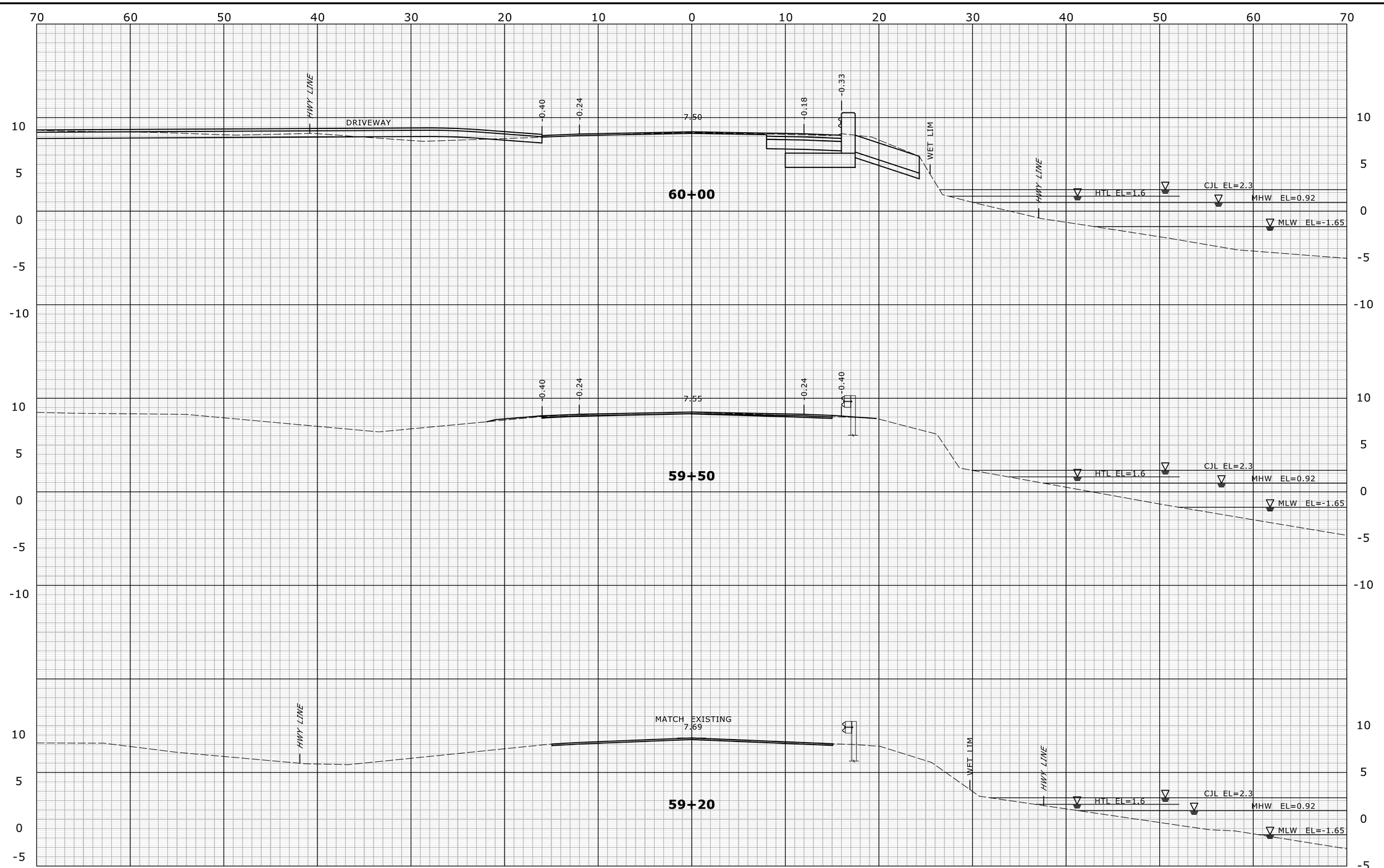
AI Engineers, Inc.
919 MIDDLE STREET
MIDDLETOWN, CT 06457
Phone: (860) 635-7740
Fax: (860) 635-7312

PROJECT TITLE:
REHABILITATION OF BRIDGE NO. 02932 ROUTE 2A OVER HALSEY BROOK

TOWN: **PRESTON**

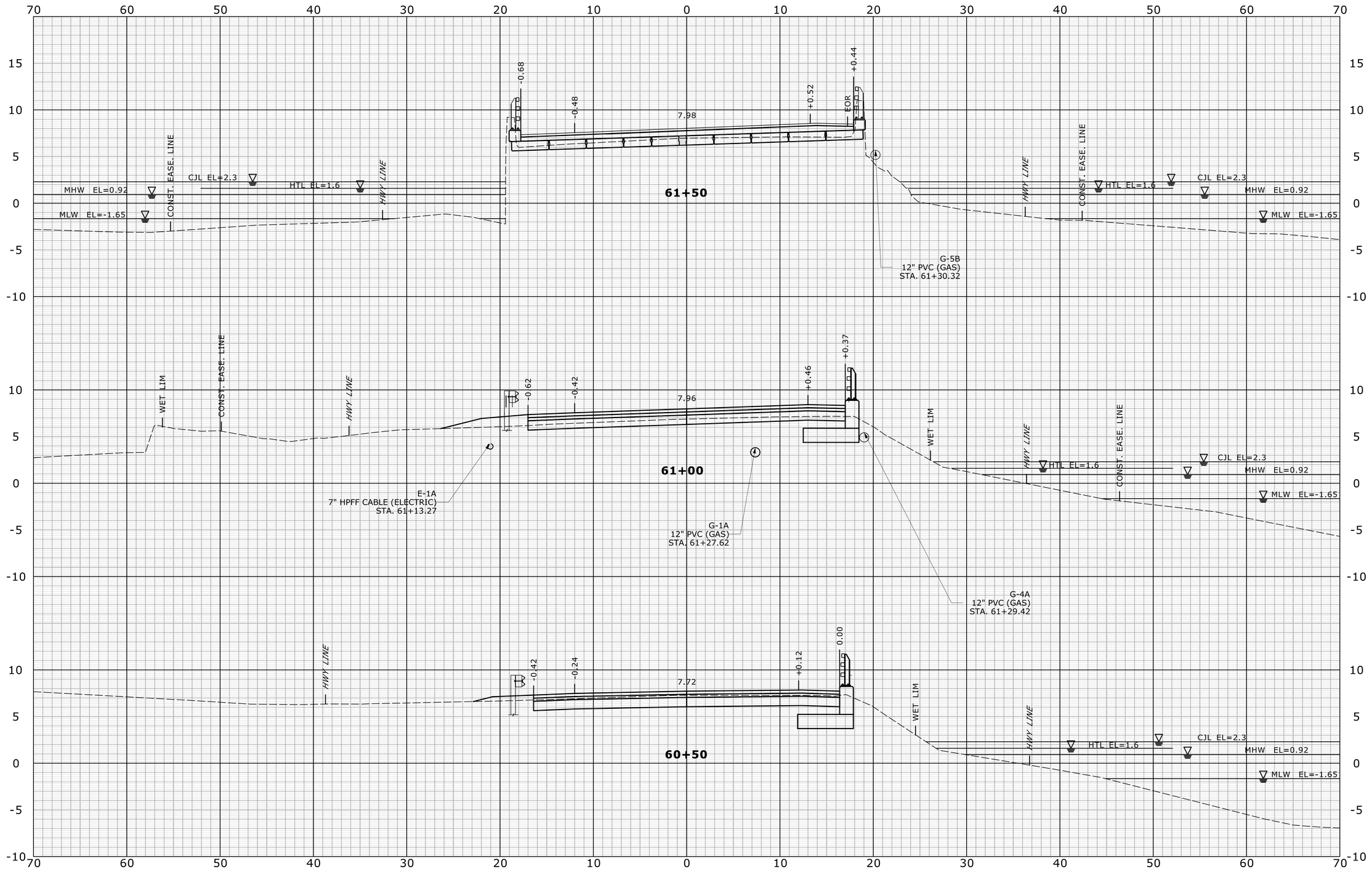
DRAWING TITLE:
SEDIMENTATION AND EROSION CONTROL PLAN

PROJECT NO. **0113-0108**
DRAWING NO. **SED-01**
SHEET NO.



FINAL DESIGN REVIEW

	DESIGNER/DRAFTER: ML CHECKED BY: SG SCALE IN FEET 0 5 10	STATE OF CONNECTICUT DEPARTMENT OF TRANSPORTATION	SIGNATURE/ BLOCK:	PROJECT TITLE: REHABILITATION OF BRIDGE NO. 02932 ROUTE 2A OVER HALSEY BROOK	TOWN: PRESTON DRAWING TITLE: CROSS SECTIONS CT ROUTE 2A	PROJECT NO. 0113-0108 DRAWING NO. XSC-01 SHEET NO.



REV.	DATE	REVISION DESCRIPTION	SHEET NO.

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Plotted Date: 3/1/2019

DESIGNER/DRAFTER: ML

CHECKED BY: SG

SCALE IN FEET
0 5 10
SCALE 1" = 5'

STATE OF CONNECTICUT
DEPARTMENT OF TRANSPORTATION

Filename: ...\HW_MSH_0113_0108_XSC-2.dgn

SIGNATURE/ BLOCK:

PROJECT TITLE:
REHABILITATION OF BRIDGE NO. 02932 ROUTE 2A OVER HALSEY BROOK

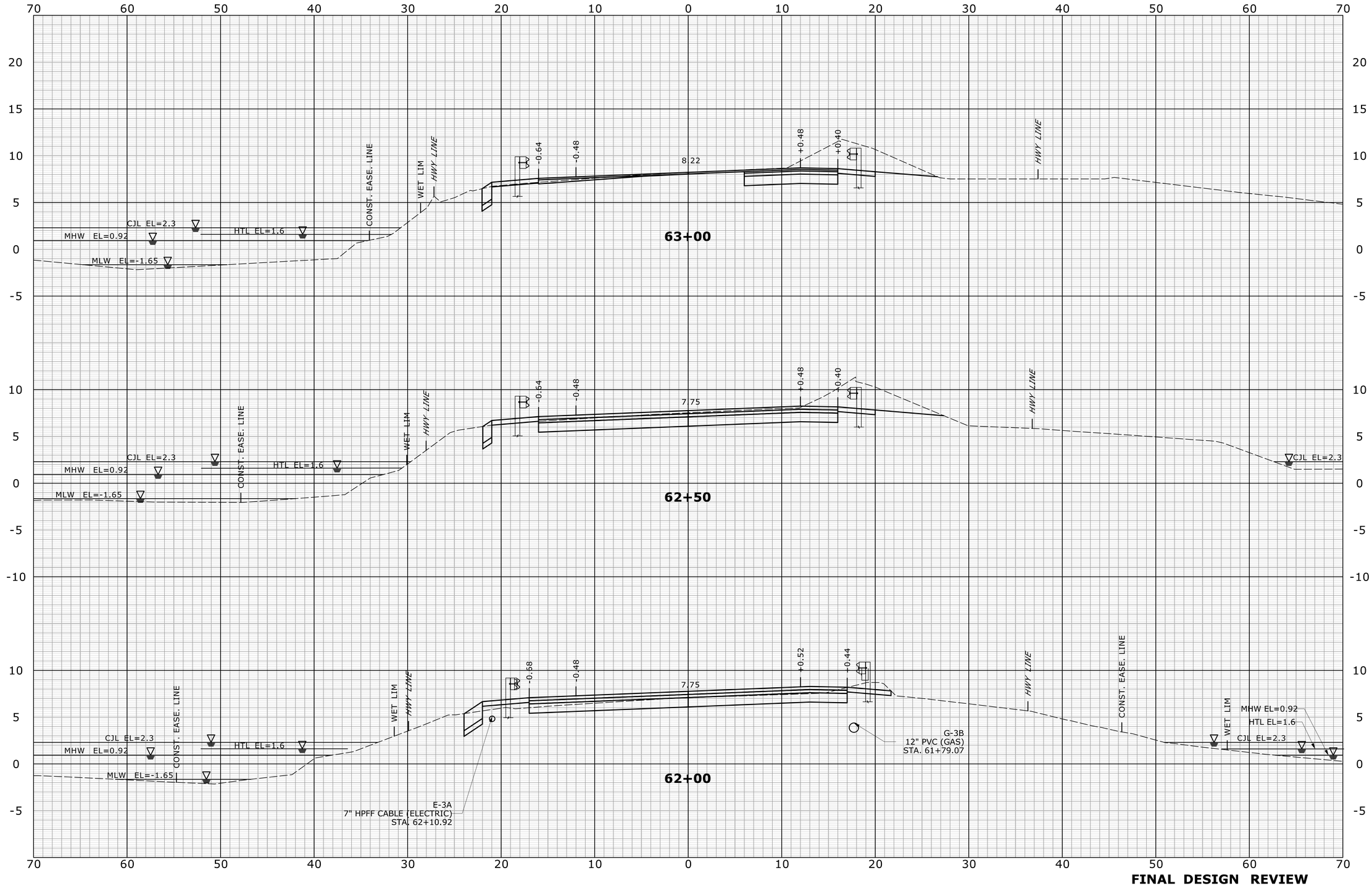
TOWN: **PRESTON**

DRAWING TITLE:
CROSS SECTIONS CT ROUTE 2A

PROJECT NO. **0113-0108**

DRAWING NO. **XSC-02**

SHEET NO.



FINAL DESIGN REVIEW

REV.	DATE	REVISION DESCRIPTION	SHEET NO.

Plotted Date: 3/1/2019

DESIGNER/DRAFTER: ML

CHECKED BY: SG

SCALE IN FEET 0 5 10

SCALE 1" = 5'

STATE OF CONNECTICUT
DEPARTMENT OF TRANSPORTATION

Filename: ...\HW_MSH_0113_0108_XSC-3.dgn

SIGNATURE/ BLOCK:

PROJECT TITLE:
REHABILITATION OF BRIDGE NO. 02932 ROUTE 2A OVER HALSEY BROOK

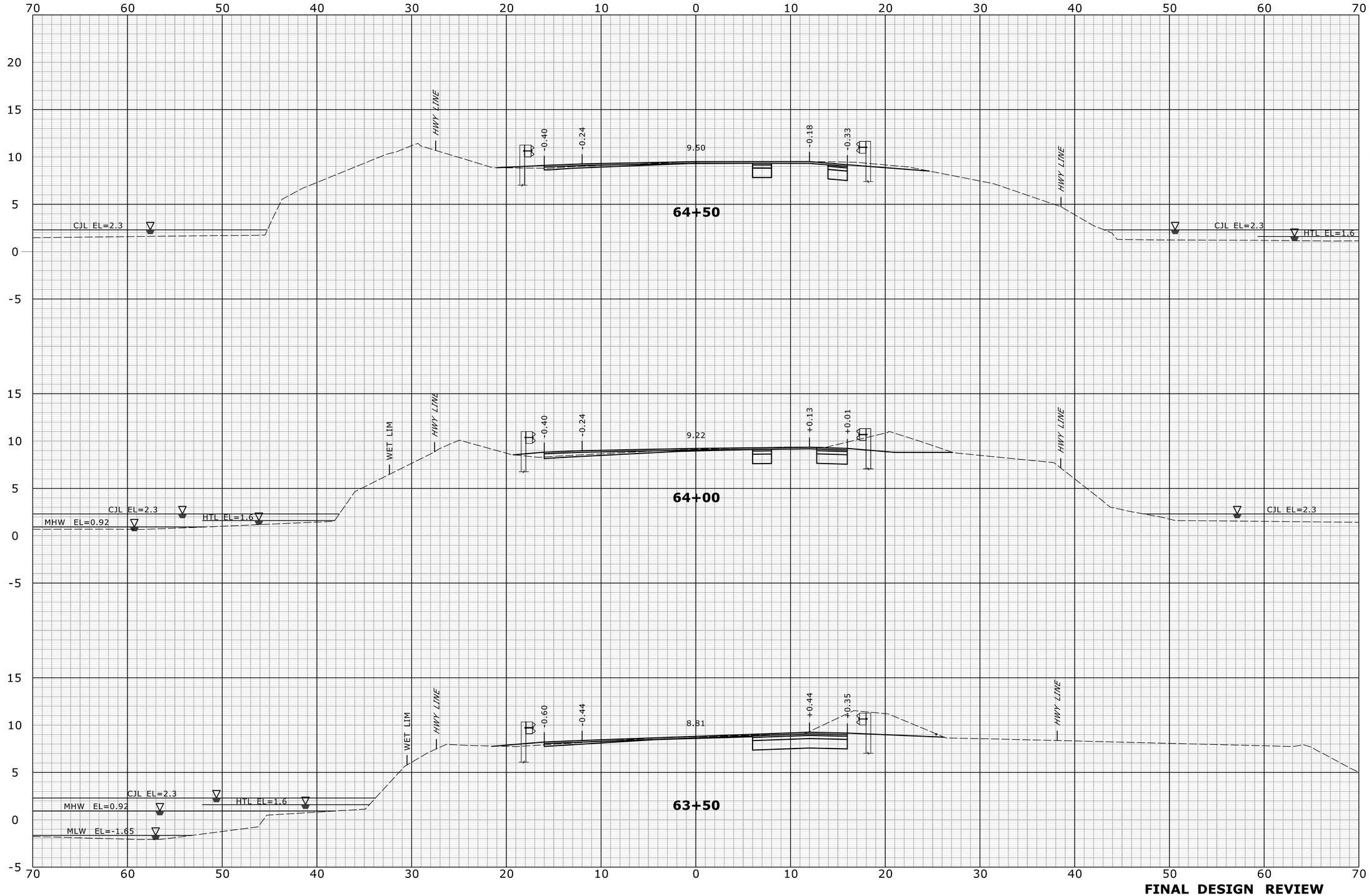
TOWN: **PRESTON**

DRAWING TITLE: **CROSS SECTIONS CT ROUTE 2A**

PROJECT NO. **0113-0108**

DRAWING NO. **XSC-03**

SHEET NO.



FINAL DESIGN REVIEW

REV.	DATE	REVISION DESCRIPTION	SHEET NO.

Plotted Date: 3/1/2019

DESIGNER/DRAFTER: ML

CHECKED BY: SG

SCALE IN FEET 0 5 10

SCALE 1" = 5'

STATE OF CONNECTICUT
DEPARTMENT OF TRANSPORTATION

Filename: ...\HW_MSH_0113_0108_XSC-4.dgn

SIGNATURE/ BLOCK:

PROJECT TITLE:
REHABILITATION OF BRIDGE NO. 02932 ROUTE 2A OVER HALSEY BROOK

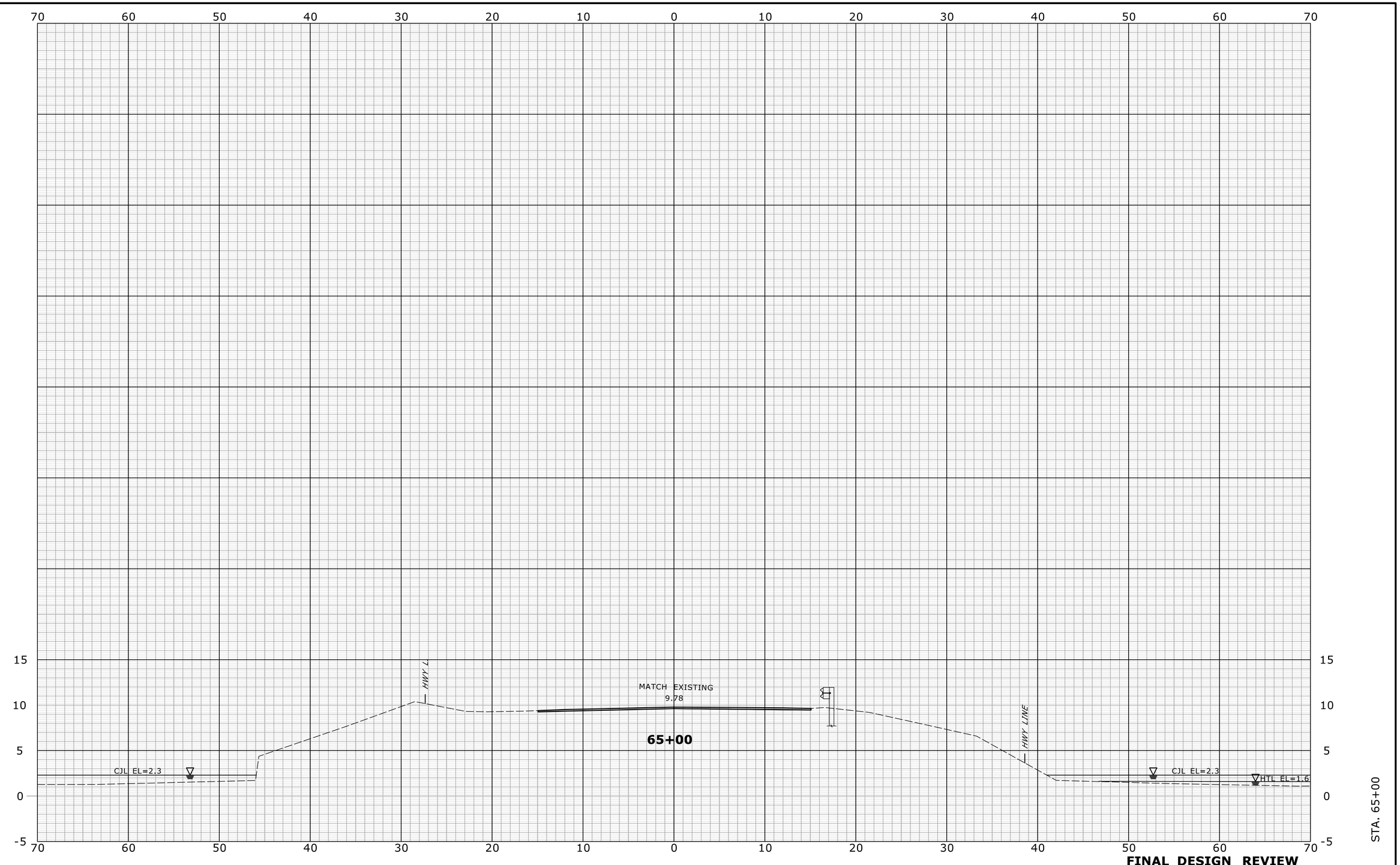
TOWN: **PRESTON**

DRAWING TITLE: **CROSS SECTIONS CT ROUTE 2A**

PROJECT NO. **0113-0108**

DRAWING NO. **XSC-04**

SHEET NO.



FINAL DESIGN REVIEW

REV.	DATE	REVISION DESCRIPTION	SHEET NO.

Plotted Date: 3/1/2019

DESIGNER/DRAFTER: ML

CHECKED BY: SG

SCALE IN FEET
0 5 10
SCALE 1" = 5'

STATE OF CONNECTICUT
DEPARTMENT OF TRANSPORTATION

Filename: ...\HW_MSH_0113_0108_XSC-5.dgn

SIGNATURE/ BLOCK:

PROJECT TITLE:
REHABILITATION OF BRIDGE NO. 02932 ROUTE 2A OVER HALSEY BROOK

TOWN: **PRESTON**

DRAWING TITLE:
CROSS SECTIONS CT ROUTE 2A

PROJECT NO. **0113-0108**

DRAWING NO. **XSC-05**

SHEET NO.

02.03 - STRUCTURE
INDEX OF DRAWINGS

DRAWING NUMBER	DRAWING TITLE	DRAWING NUMBER	DRAWING TITLE
S-01	STRUCTURE - INDEX OF DRAWINGS		
S-02	GENERAL PLAN AND ELEVATION		
S-03	LAYOUT PLAN, SECTION AND QUANTITY TABLE		
S-04	STAGE 1 - WATER HANDLING PLAN		
S-05	STAGE 2 - WATER HANDLING PLAN		
S-06	CONSTRUCTION STAGING SECTIONS		
S-07	ABUTMENT NO. 1 MODIFICATIONS AND DETAILS		
S-08	ABUTMENT NO. 2 MODIFICATIONS AND DETAILS		
S-09	FRAMING PLAN AND BEARING DETAILS		
S-10	PRESTRESSED DECK UNITS		
S-11	BARRIER WALL ELEVATIONS AND SECTION		
S-12	OREGON RAIL BRIDGE RAIL DETAILS		
S-13	RAIL AND END BLOCK DETAILS		
S-14	SUBSTRUCTURE REPAIR DETAILS		
S-15	TEMPORARY PRECAST CONCRETE BARRIER CURB (STRUCTURE)		

DESIGNED BY:
AI ENGINEERS, INC.

FINAL DESIGN REVIEW

REV.	DATE	REVISION DESCRIPTION	SHEET NO.

Plotted Date: 3/1/2019

DESIGNER/DRAFTER: MRG
CHECKED BY:

STATE OF CONNECTICUT
DEPARTMENT OF TRANSPORTATION

Filename: ...\01_SB_MST_Br02932_0113-0108_Structure Index.dgn

SIGNATURE/ BLOCK:

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919 MIDDLE STREET
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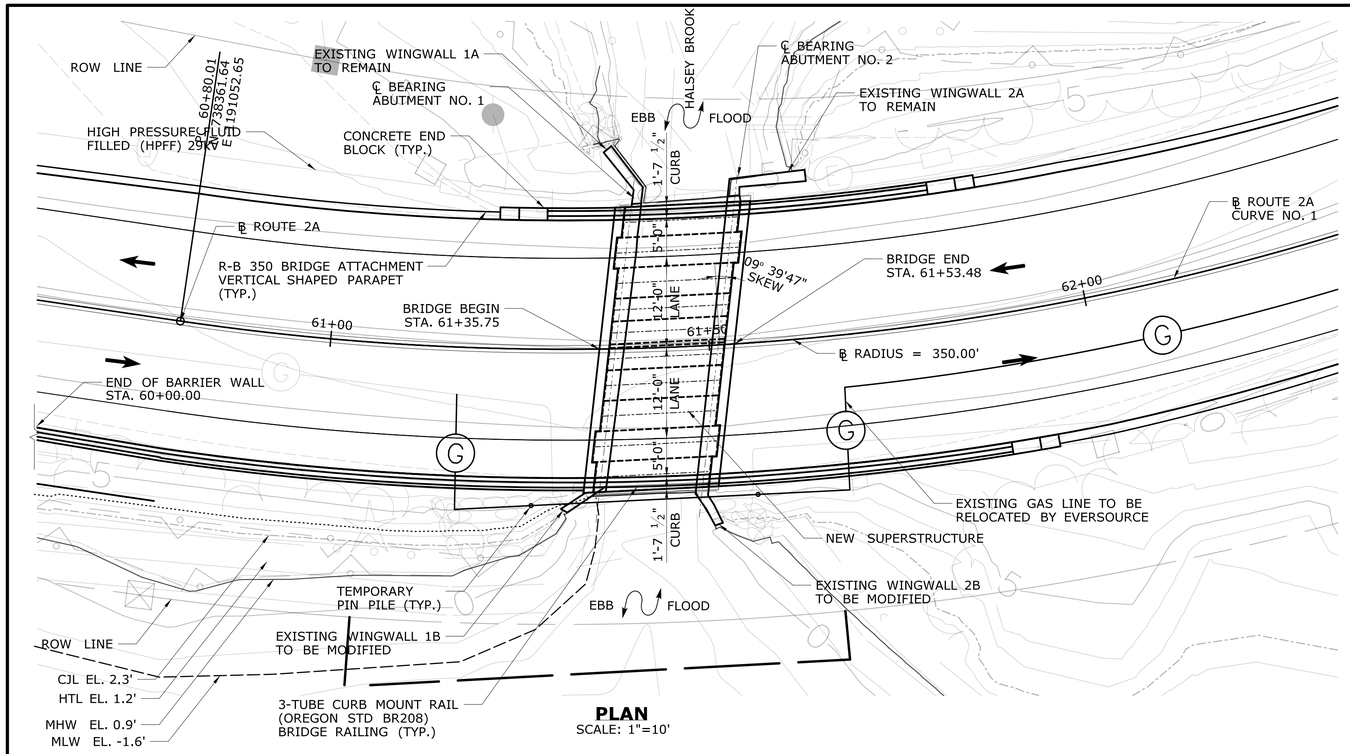
PROJECT TITLE:
REHABILITATION OF BRIDGE NO. 02932 ROUTE 2A OVER HALSEY BROOK

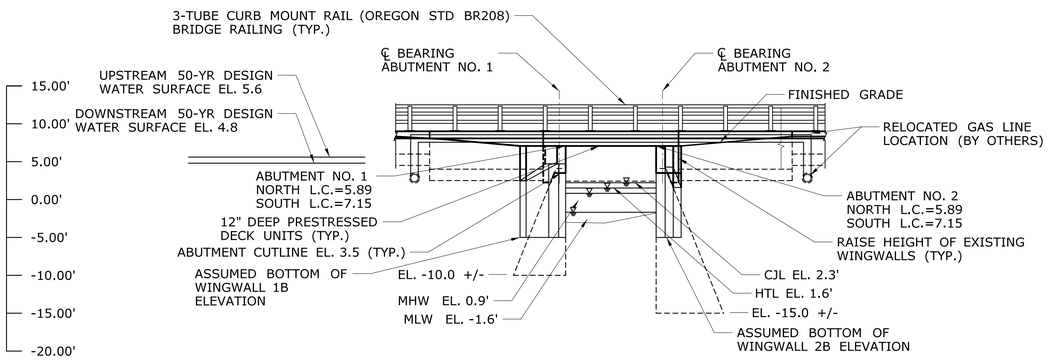
TOWN: **PRESTON**

DRAWING TITLE: **STRUCTURE INDEX OF DRAWING**

PROJECT NO. **0113-0108**
DRAWING NO. **S-01**
SHEET NO.



PLAN
SCALE: 1"=10'



SOUTH ELEVATION
SCALE: 1"=10'

NOTE:
BOTTOM ELEVATION OF EXISTING ABUTMENT FOOTINGS TAKEN FROM BORINGS SHOWN IN GEOTECHNICAL REPORT PLAN BY GEOCOMP, 125 NAGOG PARK, ACTON, MA. 01720. PLAN DATED: 01/16/2019

HYDRAULIC DATA	
DRAINAGE AREA (SQ. MILE)	0.79
DESIGN FREQUENCY (YEAR)	50
DESIGN DISCHARGE (CFS)	600
AVERAGE DAILY FLOW ELEVATION (FT)	0.9 (MHW)
UPSTREAM DESIGN WATER SURFACE ELEVATION (FT)	5.6
DOWNSTREAM DESIGN WATER SURFACE ELEVATION (FT)	4.8
MAXIMUM SCOUR ELEVATION (FT)	-7.5
FREQUENCY (YEAR)	200
DISCHARGE (CFS)	940
WORST CASE SCOUR SUBSTRUCTURE UNIT	WEST ABUTMENT (ABUTMENT NO. 1)

* HYDRAULIC DATA SHOWN IS TAKEN FROM FINAL HYDRAULIC REPORT BY CME ASSOCIATES, INC., DATED 11/29/18

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

GENERAL NOTES:

SPECIFICATIONS: CONNECTICUT DEPARTMENT OF TRANSPORTATION FORM 817 (2016), SUPPLEMENTAL SPECIFICATIONS DATED JULY 2018 AND SPECIAL PROVISIONS.

DESIGN SPECIFICATIONS: AASHTO LRFD BRIDGE DESIGN SPECIFICATIONS, 8TH EDITION 2017, WITH THE INTERIM SPECIFICATIONS UP TO AND INCLUDING THE YEAR 2016, AS SUPPLEMENTED BY THE CONNECTICUT DEPARTMENT OF TRANSPORTATION BRIDGE DESIGN MANUAL (2003).

ALLOWABLE DESIGN STRESSES:
CLASS "F" CONCRETE ..... f'c = 4000 psi
PRESTRESSED 12" DEEP DECK UNITS ..... f'c = 6500 psi
ULTRA HIGH PERFORMANCE CONCRETE ..... f'c = 18000 psi

THE SPECIFIED CONCRETE STRENGTHS USED IN DESIGN, f'c, OF THE CONCRETE COMPONENTS ARE 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" AND TO THE APPLICABLE SPECIAL PROVISIONS.

REINFORCEMENT (ASTM A615, GRADE 60) ..... fy = 60,000 psi

LIVE LOAD: AASHTO HL-93

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 MAY VARY IN THICKNESS FROM 0" TO 1.5" MAX. FOR EACH LIFT NEEDED. THE TOP COURSE SHALL BE HOT MIX ASPHALT (2" HMA S0.5) FOR THE BRIDGE LIMITS ONLY.

DIMENSIONS: ALL DIMENSIONS SHOWN ON THE PLANS ARE IN FEET AND INCHES EXCEPT IF NOTED OTHERWISE. WHEN ELEVATIONS ARE GIVEN TO LESS THAN THREE DECIMAL PLACES, THE OMITTED DIGITS ARE ASSUMED TO BE ZEROS.

EXISTING DIMENSIONS: DIMENSIONS OF THE EXISTING STRUCTURE SHOWN ON THESE PLANS ARE FOR GENERAL REFERENCE ONLY. THEY HAVE BEEN TAKEN FROM SURVEY DATA, AND ARE NOT GUARANTEED. THE CONTRACTOR SHALL TAKE ALL FIELD MEASUREMENTS NECESSARY TO ASSURE PROPER FIT OF THE FINISHED WORK AND SHALL ASSUME FULL RESPONSIBILITY FOR THEIR ACCURACY. WHEN SHOP DRAWINGS BASED ON FIELD MEASUREMENTS ARE SUBMITTED FOR APPROVAL, THE FIELD MEASUREMENTS SHALL BE INCLUDED FOR REFERENCE.

CLASS "F" CONCRETE: CLASS "F" CONCRETE SHALL BE USED FOR BRIDGE CURBS, END BLOCKS, BRIDGE SEATS AND BACKWALLS, BARRIER WALLS AND FOOTINGS, AND WINGWALL RECONSTRUCTION.

CLASS "S" CONCRETE: CLASS "S" CONCRETE SHALL BE USED FOR ABUTMENT AND WINGWALL REPAIRS.

ULTRA HIGH PERFORMANCE CONCRETE: ULTRA HIGH PERFORMANCE CONCRETE SHALL BE USED FOR CLOSURE POUR AND SHEAR KEYS.

JOINT SEAL: SEE SPECIAL PROVISIONS.

PENETRATING SEALER: PENETRATING SEALER PROTECTIVE COMPOUND SHALL BE APPLIED TO ALL EXPOSED SURFACES, SEE SPECIAL PROVISIONS.

EXPOSED EDGES: EXPOSED EDGES OF CAST IN PLACE CONCRETE SHALL BE BEVELED 1" X 1" UNLESS DIMENSIONED OTHERWISE.

CONCRETE COVER: ALL REINFORCEMENT SHALL HAVE 2" MIN. COVER UNLESS DIMENSIONED OTHERWISE.

REINFORCEMENT: ALL REINFORCING SHALL BE ASTM A615 GRADE 60.

EPOXY COATED REINFORCING BARS: ALL REINFORCEMENT IN THE SUPERSTRUCTURE, INCLUDING THE PRESTRESSED DECK UNITS AND CURBS SHALL BE EPOXY COATED UNLESS OTHERWISE NOTED.

NON-EPOXY: BLACK BARS FOR BARRIER WALLS, END BLOCKS, ABUTMENT SEATS AND WINGWALL MODIFICATION.

PREFORMED EXPANSION JOINT FILLER: THE COST OF FURNISHING AND INSTALLING PREFORMED EXPANSION JOINT FILLER SHALL BE INCLUDED IN THE COST OF THE ITEM "PREFORMED EXPANSION JOINT FILLER FOR BRIDGES."

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

BRIDGE NUMBER PLACERDS: THIS SIGN IS 4" X 12" ALUMINUM SHEET METAL WITH WHITE REFLECTIVE LETTERS ON A GREEN REFLECTIVE BACKGROUND WITH 5 NUMERALS (02932). IT SHOULD BE LOCATE AT THE LEADING END OF EACH PARAPET, MOUNTED TO THE FRONT FACE OF THE PARAPET WITH THE SIGN AND LEGEND READING HORIZONTALLY.

C.I.P. CONCRETE DISTRIBUTION		
SUBSTRUCTURE:	CY	4.0
SUPERSTRUCTURE:	CY	32.0
TOTAL:	CY	36.0

ESTIMATED P/S DECK UNIT SHIPPING ENVELOPE AND WEIGHT			
LENGTH (FT)	HEIGHT (FT)	WIDTH (FT)	WEIGHT (LBS)
15'-1 13/16"	12"	3'-0"	6820
15'-1 13/16"	12"	4'-0"	8500
16'-4"	12"	4'-0"	9165

FINAL DESIGN REVIEW

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Plotted Date: 3/1/2019

DESIGNER/DRAFTER: MRG
CHECKED BY:
SCALE AS NOTED

STATE OF CONNECTICUT
DEPARTMENT OF TRANSPORTATION

Filename: ...\02_SB_MST_Br02932_0113_0108_Gen Plan.dgn

SIGNATURE/ BLOCK:

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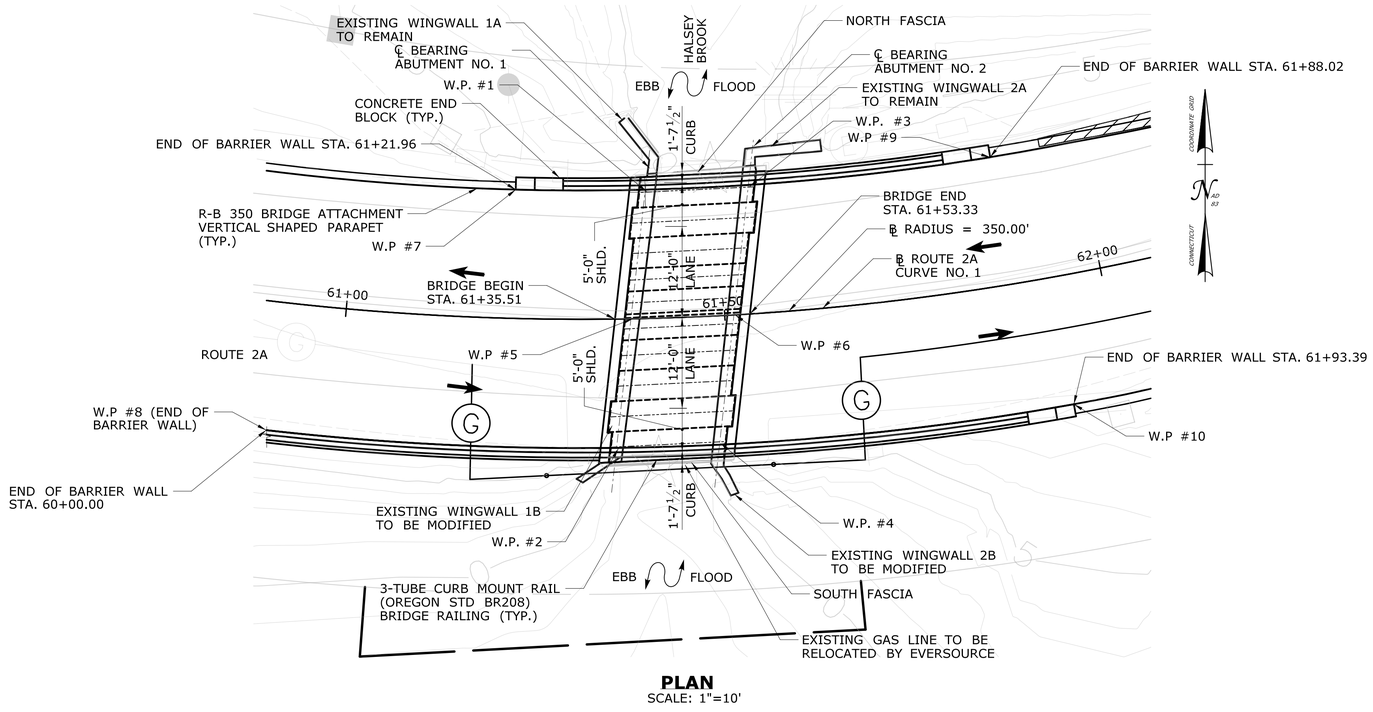
PROJECT TITLE:
REHABILITATION OF BRIDGE NO. 02932 ROUTE 2A OVER HALSEY BROOK

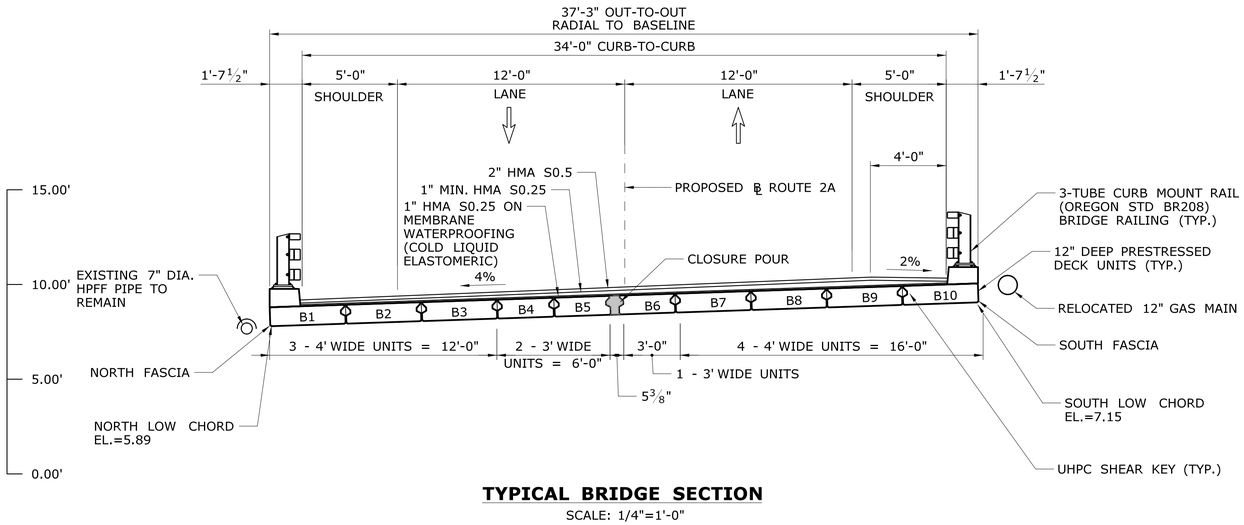
TOWN: **PRESTON**

DRAWING TITLE: **GENERAL PLAN AND ELEVATION**

PROJECT NO. **0113-0108**
DRAWING NO. **S-02**
SHEET NO.



PLAN
SCALE: 1"=10'



TYPICAL BRIDGE SECTION
SCALE: 1/4"=1'-0"

TABLE OF BRIDGE QUANTITIES

ITEM	UNIT	QUANTITY
STRUCTURE EXCAVATION - EARTH (COMPLETE)	CY	342
HANDLING WATER (SITE NO. 2)	LS	1
GRANULAR FILL	CY	71
PERVIOUS STRUCTURE BACKFILL	CY	197
SAWING AND SEALING JOINTS IN BITUMINOUS CONCRETE PAVEMENT	LF	68
HMA S0.5	TON	8
HMA S0.25	TON	12
REMOVAL OF SUPERSTRUCTURE (SITE NO. 2)	LS	1
PRESTRESSED DECK UNIT (3'-0" X 1'-0")	LF	46
PRESTRESSED DECK UNIT (4'-0" X 1'-0")	LF	108
ELASTOMERIC BEARING PADS	CI	3960
CLASS "S" CONCRETE	CY	3
CLASS "F" CONCRETE	CY	169
1" PREFORMED EXPANSION JOINT FILLER FOR BRIDGES	SF	85
DEFORMED STEEL BARS	LB	12771
DEFORMED STEEL BARS - EPOXY COATED	LB	806
DRILLING HOLES AND GROUTING DOWELS	LF	288
MEMBRANE WATERPROOFING (COLD LIQUID ELASTOMERIC)	SY	79
DAMPPROOFING	SY	334
TEMPORARY EARTH RETAINING SYSTEM	SF	1211
EARTH RETAINING SYSTEM LEFT IN PLACE	SF	606
6" FOUNDATION UNDERDRAIN	LF	224
PENTRATING SEALER PROTECTIVE COMPOUND	SY	84
TEMPORARY PRECAST CONCRETE BARRIER CURB (STRUCTURE)	LF	20
RELOCATED TEMPORARY PRECAST CONCRETE BARRIER CURB (STRUCTURE)	LF	20
METAL BRIDGE RAIL	LF	181
REMOVAL OF EXISTING MASONRY	CY	3
TEMPORARY SUPPORT OF UTILITIES	LS	1
PROTECTION AND SUPPORT OF EXISTING UTILITIES	LS	1
ULTRA HIGH PERFORMANCE CONCRETE KEYWAYS	CY	2

CURVE NO. 1	
U.S. ROUTE 2A	
P.C.	STA. 60+80.01
	N 738,361.64
	E 1,191,052.65
C.C.	N 738,707.92
	E 1,191,103.58
P.T.	STA. 63+73.67
	N 738,438.65
	E 1,191,327.18
△	48° 04'22.4" LT
T	156.10'
L	293.66'
R	350.00'

WORKING POINT COORDINATES

WP NO.	NORTHING	EASTING
WP-1	738,374.69	1,191,111.93
WP-2	738,341.03	1,191,108.19
WP-3	738,375.37	1,191,125.54
WP-4	738,341.75	1,191,121.80
WP-5	738,357.98	1,191,110.07
WP-6	738,358.50	1,191,123.66
WP-7	738,375.03	1,191,094.86
WP-8	738,357.46	1,190,971.16
WP-9	738,379.31	1,191,157.48
WP-10	738,346.71	1,191,168.53

FINAL DESIGN REVIEW

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Plotted Date: 3/1/2019

DESIGNER/DRAFTER: MRG
CHECKED BY:
SCALE AS NOTED

STATE OF CONNECTICUT
DEPARTMENT OF TRANSPORTATION

Filename: ...\03_SB_MST_Br02932_0113_0108_Layout Plan.dgn

SIGNATURE/ BLOCK:

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919 MIDDLE STREET
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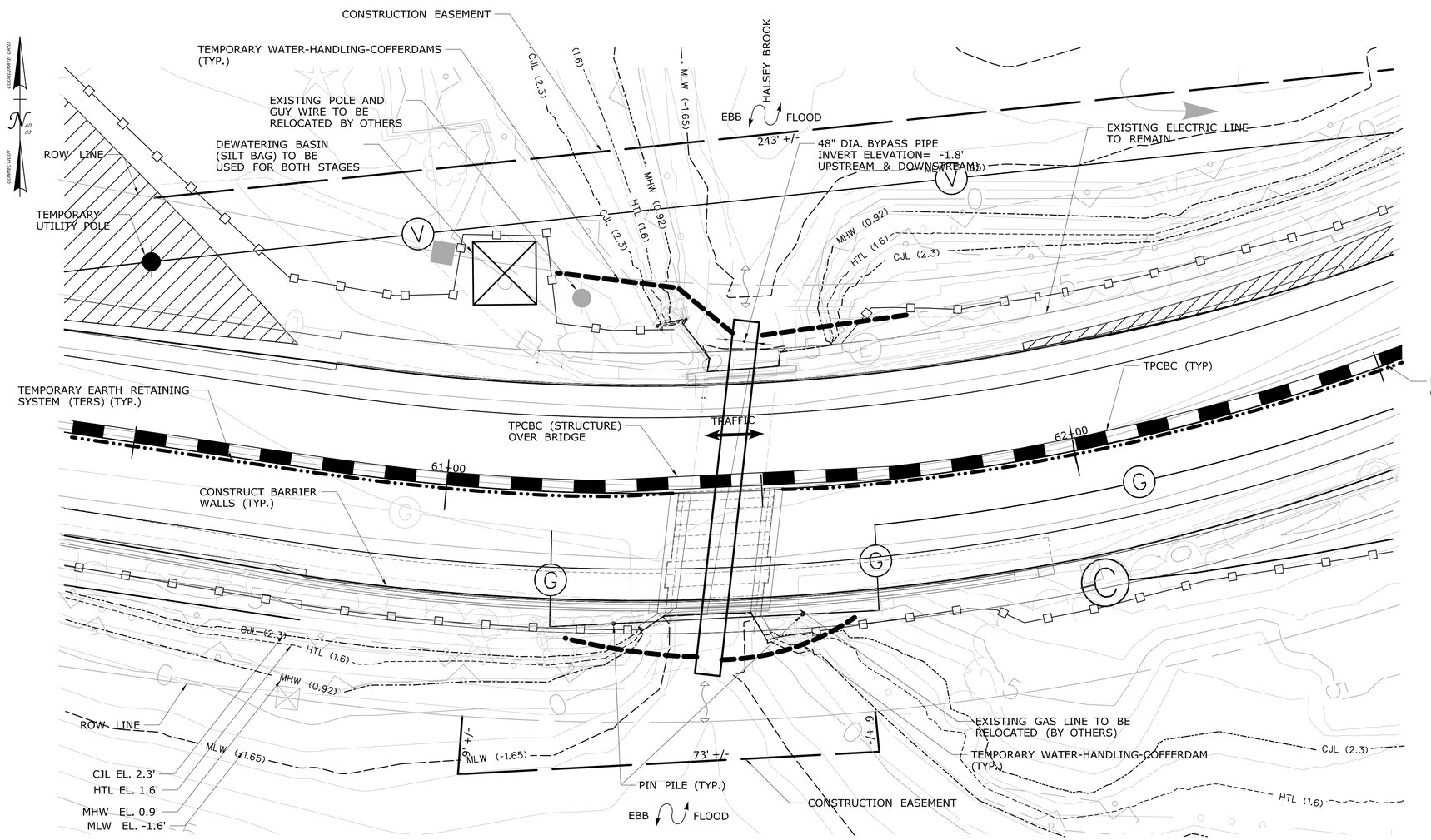
PROJECT TITLE:
REHABILITATION OF BRIDGE NO. 02932 ROUTE 2A OVER HALSEY BROOK

TOWN: **PRESTON**

DRAWING TITLE: **LAYOUT PLAN, SECTION AND QUANTITY TABLE**

PROJECT NO. **0113-0108**
DRAWING NO. **S-03**
SHEET NO.



STAGE 1 - PLAN & WATER HANDLING

SCALE: 1" = 10'

WATER HANDLING NOTES

1. CONTRACTOR MAY INSTALL THE BYPASS PIPE AND THE WATER HANDLING COFFERDAMS BEFORE OR AFTER THE REMOVAL OF THE SUPERSTRUCTURE AND THE REMOVAL OF THE DEBRIS SHIELD IN STAGE 1.

2. THE CONTRACTOR IS ALERTED TO THE PRESENCE OF OVERHEAD UTILITIES ALONG THE NORTH SIDE OF THE BRIDGE. CONTRACTOR SHALL COORDINATE WITH UTILITY OWNERS PRIOR TO THE INSTALLATION OF THE TEMPORARY WATER-HANDLING-COFFERDAMS AND BYPASS PIPE INSTALLATION.

3. FINAL CHANNEL GRADING WILL CONSIST OF RESTORING DISTURBED AREAS FROM SUBSTRUCTURE REPAIR WORK AND REMOVAL OF BYPASS PIPE AND REUSE OF EXISTING CHANNEL BOTTOM MATERIAL WILL BE PERFORMED IN DRY CONDITIONS DURING EACH STAGE. THE CHANNEL RESTORATION AND ASSOCIATED WORK WILL BE PERFORMED AND PAID IN CONFORMANCE WITH THE SPECIAL PROVISIONS OF ITEM "EXCAVATION AND REUSE OF EXISTING CHANNEL BOTTOM MATERIAL."

4. THE TOP ELEVATION OF THE TEMPORARY WATER-HANDLING-COFFERDAMS WILL BE 1.0 FT. ABOVE THE 2-YEAR ADJUSTED STORM ELEVATION UPSTREAM AND DOWNSTREAM.

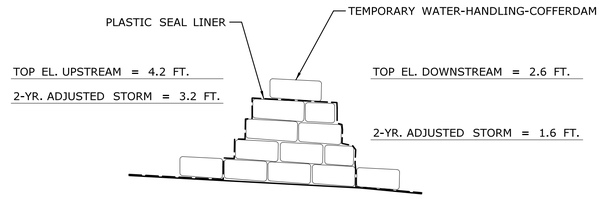
5. TEMPORARY WATER-HANDLING-COFFERDAM TO BE PAID FOR UNDER ITEM - "HANDLING WATER (SITE NO. 2)".

6. GROUND DISTURBANCE OUTSIDE THE ROW LIMIT IS TO BE LIMITED TO INSTALLATION OF TEMPORARY OVERHEAD UTILITY POLES, INSTALLATION OF PILES FOR SUPPORT OF TEMPORARY GAS MAIN, AND STAKING FOR SEDIMENTATION 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 OF TIMBER MATTING OR OTHER GROUND PROTECTION AS APPROVED BY THE ENGINEER.

NOTICE TO CONTRACTOR
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 COULD EITHER BE REMOVED OR LEFT IN PLACE 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 COFFERDAMS AND TERS FOR USE WITHIN THE PROJECT AREA.



TEMPORARY WATER-HANDLING-COFFERDAM

N.T.S.

TEMPORARY HYDRAULIC SUMMARY DATA	
AVERAGE DAILY FLOW (CFS)	4
AVERAGE SPRING FLOW (CFS)	6
2-YEAR FREQUENCY DISCHARGE (CFS)	85
TEMPORARY DESIGN DISCHARGE (CFS)	85
TEMPORARY DESIGN FREQUENCY	2-YEAR (ADJUSTED)
TEMPORARY UPSTREAM WATER SURFACE ELEVATION (FT)	3.2
TEMPORARY DOWNSTREAM WATER SURFACE ELEVATION (FT)	1.6

*TEMPORARY HYDRAULICS DATA TAKEN FROM FINAL HYDRAULIC REPORT BY CME ASSO. INC., DATED 11/29/18

FINAL DESIGN REVIEW

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Plotted Date: 3/1/2019

DESIGNER/DRAFTER: MRG
CHECKED BY:
SCALE AS NOTED

STATE OF CONNECTICUT
DEPARTMENT OF TRANSPORTATION

Filename: ...\04_SB_MST_Br02932_0113_0108_Water_Handling-1.dgn

SIGNATURE/ BLOCK:

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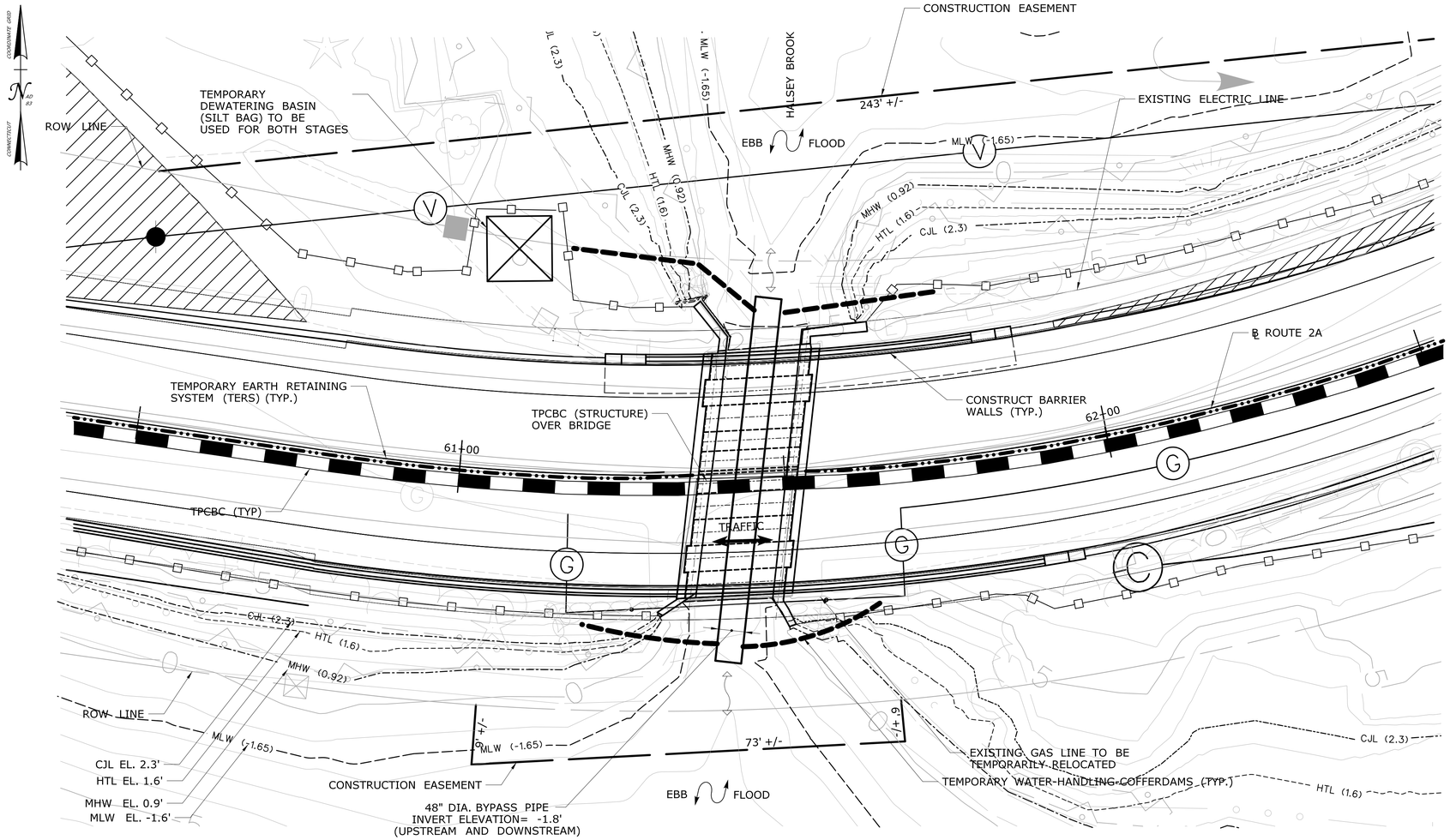
PROJECT TITLE:
REHABILITATION OF BRIDGE NO. 02932 ROUTE 2A OVER HALSEY BROOK

TOWN: **PRESTON**

DRAWING TITLE: **STAGE 1 - WATER HANDLING PLAN**

PROJECT NO. 0113-0108
DRAWING NO. S-04
SHEET NO.



STAGE 2 - PLAN & WATER HANDLING

SCALE: 1" = 10'

NOTICE TO CONTRACTOR
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 COULD EITHER BE REMOVED OR LEFT IN PLACE 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 COFFERDAMS AND TERS FOR USE WITHIN THE PROJECT AREA.

FINAL DESIGN REVIEW

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Plotted Date: 3/1/2019

DESIGNER/DRAFTER: MRG
CHECKED BY:
SCALE AS NOTED

STATE OF CONNECTICUT
DEPARTMENT OF TRANSPORTATION

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SIGNATURE/ BLOCK:

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PROJECT TITLE:
REHABILITATION OF BRIDGE NO. 02932 ROUTE 2A OVER HALSEY BROOK

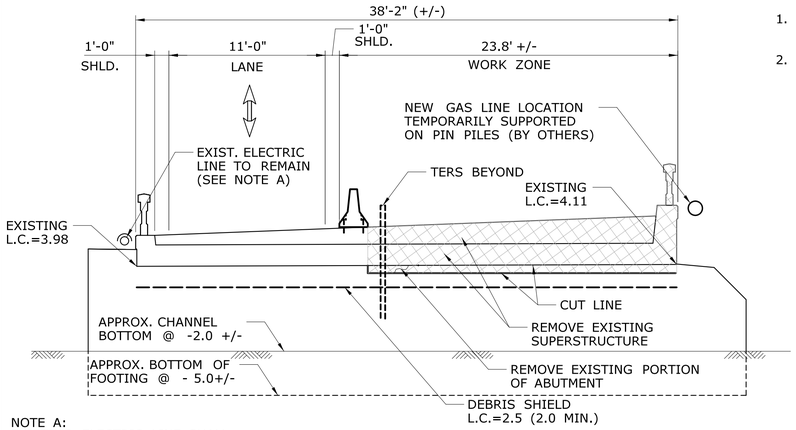
TOWN: **PRESTON**

DRAWING TITLE: **STAGE 2 - WATER HANDLING PLAN**

PROJECT NO. 0113-0108
DRAWING NO. S-05
SHEET NO.

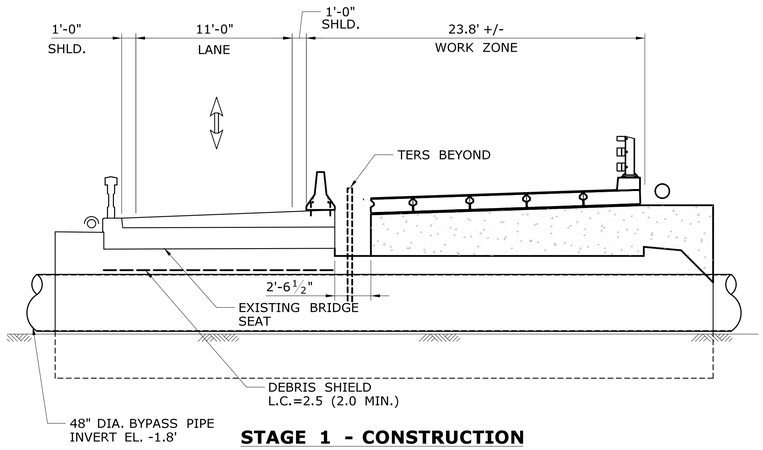
PRE-STAGE CONSTRUCTION:

1. RELOCATE EXISTING SNET POLE #1039 LOCATED IN THE NORTHWEST CORNER AND OVERHEAD UTILITY LINES. RELOCATION TO BE PERFORMED BY OTHERS.
2. RELOCATE EXISTING GAS LINE (BY EVERSOURCE) AWAY FROM THE SOUTH FASCIA OF THE BRIDGE AND SUPPORT THE RELOCATED LINE TEMPORARILY. THIS WORK WILL BE COORDINATED WITH EVERSOURCE AND UTILITY RELOCATION PLANS.



NOTE A:
EXISTING ELECTRIC LINE SHALL BE TEMPORARILY SUPPORTED PRIOR TO STAGE 1 REMOVAL OPERATIONS

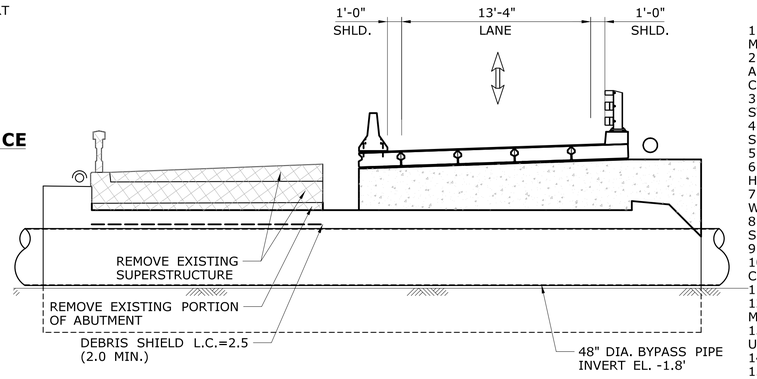
STAGE 1 - REMOVAL
SCALE: 3/16"=1'-0"



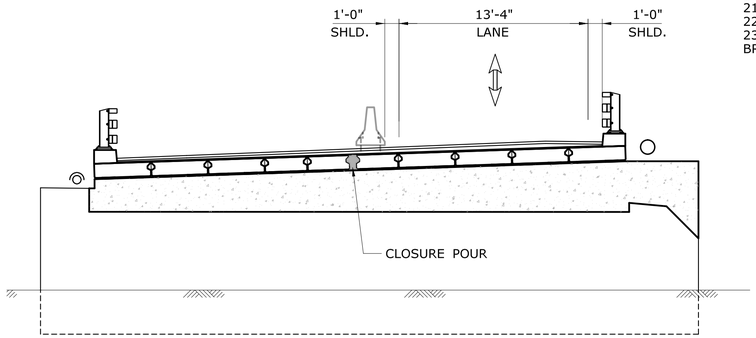
STAGE 1 - CONSTRUCTION
SCALE: 3/16"=1'-0"

STAGE 1 - SUGGESTED CONSTRUCTION SEQUENCE

1. INSTALL SEDIMENTATION AND EROSION CONTROL MEASURES ON SOUTH SIDE.
2. INSTALL TEMPORARY SIGNALIZATION AT EACH END OF THE CONSTRUCTION ZONE AS PER MP OF T PLANS.
3. INSTALL TPCBC (STRUCTURE) ON THE BRIDGE AND TPCBC ALONG ROUTE 2A PER MP OF T PLANS AND SHIFT ROUTE 2A TRAFFIC TO A ONE-WAY ALTERNATING CONFIGURATION.
4. INSTALL TEMPORARY EARTH RETAINING SYSTEM (TERS).
5. REMOVE EXISTING GUIDE RAILING FROM SOUTH SIDE.
6. INSTALL TEMPORARY MICROPILE SUPPORTS ON THE SOUTH SIDE.
7. RELOCATE PORTION OF GAS LINE ONTO TEMPORARY SUPPORTS. (WORK BY EVERSOURCE)
8. DIG TRENCH, INSTALL PERMANENT GAS LINE AWAY FROM BARRIER WALL FOOTINGS. (WORK BY EVERSOURCE)
9. BACKFILL GAS LINE TRENCH (WORK BY EVERSOURCE).
10. EXCAVATE APPROACH PAVEMENT AS NECESSARY WITHIN PROJECT LIMIT.
11. INSTALL DEBRIS SHIELD AND REMOVE EXISTING SUPERSTRUCTURE.
12. REMOVE DEBRIS SHIELD FROM THE SOUTH SIDE.
13. INSTALL WATER HANDLING COFFERDAM AND BYPASS PIPE.
14. REMOVE PORTION OF EXISTING ABUTMENTS AND WINGWALLS TO CUT-LINE ELEVATION.
15. PERFORM SUBSTRUCTURE REPAIRS.
16. EXCAVATE AND CONSTRUCT ABUTMENT AND WINGWALL MODIFICATION.
17. INSTALL ELASTOMERIC BEARINGS, NEW DECK UNITS AND CURBING.
18. GROUT UHPC SHEAR KEYS.
19. CONSTRUCT SOUTH BARRIER WALLS AND END BLOCKS.
20. DAMPPROOF BACK OF ABUTMENTS AND BARRIER WALLS.
21. BACKFILL BEHIND ABUTMENTS AND BARRIER WALLS.
22. CONSTRUCT APPROACH PAVEMENT.
23. INSTALL MEMBRANE WATERPROOFING AND FIRST OVERLAY COURSE.
24. INSTALL BRIDGE RAILING.
25. INSTALL SOUTH SIDE GUIDE RAILING.
26. INSTALL PAVEMENT MARKINGS.
27. INSTALL PERMANENT SUPPORTS FOR THE GAS LINE ON TOP OF WINGWALLS AND REMOVE TEMPORARY SUPPORTS.
28. CONNECT NEW GAS LINE WITH THE RELOCATED PORTION OF THE GAS LINE. (WORK BY EVERSOURCE)
29. ABANDON OLD GAS LINE. (WORK BY EVERSOURCE).
30. OPEN SOUTH SIDE TO ONE -WAY ALTERNATING TRAFFIC.



STAGE 2 - REMOVAL
SCALE: 3/16"=1'-0"



STAGE 2 - CONSTRUCTION
SCALE: 3/16"=1'-0"

STAGE 2 - SUGGESTED CONSTRUCTION SEQUENCE

1. INSTALL SEDIMENTATION AND EROSION CONTROL MEASURES ON NORTH SIDE.
2. RELOCATE TPCBC (STRUCTURE) ON THE BRIDGE AND TPCBC ALONG ROUTE 2A AS NECESSARY TO CREATE WORK ZONE FOR STAGE 2.
3. INSTALL OR REUSE TEMPORARY EARTH RETAINING SYSTEM (TERS).
4. REMOVE EXISTING GUIDE RAILING FROM NORTH SIDE.
5. INSTALL TEMPORARY SUPPORTS FOR HPFF LINE.
6. REMOVE EXISTING SUPPORT BRACKETS OF THE HPFF LINE FROM THE BRIDGE.
7. EXCAVATE APPROACH PAVEMENT AS NECESSARY WITHIN PROJECT LIMIT.
8. INSTALL DEBRIS SHIELD AND REMOVE EXISTING SUPERSTRUCTURE.
9. REMOVE DEBRIS SHIELD FROM THE NORTH SIDE.
10. REMOVE PORTION OF EXISTING ABUTMENTS TO CUT-LINE ELEVATION.
11. PERFORM SUBSTRUCTURE REPAIRS.
12. EXCAVATE AND CONSTRUCT ABUTMENT MODIFICATION.
13. INSTALL ELASTOMERIC BEARINGS, NEW DECK UNITS AND CURBING.
14. GROUT UHPC SHEAR KEYS.
15. CONSTRUCT NORTH BARRIER WALLS AND END BLOCKS.
16. DAMPPROOF BACK OF ABUTMENTS AND BARRIER WALLS.
17. BACKFILL BEHIND ABUTMENTS AND BARRIER WALLS.
18. CONSTRUCT APPROACH PAVEMENT.
19. INSTALL MEMBRANE WATERPROOFING AND FIRST OVERLAY COURSE.
20. INSTALL BRIDGE RAILING.
21. INSTALL NORTH SIDE GUIDE RAILING.
22. INSTALL PAVEMENT MARKINGS.
23. REMOVE TEMPORARY SIGNALS, TPCBC AND OPEN BRIDGE TO TWO LANE TRAFFIC.

STAGE 3 - SUGGESTED CONSTRUCTION SEQUENCE

24. INSTALL REMAINING PAVEMENT COURSES UTILIZING TEMPORARY TRAFFIC CLOSURES.
25. INSTALL PERMANENT PAVEMENT MARKINGS.
26. LOAM AND SEED ON EMBANKMENT SLOPES.

NOTE:
ALL EXISTING DIMENSIONS ARE APPROXIMATE AND BASED ON AN EXISTING FIELD SURVEY BY THE CT DOT DATED 10-30-18 AND VARIOUS FIELD MEASUREMENTS. CONTRACTOR SHALL VERIFY ALL DIMENSIONS PRIOR TO ANY CONSTRUCTION OR FABRICATION OF MATERIALS. AI ENGINEERS INC. ACCEPTS NO RESPONSIBILITY FOR THE ACCURACY OF MAPS AND DATA WHICH HAVE BEEN SUPPLIED BY OTHERS.

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: 3/1/2019

DESIGNER/DRAFTER: MRG
CHECKED BY:
SCALE AS NOTED

STATE OF CONNECTICUT
DEPARTMENT OF TRANSPORTATION

Filename: ...\06_SB_MST_Br02932_0113_0108_Construction Staging.dgn

SIGNATURE/ BLOCK:

AI Engineers, Inc.
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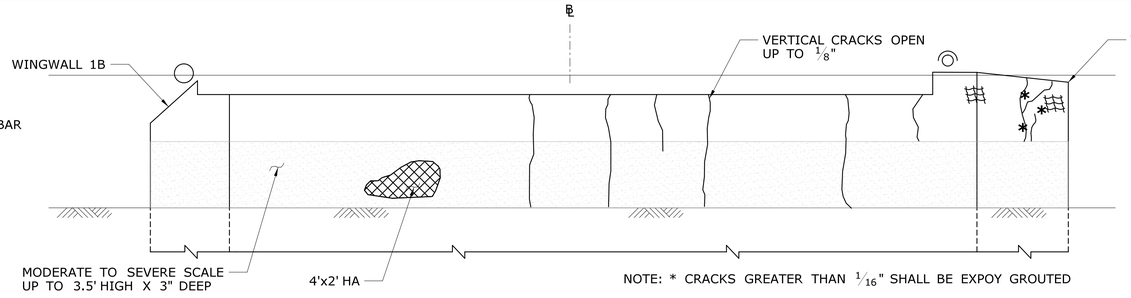
MIDDLETOWN, CT 06457
Phone: (860) 635-7740
Fax: (860) 635-7312

PROJECT TITLE:
REHABILITATION OF BRIDGE NO. 02932 ROUTE 2A OVER HALSEY BROOK

TOWN: **PRESTON**
PROJECT NO. **0113-0108**
DRAWING NO. **S-06**
SHEET NO.
DRAWING TITLE: **CONSTRUCTION STAGING SECTIONS**

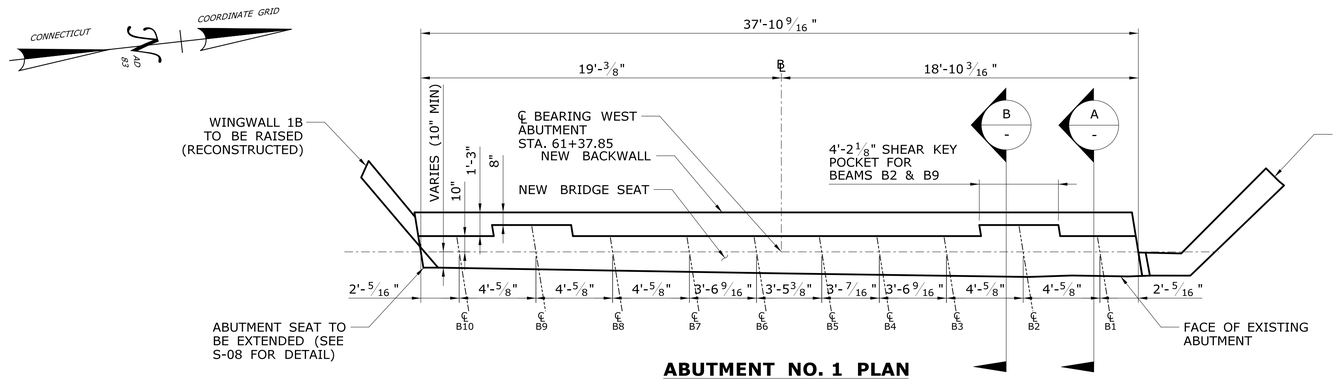
DETERIORATION LEGEND

- HOLLOW AREA
- SHALLOW REBAR
- SPALL AREA
- SPALL AREA WITH EXPOSED REBAR
- MAPCRACKS
- HAIRLINE CRACKS
- HONEYCOMB AREA
- SCALE AREA
- * EFFLORESCENCE PRESENT



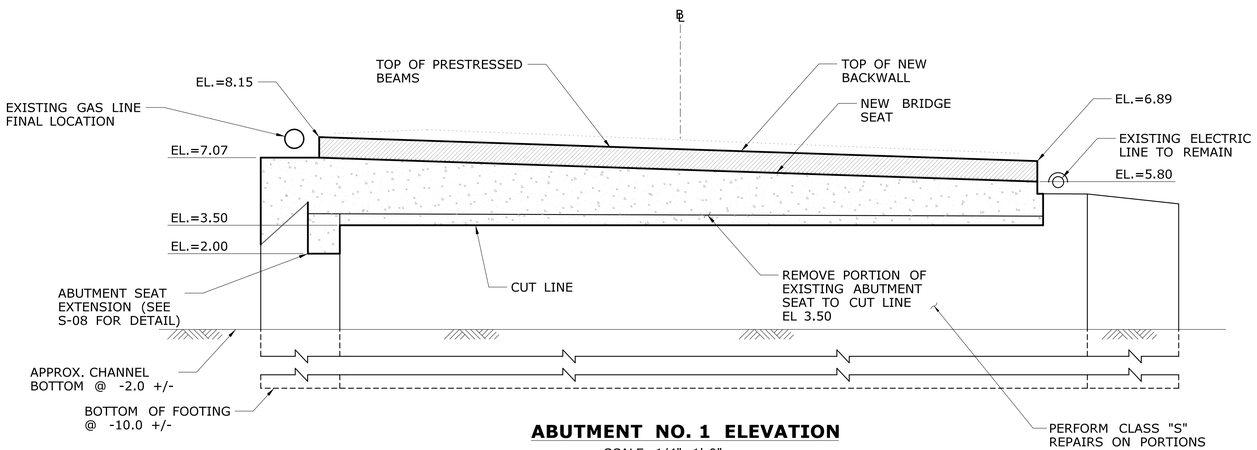
ABUTMENT NO. 1 REPAIR LOCATIONS

SCALE: 1/4"=1'-0"



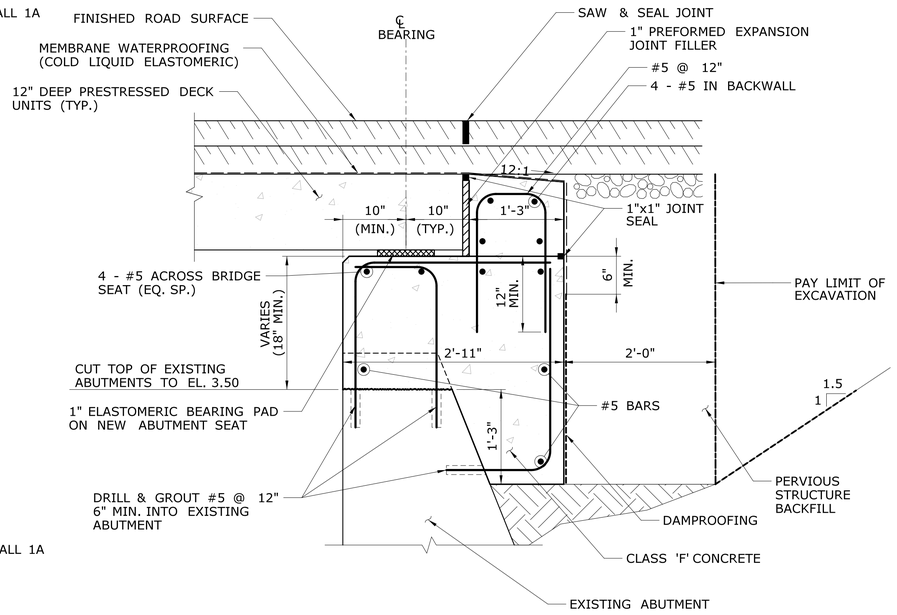
ABUTMENT NO. 1 PLAN

SCALE: 1/4"=1'-0"



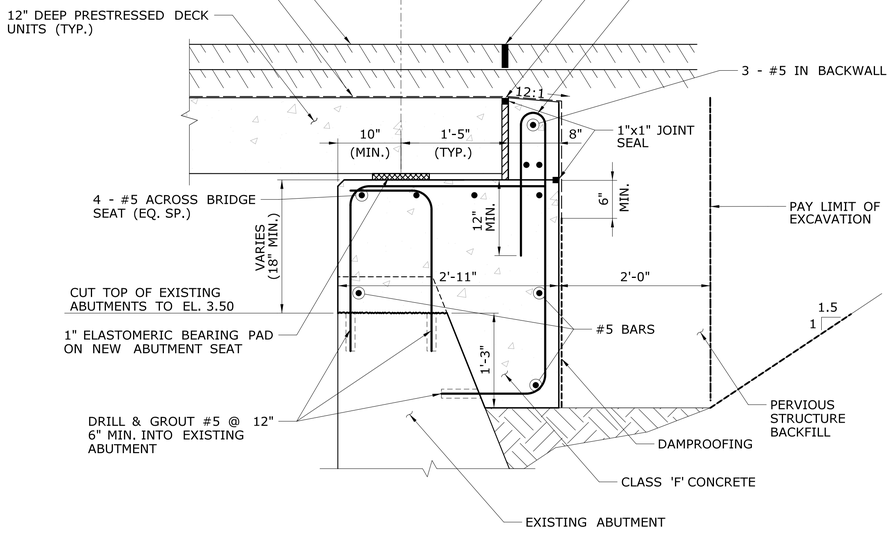
ABUTMENT NO. 1 ELEVATION

SCALE: 1/4"=1'-0"



SECTION 'A'
TYPICAL ABUTMENT MODIFICATION DETAIL

SCALE: 1"=1'-0"



SECTION 'B'
TYPICAL ABUTMENT MODIFICATION DETAIL AT SHEAR KEY

SCALE: 1"=1'-0"

NOTES:

1. ALL EXISTING DIMENSIONS ARE APPROXIMATE AND BASED ON AN EXISTING FIELD SURVEY BY THE CT DOT DATED 10-30-18 AND VARIOUS FIELD MEASUREMENTS. CONTRACTOR SHALL VERIFY ALL DIMENSIONS PRIOR TO ANY CONSTRUCTION OR FABRICATION OF MATERIALS. AI ENGINEERS INC. ACCEPTS NO RESPONSIBILITY FOR THE ACCURACY OF MAPS AND DATA WHICH HAVE BEEN SUPPLIED BY OTHERS.
2. DETERIORATED AREAS NOTED IN THE ABUTMENT ELEVATIONS WERE TAKEN FROM INSPECTION REPORT DATED 04/05/2018 AND OBSERVATION DURING SITE VISIT DURING AUG. 2018. IF CONDITIONS ARE FOUND TO BE DIFFERENT DURING CONSTRUCTION, THE CONTRACTOR SHALL NOTIFY ENGINEER PRIOR TO PERFORMING ANY REPAIR WORK.

FINAL DESIGN REVIEW

REV.	DATE	REVISION DESCRIPTION	SHEET NO.

Plotted Date: 3/1/2019

DESIGNER/DRAFTER: MRG
CHECKED BY:
SCALE AS NOTED

STATE OF CONNECTICUT
DEPARTMENT OF TRANSPORTATION

Filename: ...\07_SB_MST_Br02932_0113_0108_Abutment1 Modifications.dgn

SIGNATURE/ BLOCK:

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PROJECT TITLE:
REHABILITATION OF BRIDGE NO. 02932 ROUTE 2A OVER HALSEY BROOK

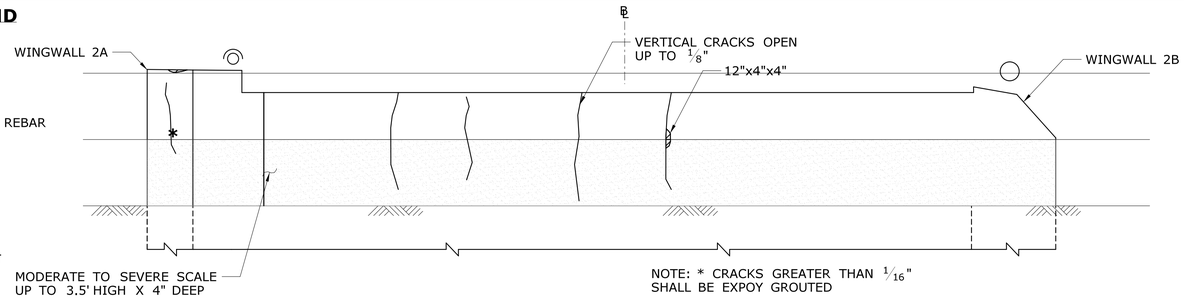
TOWN: **PRESTON**

DRAWING TITLE: **ABUTMENT NO. 1 MODIFICATIONS & DETAILS**

PROJECT NO. **0113-0108**
DRAWING NO. **S-07**
SHEET NO.

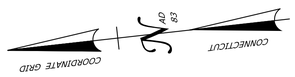
DETERIORATION LEGEND

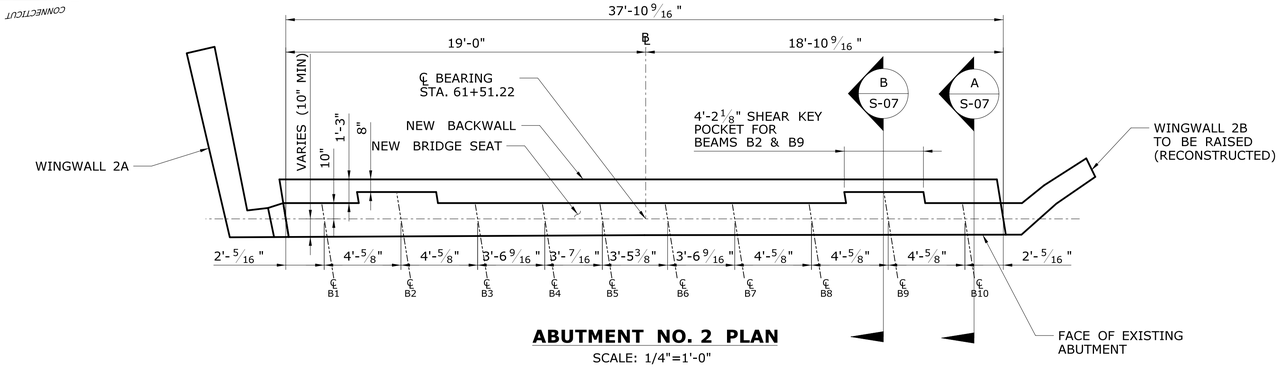
- HOLLOW AREA
- SHALLOW REBAR
- SPALL AREA
- SPALL AREA W/EXPOSED REBAR
- MAPCRACKS
- HAIRLINE CRACKS
- HONEYCOMB AREA
- SCALE AREA
- * EFFLORESCENCE PRESENT



ABUTMENT NO. 2 REPAIR LOCATIONS

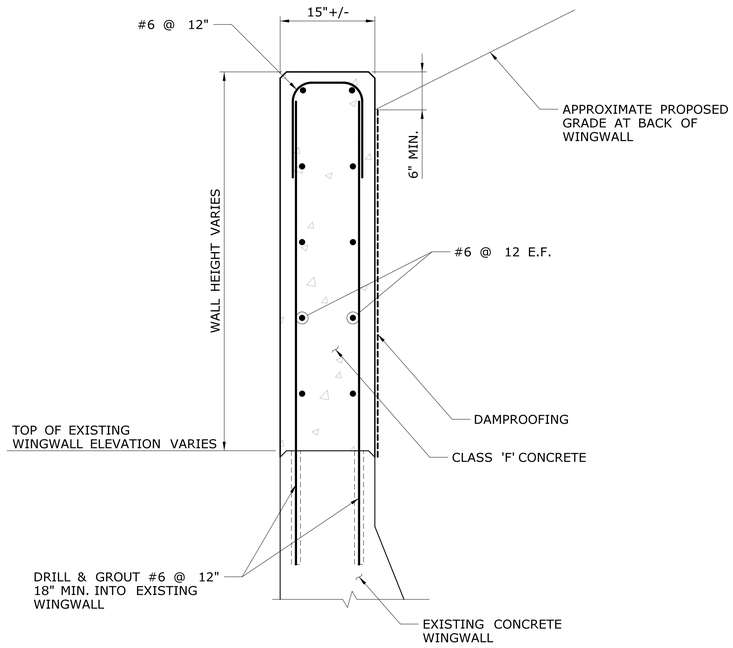
SCALE: 1/4"=1'-0"





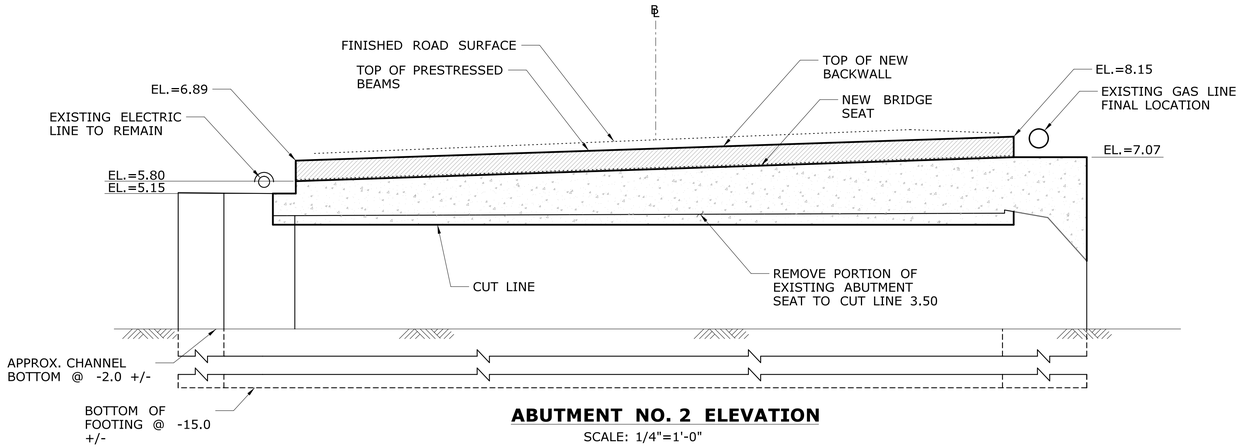
ABUTMENT NO. 2 PLAN

SCALE: 1/4"=1'-0"



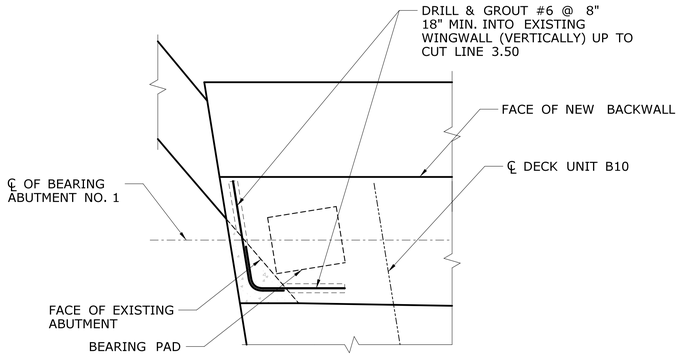
TYPICAL WINGWALL MODIFICATION DETAIL

SCALE: 1"=1'-0"



ABUTMENT NO. 2 ELEVATION

SCALE: 1/4"=1'-0"



ABUTMENT SEAT EXTENSION DETAIL

SCALE: 1"=1'-0"

NOTES:

1. ALL EXISTING DIMENSIONS ARE APPROXIMATE AND BASED ON AN EXISTING FIELD SURVEY BY THE CT DOT DATED 10-30-18 AND VARIOUS FIELD MEASUREMENTS. CONTRACTOR SHALL VERIFY ALL DIMENSIONS PRIOR TO ANY CONSTRUCTION OR FABRICATION OF MATERIALS. AI ENGINEERS INC. ACCEPTS NO RESPONSIBILITY FOR THE ACCURACY OF MAPS AND DATA WHICH HAVE BEEN SUPPLIED BY OTHERS.
2. DETERIORATED AREAS NOTED IN THE ABUTMENT ELEVATIONS WERE TAKEN FROM INSPECTION REPORT DATED 04/05/2018 AND OBSERVATION DURING SITE VISIT DURING AUG. 2018. IF CONDITIONS ARE FOUND TO BE DIFFERENT DURING CONSTRUCTION, THE CONTRACTOR SHALL NOTIFY ENGINEER PRIOR TO PERFORMING ANY REPAIR WORK.

FINAL DESIGN REVIEW

REV.	DATE	REVISION DESCRIPTION	SHEET NO.

Plotted Date: 3/1/2019

DESIGNER/DRAFTER: MRG

CHECKED BY:

SCALE AS NOTED

STATE OF CONNECTICUT
DEPARTMENT OF TRANSPORTATION

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SIGNATURE/ BLOCK:

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PROJECT TITLE:
REHABILITATION OF BRIDGE NO. 02932 ROUTE 2A OVER HALSEY BROOK

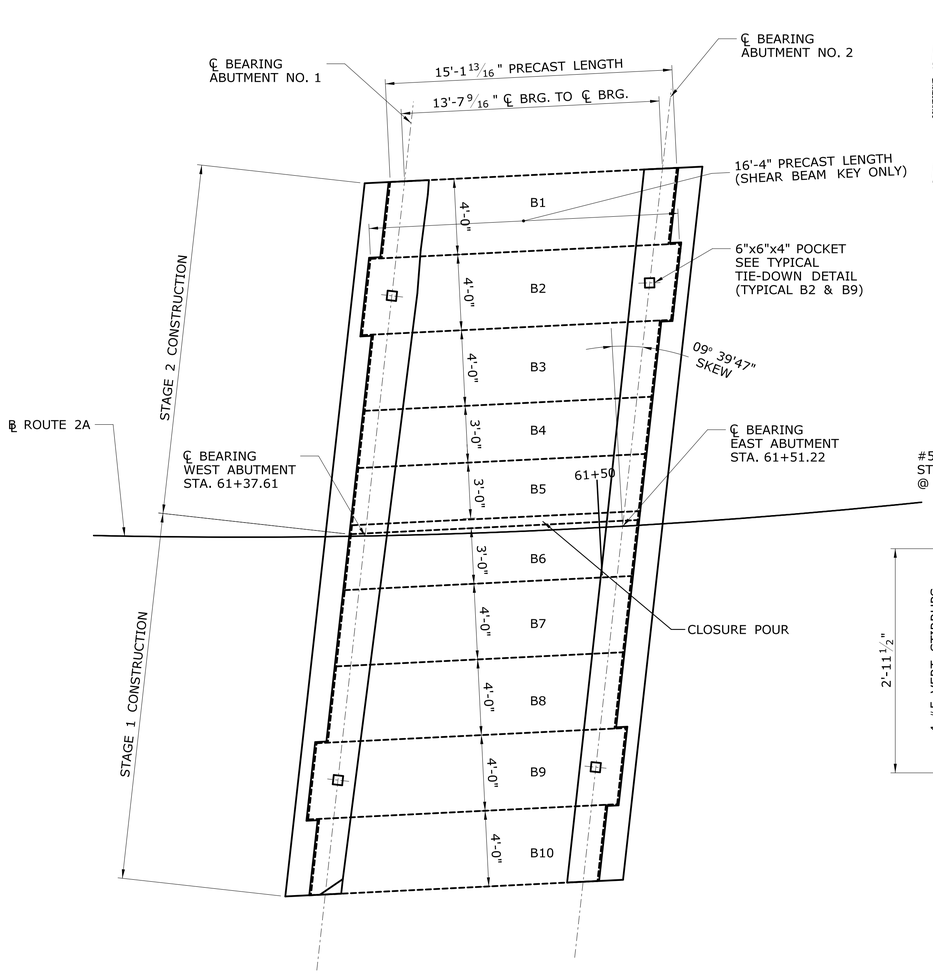
TOWN: **PRESTON**

PROJECT NO. **0113-0108**

DRAWING TITLE: **ABUTMENT NO. 2 MODIFICATIONS & DETAILS**

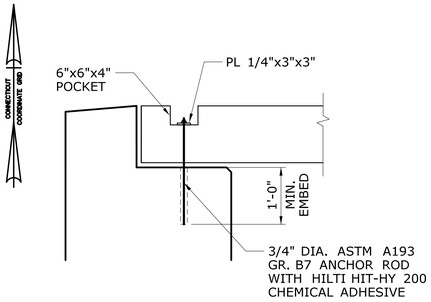
DRAWING NO. **S-08**

SHEET NO.



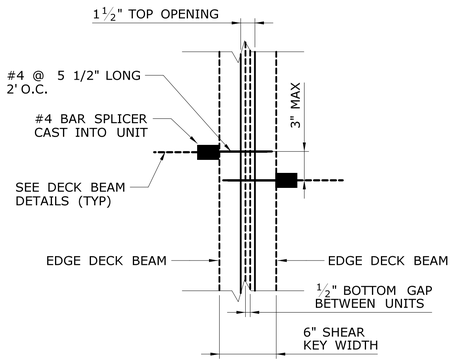
FRAMING PLAN

SCALE: 1/4"=1'-0"



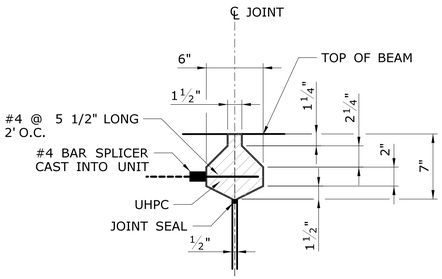
TYPICAL TIE-DOWN DETAIL

SCALE: 1"=1'-0"



UHPC SHEAR KEY PLAN

SCALE: 1 1/2"=1'

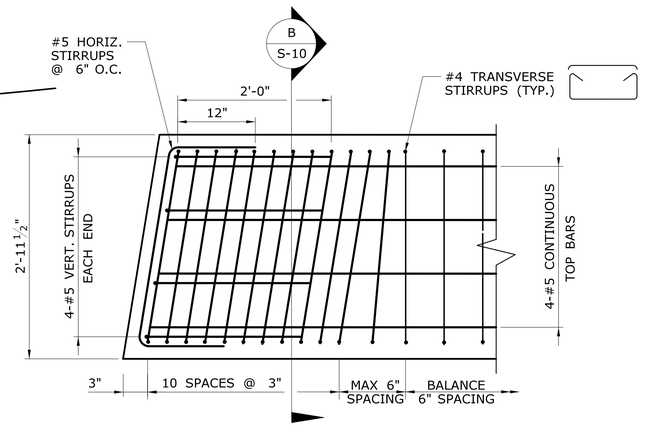


UHPC SHEAR KEY

SCALE: 1 1/2"=1'

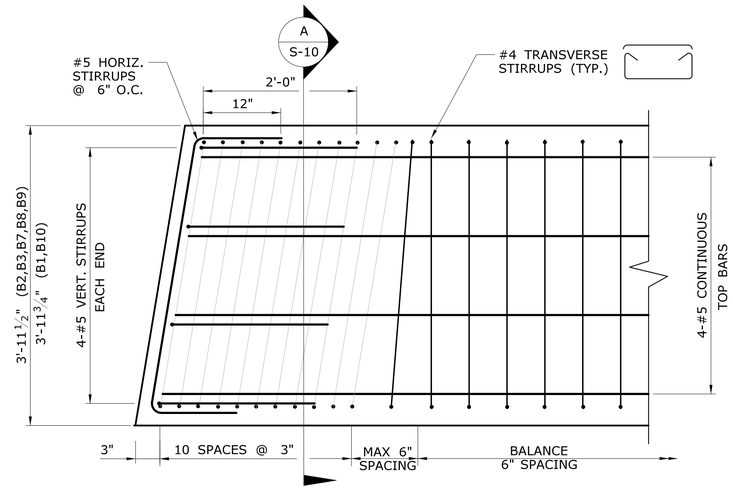
UHPC SHEAR KEY NOTES

1) SURFACE OF SHEAR KEYS TO BE FILLED WITH UHPC SHALL BY ROUGHENED AND CLEANED PRIOR TO BEAM PLACEMENT
2) AFTER FINAL BEAM PLACEMENT, SHEAR KEYS SHALL BE FILLED WITH ULTRA HIGH PERFORMANCE CONCRETE (UHPC) IN ONE CONTINUOUS POUR PER KEY.
3) A NOMINAL OVERFILL IS ANTICIPATED AT CROWN OF SHEAR KEY LOCATIONS. THE COST OF GRINDING THE EXCESS MATERIAL SHALL BE INCLUDED IN THE COST OF THE UHPC CONCRETE.



PLAN VIEW FOR BEAMS B4, B5, & B6 (STRANDS NOT SHOWN FOR CLARITY)

SCALE: 1" = 1'-0"

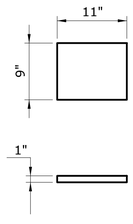


PLAN VIEW FOR BEAMS B1, B2, B3, B7, B8, B9 & B10 (STRANDS NOT SHOWN FOR CLARITY)

SCALE: 1" = 1'-0"

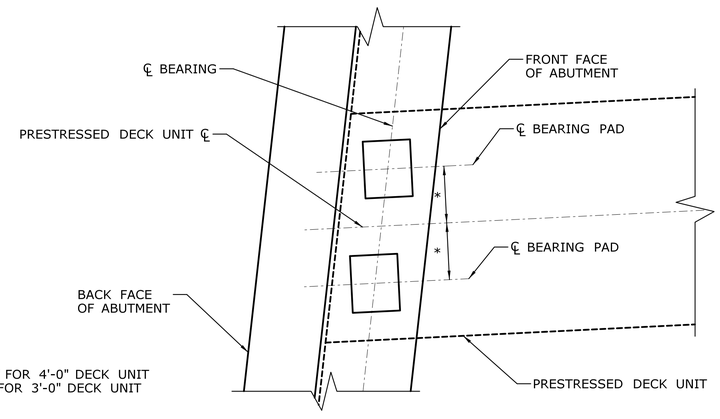
BEARING ASSEMBLY NOTES:

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"



NOTES:

* 12" FOR 4'-0" DECK UNIT
9" FOR 3'-0" DECK UNIT

ELASTOMERIC BEARING LAYOUT

SCALE: = 3/4" = 1'-0"

FINAL DESIGN REVIEW

REV.	DATE	REVISION DESCRIPTION	SHEET NO.

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Plotted Date: 3/1/2019

DESIGNER/DRAFTER: MRG
CHECKED BY:
SCALE AS NOTED

STATE OF CONNECTICUT
DEPARTMENT OF TRANSPORTATION

Filename: ...\09_SB_MST_Br02932_0113_0108_Framing Bearing Plan.dgn

SIGNATURE/ BLOCK:

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PROJECT TITLE:
REHABILITATION OF BRIDGE NO. 02932 ROUTE 2A OVER HALSEY BROOK

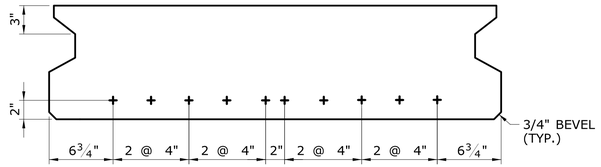
TOWN: **PRESTON**

DRAWING TITLE: **FRAMING PLAN AND BEARING DETAILS**

PROJECT NO. 0113-0108
DRAWING NO. S-09
SHEET NO.

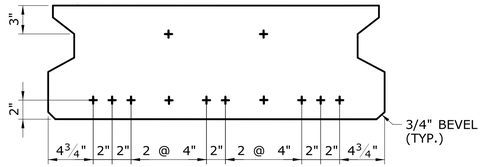
BEAM B1 & B10 STRAND LAYOUT

SCALE: 1 1/2" = 1'-0"



BEAMS B2, B3,B7 , B8 & B9 STRAND LAYOUT

SCALE: 1 1/2" = 1'-0"

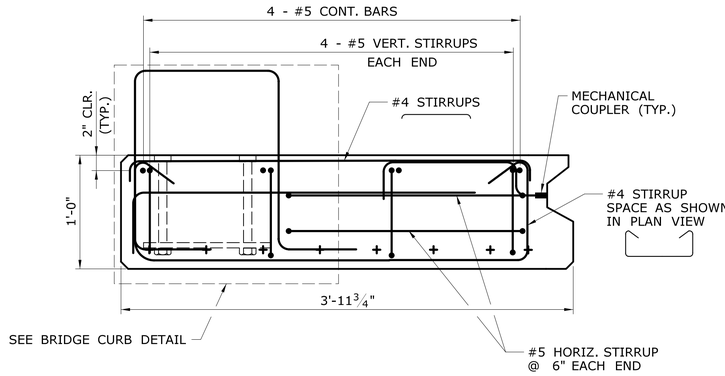


BEAM B4, B5, & B6 STRAND LAYOUT

SCALE: 1 1/2" = 1'-0"

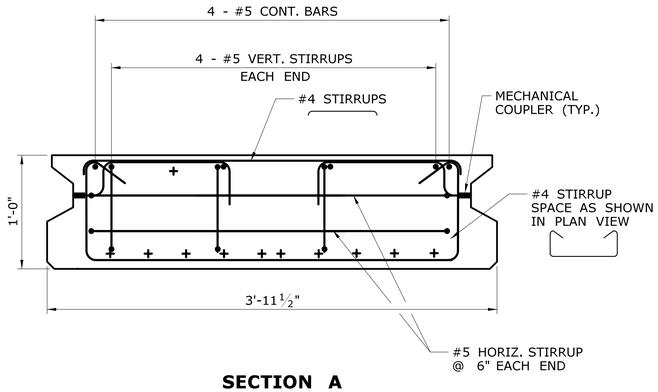
PRESTRESSED DECK UNIT NOTES:

1. PRESTRESSED DECK UNITS SHALL CONFORM TO THE FOLLOWING REQUIREMENTS.
   F'c= 4,000 PSI
   F'c= 6,500 PSI
2. PRESTRESSED STRANDS SHALL CONFORM TO THE FOLLOWING REQUIREMENTS.
   0.5" DIAMETER, UNCOATED, 7 WIRE, LOW RELAXATION STRANDS CONFORMING TO THE REQUIREMENTS OF AASHTO M203, GRADE 270
   ULTIMATE STRENGTH (f's) = 270,000 PSI
   JACKING TENSION (FJ) = 31,000 LBS. PER STRAND
3. PRESTRESSED STRANDS SHALL BE PLACED 2" MINIMUM ON CENTER AND SHALL HAVE A MINIMUM COVER OF 2".
4. ENDS OF DECK UNITS SHALL BE VERTICAL AFTER APPLICATION OF FULL DEAD LOAD.
5. THE DRILLING OF HOLES IN PRESTRESSED DECK UNITS, OR THE USE OF POWER ACTUATED TOOLS ON PRESTRESSED DECK UNITS WILL NOT BE PERMITTED.
6. NO ADDITIONAL DEAD LOADS OR LIVE LOADS SHALL BE APPLIED TO THE PRESTRESSED DECK UNITS UNTIL UHPC KEYWAYS ARE FULLY GROUTED AND GROUT IN THE LONGITUDINAL SHEAR KEYS HAS REACHED A SEVEN-DAY COMPRESSIVE STRENGTH OF 4500 PSI.
7. THE DECK UNITS SHALL BE PLACED AT THE NOMINAL SPACING SHOWN ON THE PLANS WITH A 1/2" WIDE GAP BETWEEN THE UNITS. THE WIDTH OF THIS GAP CAN VARY DUE TO SWEEP OF THE BEAMS.
8. GROUT FOR SHEAR KEYS SHALL BE RODDED OR VIBRATED TO ENSURE THAT ALL VOIDS IN THE SHEAR KEY ARE FILLED.
9. MILD REINFORCING STEEL SHALL BE EPOXY COATED ASTM A615 GRADE 60
10. SHEAR KEY SHALL BE OMITTED ON OUTSIDE FACE OF FASCIA BEAMS.



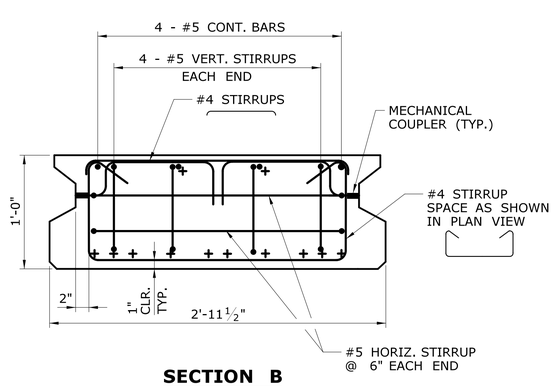
SECTION A FOR BEAMS B1 & B10

SCALE: 1 1/2" = 1'-0"



SECTION A FOR BEAMS B2, B3, B7, B8 & B9

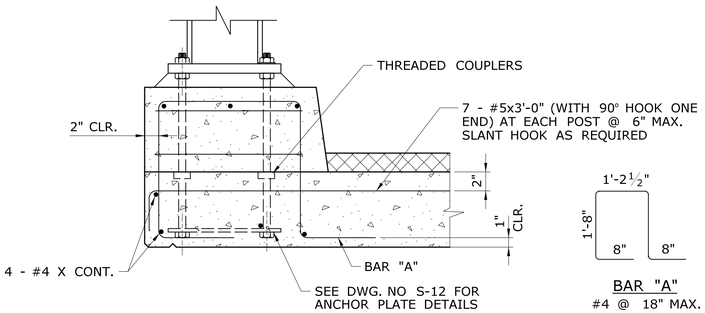
SCALE: 1 1/2" = 1'-0"



SECTION B FOR BEAMS B4, B5, & B6

SCALE: 1 1/2" = 1'-0"

NOTE:
1) THE TEMPORARY BARRIER SHALL BE ANCHORED WITH INSERTS CAST INTO THE DECK UNIT. THE CONTRACTOR SHALL COORDINATE THE LOCATIONS OF THESE INSERTS WITH THE PRECAST MANUFACTURER.



BRIDGE CURB DETAIL

SCALE: 1 1/2" = 1'-0"

STRAND DATA		
MEMBER NUMBER	NUMBER OF STRANDS	C.G. OF STRANDS (INCHES) *
B1 & B10	8	2"
B2, B3, B7, B8, & B9	10	2"
B4, B5, & B6	12	3.17"

* ECCENTRICITIES ARE BASED ON THE GROSS NON-COMPOSITE SECTION. C.G. OF STRANDS IS MEASURED FROM THE BOTTOM OF THE BEAM.

CAMBER TABLE			
MEMBER NUMBER	AT TRANSFER	AT ERECTION	FINAL
	CAMBER DUE TO PRETENSIONING FORCE AT TRANSFER MINUS THE DEFLECTION DUE TO THE DEAD LOAD OF THE MEMBER.	CAMBER (DUE TO PRETENSIONING FORCE AT TRANSFER MINUS THE DEFLECTION DUE TO THE DEAD LOAD OF THE MEMBER) APPROXIMATELY 30 DAYS AFTER TRANSFER.	CAMBER AFTER ALL DEAD LOADS ARE APPLIED TO THE STRUCTURE.
B1 & B10	0.104"	0.178"	0.226"
B2, B3, B7, B8, & B9	0.134"	0.223"	0.300"
B4, B5, & B6	0.154"	0.266"	0.341"

FINAL DESIGN REVIEW

REV.	DATE	REVISION DESCRIPTION	SHEET NO.

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Plotted Date: 3/1/2019

DESIGNER/DRAFTER: MRG

CHECKED BY:

SCALE AS NOTED

STATE OF CONNECTICUT
DEPARTMENT OF TRANSPORTATION

Filename: ...\10_SB_MST_Br02932_0113_0108_Prestressed Deck Units.dgn

SIGNATURE/ BLOCK:

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PROJECT TITLE:
REHABILITATION OF BRIDGE NO. 02932 ROUTE 2A OVER HALSEY BROOK

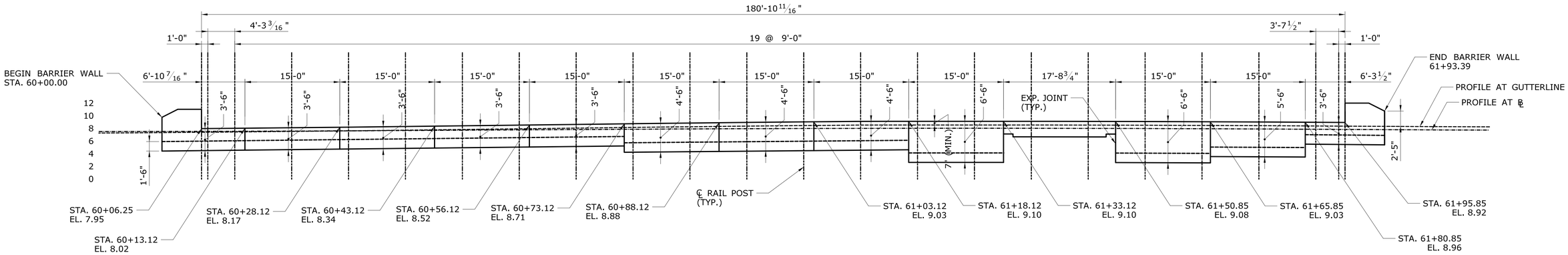
TOWN: **PRESTON**

DRAWING TITLE: **PRESTRESSED DECK UNITS**

PROJECT NO. **0113-0108**

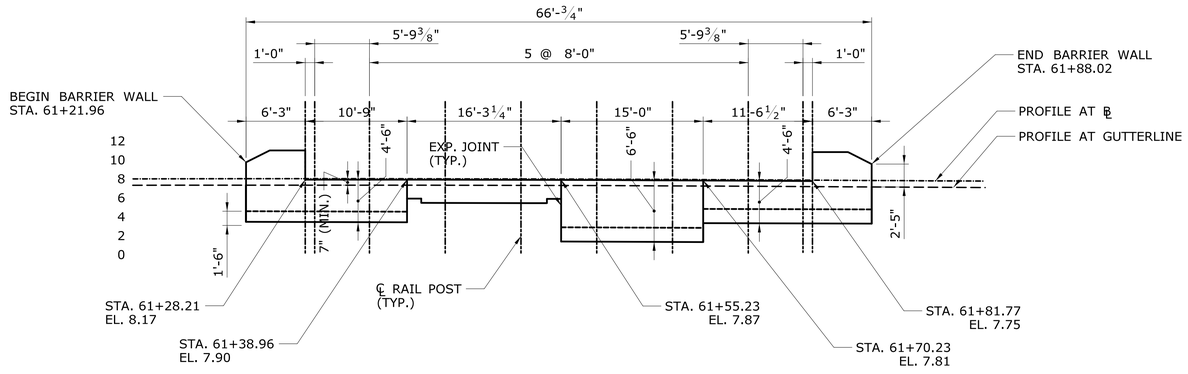
DRAWING NO. **S-10**

SHEET NO.



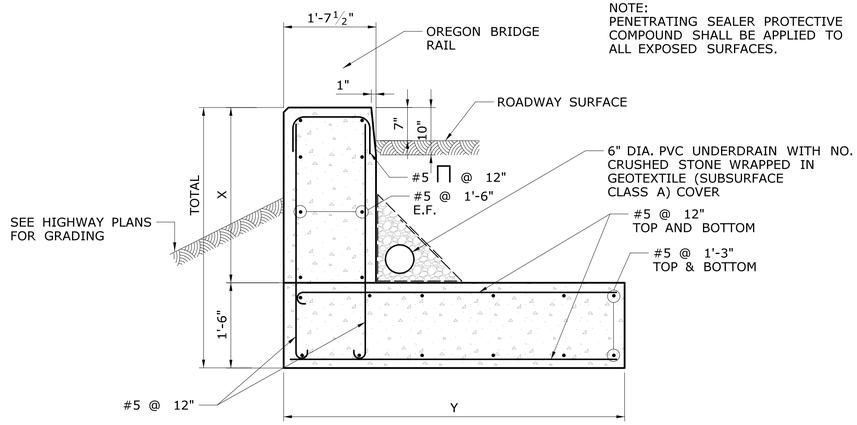
SOUTHERN ELEVATION

SCALE: 1/8" = 1'-0"



NORTHERN ELEVATION

SCALE: 1/8" = 1'-0"



BARRIER WALL SECTION

SCALE: 3/4"=1'

NOTE:
PENETRATING SEALER PROTECTIVE COMPOUND SHALL BE APPLIED TO ALL EXPOSED SURFACES.

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

FINAL DESIGN REVIEW

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Plotted Date: 3/1/2019

DESIGNER/DRAFTER: MRG

CHECKED BY:

SCALE AS NOTED

STATE OF CONNECTICUT
DEPARTMENT OF TRANSPORTATION

Filename: ...\11_SB_MST_Br02932_0113_0108_Barrier Wall Elevations.dgn

SIGNATURE/
BLOCK:

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PROJECT TITLE:
REHABILITATION OF BRIDGE NO. 02932 ROUTE 2A OVER HALSEY BROOK

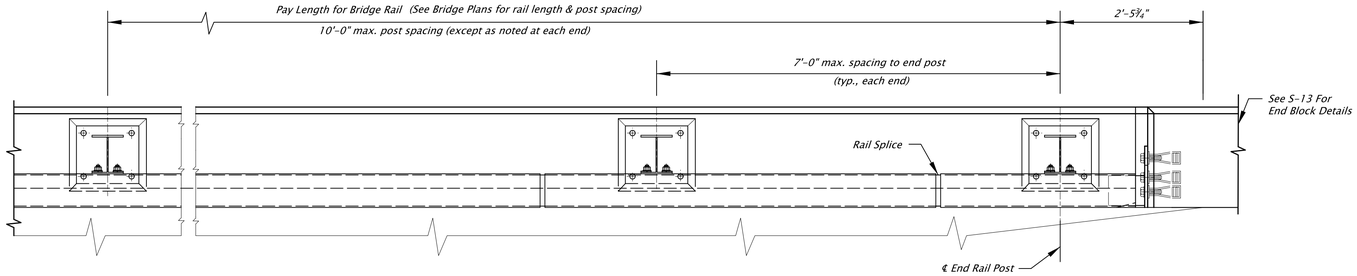
TOWN: **PRESTON**

DRAWING TITLE:
BARRIER WALL ELEVATIONS AND SECTION

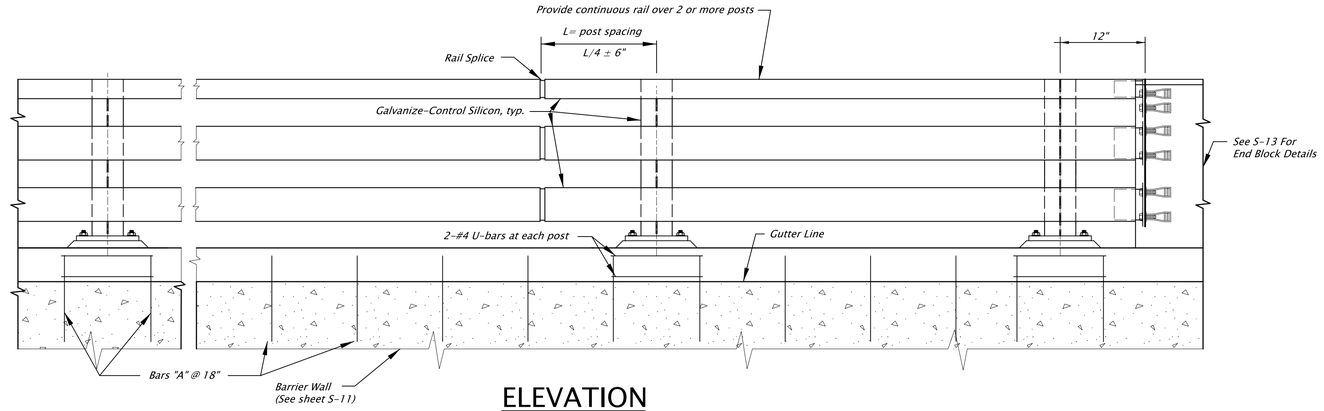
PROJECT NO. **0113-0108**

DRAWING NO. **S-11**

SHEET NO.

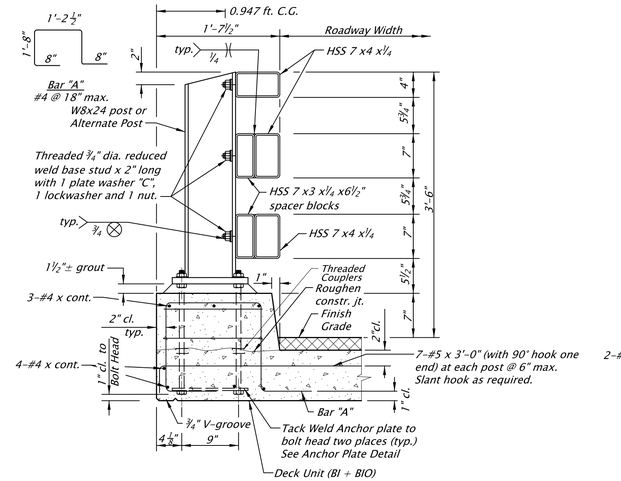


PLAN



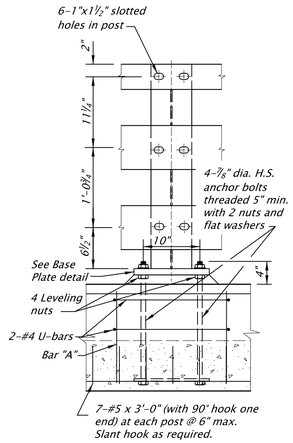
ELEVATION

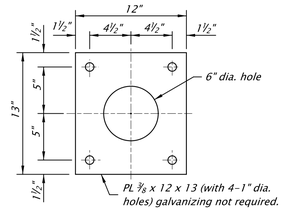
SCALE: 3/4" = 1'-0"



CURB AND POST DETAIL

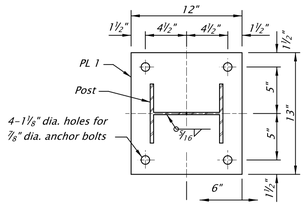
SCALE: 1" = 1'-0"





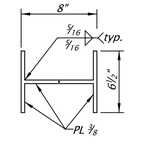
ANCHOR PLATE DETAIL

SCALE: 1 1/2" = 1'-0"



BASE PLATE DETAIL

SCALE: 1 1/2" = 1'-0"



ALTERNATE POST

SCALE: 1 1/2" = 1'-0"

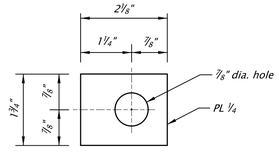
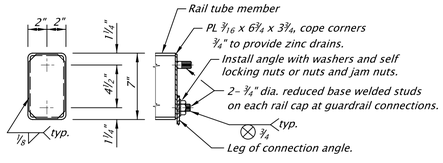


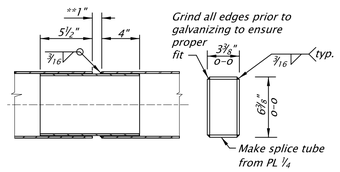
PLATE WASHER "C"

SCALE: 6" = 1'-0"



RAIL CAP DETAIL

SCALE: 1 1/2" = 1'-0"



RAIL SPLICE DETAIL

SCALE: 1 1/2" = 1'-0"

***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.*

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

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Plotted Date: 3/1/2019

DESIGNER/DRAFTER: MRG

CHECKED BY:

SCALE AS NOTED

STATE OF CONNECTICUT
DEPARTMENT OF TRANSPORTATION

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

SIGNATURE/ BLOCK:

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PROJECT TITLE:
REHABILITATION OF BRIDGE NO. 02932 ROUTE 2A OVER HALSEY BROOK

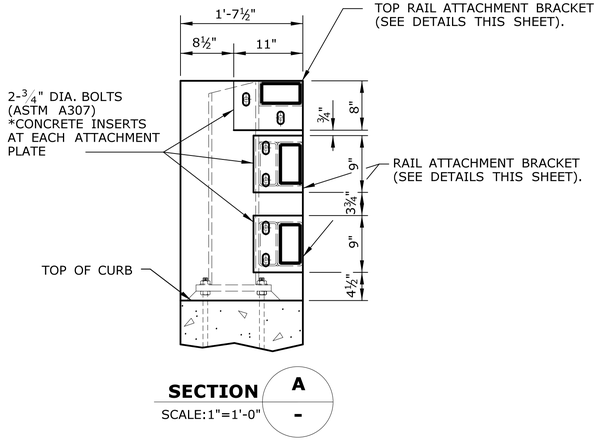
TOWN: **PRESTON**

DRAWING TITLE: **BRIDGE RAIL DETAILS**

PROJECT NO. **0113-0108**

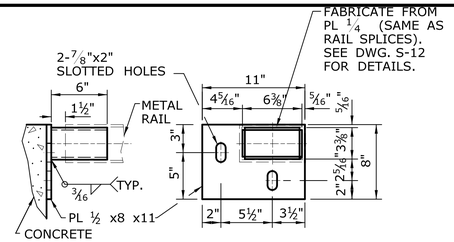
DRAWING NO. **S-12**

SHEET NO.



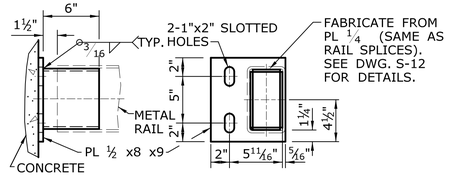
SECTION A-A

SCALE:1"=1'-0"



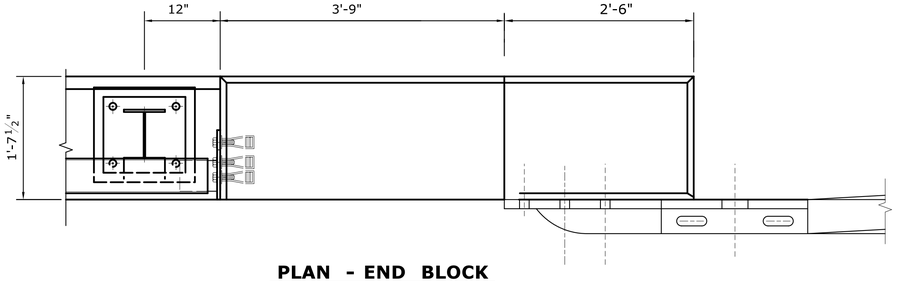
TOP RAIL ATTACHMENT BRACKET

SCALE: N.T.S



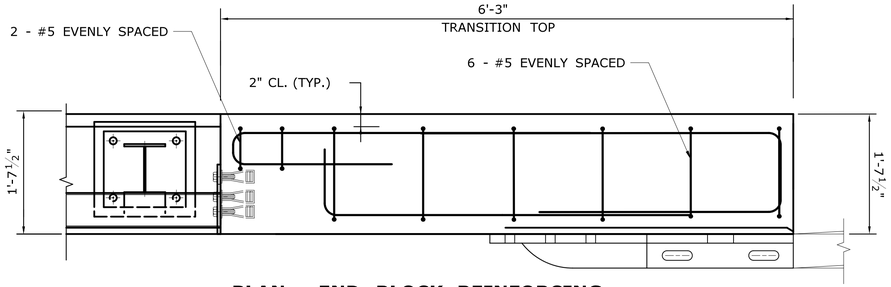
RAIL ATTACHMENT BRACKET

SCALE: N.T.S



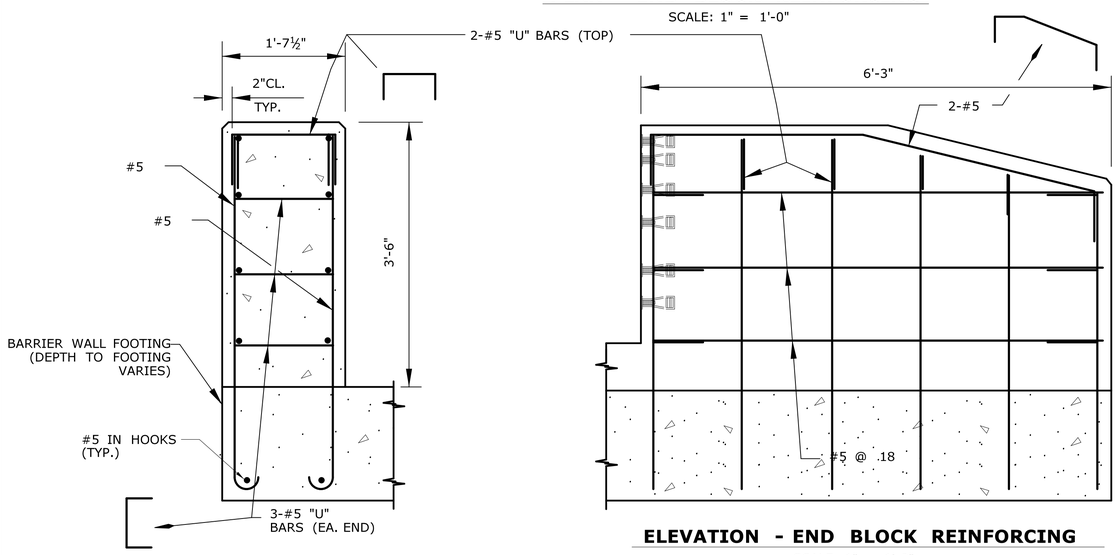
PLAN - END BLOCK

SCALE: 1" = 1'-0"



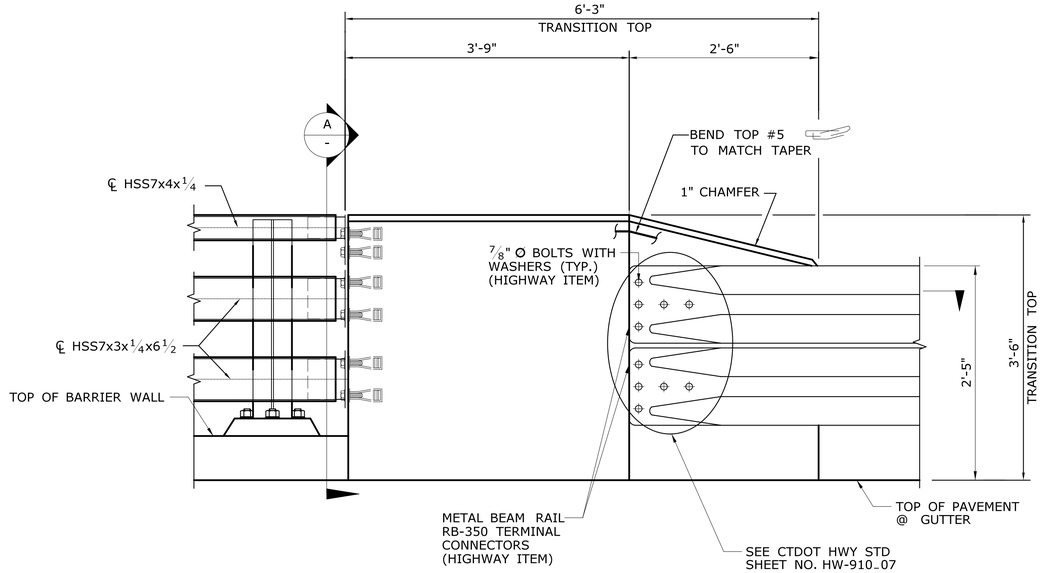
PLAN - END BLOCK REINFORCING

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.
2. PENETRATING SEALER PROTECTIVE COMPOUND SHALL BE APPLIED TO ALL EXPOSED SURFACES.

FINAL DESIGN REVIEW

REV.	DATE	REVISION DESCRIPTION	SHEET NO.

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Plotted Date: 3/1/2019

DESIGNER/DRAFTER: RR

CHECKED BY:

SCALE AS NOTED

STATE OF CONNECTICUT
DEPARTMENT OF TRANSPORTATION

Filename: ...\13_SB_MST_Br02932_0113_010B_End Block Details.dgn

SIGNATURE/ BLOCK:

AI Engineers, Inc.
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Phone: (860) 635-7740
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PROJECT TITLE:

REHABILITATION OF BRIDGE NO. 02932 ROUTE 2A OVER HALSEY BROOK

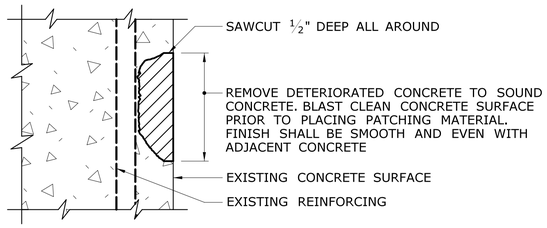
TOWN: **PRESTON**

DRAWING TITLE: **END BLOCK AND RAIL DETAILS**

PROJECT NO. **0113-0108**

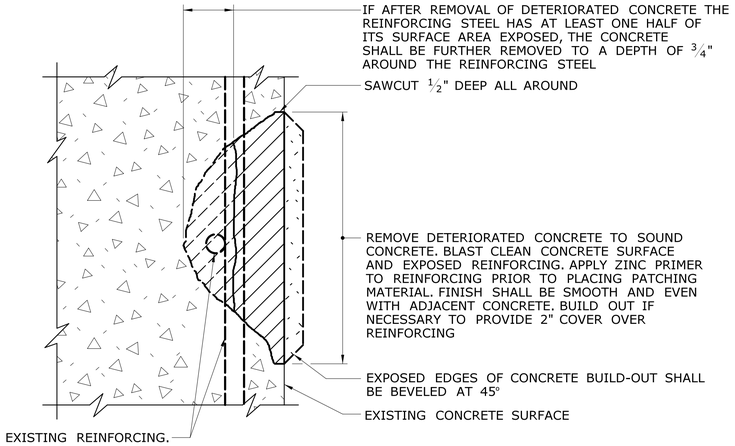
DRAWING NO. **S-13**

SHEET NO.



VERTICAL SURFACE CONCRETE REPAIR WITHOUT EXPOSED REINFORCING

SCALE: 3" = 1'-0"



VERTICAL SURFACE CONCRETE REPAIR WITH EXPOSED REINFORCING

SCALE: 3" = 1'-0"

AT ABUTMENTS, PIERS AND WINGWALLS

TABLE OF MIN. SPLICE LENGTHS	
BAR SIZE	MIN. SPLICE LENGTH
#5	1'-8"
#6	2'-1"
#7	2'-10"
#8	3'-9"
#9	4'-9"
#10	6'-0"
#11	7'-4"

CONCRETE REPAIR NOTES

1. THE ENGINEER SHALL PERFORM AN INSPECTION OF THE EXISTING PIERS AND ABUTMENTS TO DETERMINE THE LOCATION AND EXACT LIMITS OF ALL AREAS TO BE REPAIRED. THE CONTRACTOR SHALL SUPPLY WHATEVER MEANS NECESSARY, INCLUDING BUT NOT LIMITED TO LADDERS, LIFTS, AND TRAFFIC PROTECTION FOR THE ENGINEER TO SAFELY ACCESS THE AREAS FOR INSPECTION. THE COST OF PROVIDING ACCESS FOR THE INSPECTION SHALL BE CONSIDERED INCLUDED IN THE GENERAL COST OF THE PROJECT. THE ENGINEER SHALL THEN DETERMINE THE TYPE OF REPAIR REQUIRED FOR EACH AREA BASED ON GUIDELINES DESCRIBED IN THE CONCRETE PATCHING NOTES ON THIS DRAWING.
2. SEE DRAWING NOS. S-07 AND S-08 FOR SUBSTRUCTURE AREAS NOTED AS DEFICIENT IN THE BRIDGE SAFETY INSPECTION REPORT DATED APRIL, 2018. NOTED LOCATIONS ARE APPROXIMATE ONLY. THIS IN NO WAY CONSTITUTES THE FULL LIMITS OF SUBSTRUCTURE REPAIRS BUT IS A GUIDELINE OF DEFICIENT AREAS AS OF THE DATE OF THE NOTED INSPECTION. THE BRIDGE SHALL BE SOUNDED AT THE TIME OF THE PROJECT CONSTRUCTION AND THE REMOVAL LIMITS AND CORRESPONDING QUANTITIES MAY INCREASE FROM THOSE SHOWN WITHIN THE PLANS AS A RESULT OF THAT EVALUATION.
3. THE REMOVAL OF DETERIORATED CONCRETE SHALL PROCEED AS DIRECTED BY THE ENGINEER. IF THE REMOVAL OF DETERIORATED CONCRETE BECOMES EXCESSIVE, THE REMOVAL WORK SHALL BE STOPPED AT THAT LOCATION AND THE ENGINEER SHALL BE NOTIFIED IMMEDIATELY.
4. REPAIR DEPTH SHALL BE ½" OR GREATER. REPAIR DEPTHS LESS THAN ½" NEED NOT BE REPAIRED.
5. REINFORCING WHICH IS DETERMINED BY THE ENGINEER TO BE IN NEED OF REPLACEMENT SHALL BE REMOVED TO A POINT WHERE IT IS SOUND. THE PATCH SHALL EXTEND A SUFFICIENT DISTANCE BEYOND THIS POINT TO DEVELOP A SPLICE LENGTH SPECIFIED IN THE TABLE ON THIS SHEET. REINFORCING BARS SHALL BE PAID FOR UNDER THE ITEM "DEFORMED STEEL BARS".
6. IF REMOVAL OF DETERIORATED CONCRETE EXTENDS INSIDE THE MAIN REINFORCEMENT, REMOVAL SHALL BE LIMITED TO ONE FACE OF THE MEMBER AT A TIME AND A MAXIMUM OF 3 FT HORIZONTAL AND 3 FT VERTICAL. IF REMOVAL EXTENDS MORE THAN 1.5" INSIDE THE MAIN REINFORCEMENT, THE WORK SHALL BE STOPPED AND THE ENGINEER NOTIFIED IMMEDIATELY.
7. IF AFTER CONCRETE REMOVAL THE REINFORCING STEEL HAS AT LEAST ONE HALF OF ITS SURFACE AREA EXPOSED, THE CONCRETE SHALL BE FURTHER REMOVED TO A DEPTH OF ¾" AROUND THE STEEL. IF REINFORCEMENT LAP SPLICES ARE ENCOUNTERED, THE ENGINEER SHALL BE INFORMED IMMEDIATELY.
8. ON INTERSECTING SURFACES, DETERIORATED FLAT AREAS ADJOINING DETERIORATED VERTICAL AREAS AND/OR DETERIORATED VERTICAL AREAS ADJOINING DETERIORATED OVERHEAD AREAS, WITH A COMBINED AREA GREATER THAN 2 SQUARE FEET AND AT LEAST ¾" DEEP SHALL BE REPAIRED WITH "CLASS 'S' CONCRETE".
9. EXPANSION ANCHOR BOLTS SHALL BE MECHANICALLY GALVANIZED IN ACCORDANCE WITH ASTM B695, CLASS 50, TYPE 1. COST OF WELDED WIRE FABRIC AND BOLTS, INCLUDING MATERIAL AND INSTALLATION, SHALL BE INCLUDED WITH THE COST OF PATCHING MATERIAL.
10. AT THE OPTION OF THE ENGINEER, THE PATCHING MATERIALS MAY BE SPECIFIED TO REPAIR DETERIORATED AREAS NOT MEETING THE ABOVE REQUIREMENTS.
11. ALL CONCRETE PATCH PERIMETERS SHALL BE SQUARED-OFF AND SHALL NOT BE DIAGONAL, CIRCULAR, OR IRREGULARLY SHAPED.

NOTES

SHALLOW SPALLS WITHOUT EXPOSED REINFORCING SHALL NOT BE PATCHED UNLESS CONCRETE IS REMOVED TO A DEPTH OF 1" BEHIND THE STEEL AND THE AREA REPAIRED WITH "CLASS 'S' CONCRETE".

FOR ANY AREAS WHERE THE REINFORCING IS EXPOSED, CONCRETE SHALL BE FURTHER REMOVED TO A DEPTH OF 1" BEHIND THE STEEL AND THE AREA SHALL BE REPAIRED WITH "CLASS 'S' CONCRETE".

FINAL DESIGN REVIEW

REV.	DATE	REVISION DESCRIPTION	SHEET NO.

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Plotted Date: 3/1/2019

DESIGNER/DRAFTER: MRG

CHECKED BY:

SCALE AS NOTED

STATE OF CONNECTICUT
DEPARTMENT OF TRANSPORTATION

Filename: ..\14_SB_MST_Br02932_0113_0108_Substructure_ Repair_Details.dgn

SIGNATURE/ BLOCK:

AI Engineers, Inc.
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PROJECT TITLE:
REHABILITATION OF BRIDGE NO. 02932 ROUTE 2A OVER HALSEY BROOK

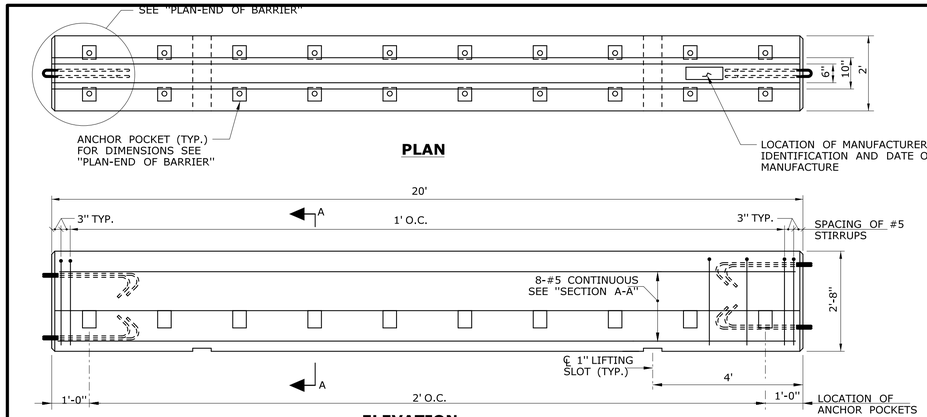
TOWN: **PRESTON**

DRAWING TITLE:
SUBSTRUCTURE REPAIR DETAILS

PROJECT NO. **0113-0108**

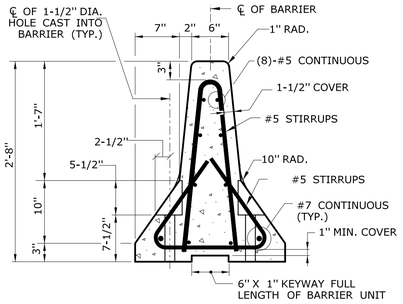
DRAWING NO. **S-14**

SHEET NO.



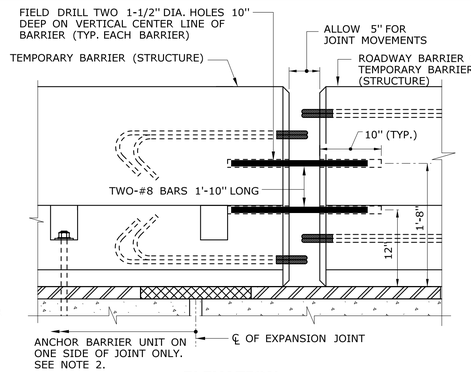
PRECAST BARRIER UNIT (STRUCTURE)

SCALE: ½"=1'-0"



SECTION A-A

SCALE: 1"=1'-0"



ELEVATION

BARRIER CONNECTION DETAILS AT EXPANSION JOINTS (CASE II SHOWN)

SCALE: 1"=1'-0"

NOTES

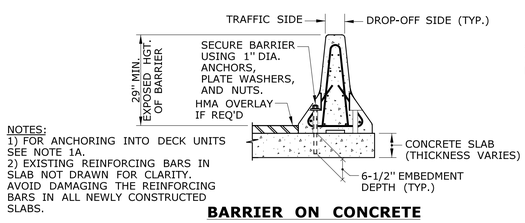
1. THE TEMPORARY BARRIER SHOWN ON THIS SHEET SHALL BE ANCHORED ONTO BRIDGE DECKS (SEE "TEMPORARY ANCHORAGE SYSTEM" SPECIAL PROVISION) WHEN IT IS USED TO PROTECT A VERTICAL DROP-OFF. THE TEMPORARY ANCHORAGE SYSTEM SHALL CONFORM TO THE FOLLOWING:

   A) PRESTRESSED DECK UNITS: THREADED INSERTS SHALL BE USED FOR SECURING TEMPORARY BARRIER (STRUCTURE) TO PRESTRESSED DECK UNITS. THE THREADED INSERTS SHALL BE CAST INTO THE DECK UNITS DURING FABRICATION AND SHALL BE LOCATED AS REQUIRED TO ACCOMMODATE THE STAGE CONSTRUCTION. SEE SPECIAL PROVISIONS FOR ADDITIONAL INFORMATION.

   B) CHEMICAL ANCHORING: THIS CONSISTS OF DRILLING HOLES EXISTING CONCRETE, PLACING THREADED ANCHORS IN THE HOLES, AND SECURING THE ANCHORS WITH A PRE-APPROVED CHEMICAL ANCHOR MATERIAL WHICH CONFORMS TO M.03.07 OF THE STANDARD SPECIFICATIONS. HOLE DIAMETER SHALL BE DETERMINED BY THE MANUFACTURER OF THE CHEMICAL ANCHORING MATERIAL.

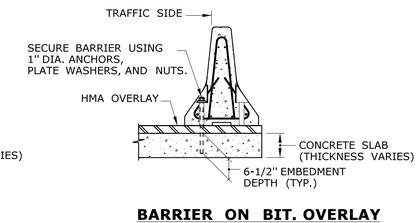
   C) THROUGH-BOLTING: THIS CONSISTS OF DRILLING THROUGH DECK SLABS AND SECURING REMOVABLE ANCHORS ON THE UNDERSIDE WITH PLATE WASHERS AND NUTS. THROUGH-BOLTING IS NOT PERMITTED ON NEW CONSTRUCTION OR PRESTRESSED CONCRETE. MAXIMUM HOLE SIZE IN SLAB = 1-1/2".

2. NUMBER OF ANCHORS: ON THE TRAFFIC SIDE OF A TYPICAL BARRIER, ANCHORS SHALL BE INSTALLED IN ALL POCKETS. AT BARRIER UNITS WHICH STRADDLE BRIDGE EXPANSION JOINTS THE ANCHOR AND CONNECTION DETAILS SHALL CONFORM TO TABLE "A".
3. THE WORK DONE ON THIS SHEET, WITH THE EXCEPTION OF THE DELINEATORS, SHALL BE PAID FOR UNDER THE ITEM "TEMPORARY PRECAST CONCRETE BARRIER CURB (STRUCTURE)".



NOTES:
1) FOR ANCHORING INTO DECK UNITS SEE NOTE 1A.
2) EXISTING REINFORCING BARS IN SLAB NOT DRAWN FOR CLARITY. AVOID DAMAGING THE REINFORCING BARS IN ALL NEWLY CONSTRUCTED SLABS.

BARRIER ON CONCRETE

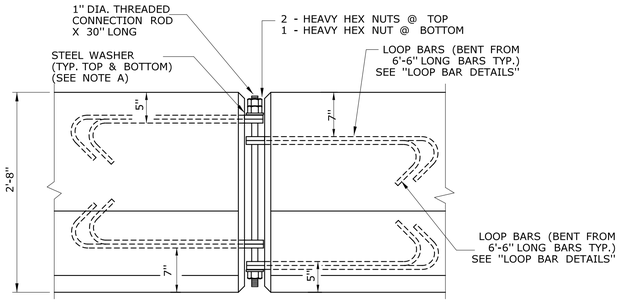


BARRIER ON BIT. OVERLAY

TEMPORARY ANCHORAGE SYSTEM

SCALE: ½"=1'-0"

NOTE:
1) THE TEMPORARY BARRIER SHALL BE ANCHORED WITH INSERTS CAST INTO THE DECK UNIT. THE CONTRACTOR SHALL COORDINATE THE LOCATIONS OF THESE INSERTS WITH THE PRECAST MANUFACTURER.



ELEVATION

BARRIER CONNECTION DETAILS

SCALE: 1"=1'-0"

NOTES FOR CONNECTION ROD DETAILS

(SEE "ELEVATION-BARRIER CONNECTION DETAILS")

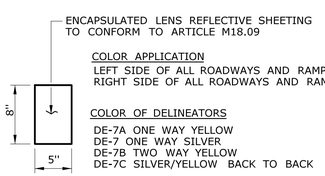
A. PLAIN CIRCULAR STEEL WASHERS SHALL BE MANUFACTURED WITH THE FOLLOWING DIMENSIONS:
   OUTSIDE DIAMETER = 2-3/4" (+1/4", -0")
   INSIDE DIAMETER = 1-1/4" (±1/16")
   THICKNESS = 3/16"

B. THE NUTS ON THE CONNECTION ROD SHALL BE TURNED UNTIL THE BOTTOM WASHER IS DRAWN UP AGAINST THE LOOP BAR. THE LOOP BARS SHALL NOT BE BENT DUE TO THE TIGHTENING PROCESS.

C. FOR EASE OF REMOVAL THE THREADS ON THE CONNECTION RODS AND NUTS SHALL BE WAXED.

TABLE "A": BARRIER UNITS AT EXP. JOINTS

CASE	SPAN LENGTH CONTRIBUTING TO MOVEMENT AT THE EXPANSION JOINT.	METHOD OF END CONNECTION TO ABUTTING BARRIER UNIT. (WHERE MOVEMENT WILL OCCUR)	ANCHOR REQUIREMENTS FOR THE BARRIER UNIT WHICH STRADDLES THE BRIDGE JOINT
I.	UP TO 100'	USE 1" CONNECTION ROD BUT DO NOT OVER TIGHTEN THE NUTS AND ALLOW ROOM FOR EXPANSION AROUND THE ROD AND LOOPS.	ON ONE SIDE OF THE JOINT ONLY, INSTALL AS MANY ANCHORS AS POSSIBLE ON THE TRAFFIC SIDE OF THE BARRIER, ON THE OTHER SIDE OF THE JOINT DO NOT INSTALL ANCHORS.
II.	100' TO 400'	FIELD DRILL HOLES IN ENDS OF BOTH UNITS AND CONNECT WITH 2-#8 BARS. FOR DETAILS SEE "BARRIER CONNECTION DETAILS".	ON ONE SIDE OF THE JOINT ONLY, INSTALL A TOTAL OF 10 ANCHORS. FILL THE POCKETS ON THE TRAFFIC SIDE BEFORE FILLING THE POCKETS ON THE DROP-OFF SIDE. IF THIS CANNOT BE ACHIEVED SEE III BELOW.
III.	OVER 400' AND BARRIER LAYOUTS WHICH DO NOT SATISFY II.	TO BE DESIGNED BY CONTRACTOR AND REVIEWED BY ENGINEER. COST OF DESIGNING AND FURNISHING SPECIAL BARRIER UNITS OR ATTACHMENTS PAID FOR UNDER "TPCBC (STRUCTURE)".	TO BE DESIGNED BY CONTRACTOR AND REVIEWED BY ENGINEER. COST OF DESIGNING AND FURNISHING SPECIAL BARRIER UNITS OR ATTACHMENTS PAID FOR UNDER "TPCBC (STRUCTURE)".



COLOR APPLICATION
LEFT SIDE OF ALL ROADWAYS AND RAMPS - YELLOW
RIGHT SIDE OF ALL ROADWAYS AND RAMPS - SILVER

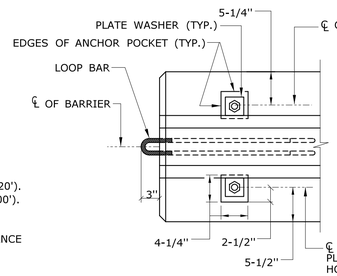
COLOR OF DELINEATORS
DE-7A ONE WAY YELLOW
DE-7 ONE WAY SILVER
DE-7B TWO WAY YELLOW
DE-7C SILVER/YELLOW BACK TO BACK

SPACING OF DELINEATORS
ON LEADING TAPERED SECTIONS - EVERY UNIT (20').
ON THE FIRST 100' OF PARALLEL SECTIONS - EVERY UNIT (20').
ON THE REMAINING LENGTH - EVERY FIFTH (5TH) UNIT (100').
MINIMUM OF 2 IF LESS THAN 100'.
ALTERNATING ONE WAY TRAFFIC - EVERY UNIT (20').
ALL OTHER ROADWAYS SHALL BE DELINEATED IN ACCORDANCE WITH M.U.T.C.D.
PAID FOR UNDER ITEM "TYPE DE-7C DELINEATORS"

DELINEATORS SHALL BE MOUNTED IN THE CENTER OF TEMPORARY BARRIERS AS REQUIRED.

DELINEATORS

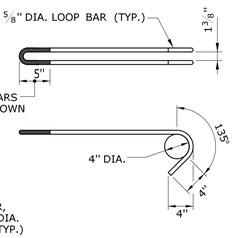
N.T.S.



PLAN

END OF BARRIER

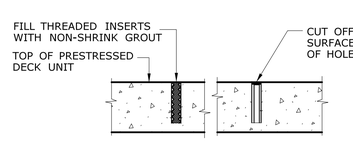
SCALE: 1"=1'-0"



ELEVATION

LOOP BAR DETAILS

SCALE: 1"=1'-0"



FILLING OF ANCHOR HOLES

SCALE: 1"=1'-0"

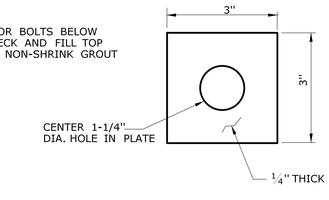


PLATE WASHER

N.T.S.

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: 3/1/2019

DESIGNER/DRAFTER: MRG
CHECKED BY:
SCALE AS NOTED

STATE OF CONNECTICUT
DEPARTMENT OF TRANSPORTATION

Filename: ...\15_SB_MST_Br02932_0113_010B_TPCBC.dgn

SIGNATURE/BLOCK:

AI Engineers, Inc.
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MIDDLETOWN, CT 06457
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Fax: (860) 635-7312

PROJECT TITLE:
REHABILITATION OF BRIDGE NO. 02932 ROUTE 2A OVER HALSEY BROOK

TOWN: **PRESTON**

DRAWING TITLE: **TEMPORARY PRECAST CONCRETE BARRIER CURB (STRUCTURE)**

PROJECT NO. **0113-0108**
DRAWING NO. **S-15**
SHEET NO.

02.05 - UTILITY
INDEX OF DRAWINGS

DRAWING NUMBER	DRAWING TITLE	DRAWING NUMBER	DRAWING TITLE
INX-01	UTILITY - INDEX OF DRAWINGS		
UTL-1	TEMPORARY UTILITY RELOCATION PLAN		
UTL-2	UTILITY TEST PIT DATA		
UTL-3	HPFF LINE TEMPORARY/PERMANENT SUPPORT		
UTL-4	HPFF LINE TEMPORARY/PERMANENT SUPPORT DETAILS - 1		
UTL-5	HPFF LINE TEMPORARY/PERMANENT SUPPORT DETAILS - 2		
UTL-6	GAS LINE TEMPORARY SUPPORT DETAILS		
UTL-7	GAS LINE PERMANENT SUPPORT DETAILS		

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

DESIGNED BY:
AI ENGINEERS, INC.

FINAL DESIGN REVIEW

REV.	DATE	REVISION DESCRIPTION	SHEET NO.

Plotted Date: 3/1/2019

DESIGNER/DRAFTER: KM
CHECKED BY: SG

STATE OF CONNECTICUT
DEPARTMENT OF TRANSPORTATION

Filename: ...\01_UTL_MSH_113-108_UTL_ INDEX.dgn

SIGNATURE/ BLOCK:

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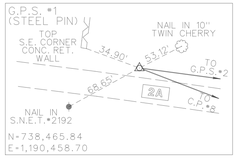
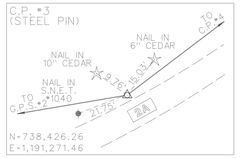
PROJECT TITLE:
REHABILITATION OF BRIDGE NO. 02932 ROUTE 2A OVER HALSEY BROOK

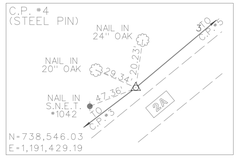
TOWN: **PRESTON**

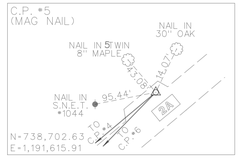
DRAWING TITLE: **UTILITY INDEX OF DRAWINGS**

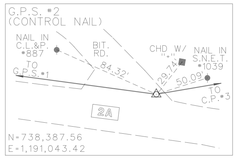
PROJECT NO. **0113-0108**
DRAWING NO. **INX-01**
SHEET NO.











BEGIN STATE PROJECT
NO. 0113-0108
ROUTE 2A
STA. 59+20
N 738,384.93
E 1,190,894.34
MATCH EXISTING

END STATE PROJECT
NO. 0113-0108
STA. 65+00
ROUTE 2A
N 738,519.36
E 1,191,424.37
MATCH EXISTING

N/F 705 WASHINGTON AVE. L.L.C. #178

N/F GLENN HARRIS

REFERENCE : ROW MAP NO. 113-03 SHEET NO. 2 OF 6

REFERENCE : ROW MAP NO. 113-03 SHEET NO. 2 OF 6

REFERENCE : ROW MAP SHEET NO. 2 OF

REFERENCE : ROW MAP NO. 113-03 SHEET NO. 2 OF 6

REFERENCE : ROW MAP NO. 113-03 SHEET NO. 2 OF 6

N/F ESTATE OF JOANNE MORSE-PIELA #202

N/F JOSEPH R. & JOANNE PIELA #200

N/F JOSEPH R. & JOANNE PIELA #198

N/F JOHN J. JR. & APRIL D. PIELA #196

N/F JOSEPH R. & JOANNE PIELA #198

BEGIN MILL AND OVERLAY
STA. 58+50
CUT BIT. CONC. PAVEMENT
MATCH EXISTING

CONNECT OVERHEAD WIRES TO EXISTING UTILITY POLE WITH ANCHORS (BY OTHERS)

CONNECT OVERHEAD WIRES TO EXISTING UTILITY POLE WITH ANCHORS (BY OTHERS)

TEMPORARY SUPPORT OF HPFF ELECTRICAL LINE

TEMPORARY UTILITY POLE (BY OTHERS)

CONSTRUCTION EASEMENT

CURVE NO. 1

BIT. CONC. DRIVEWAY

PC 60+80.01 N 738361.64 E 1191052.65

PT 63+73.67 N 738438.65 E 1191327.18

END MILL AND OVERLAY, BEGIN FULL DEPTH RECONSTRUCTION STA. 60+40

PT 59+00.00 N 738387.84 E 1190874.56

END MILL AND OVERLAY STA. 65+00 CUT BIT. CONC. PAVEMENT MATCH EXISTING

APPROXIMATE SLOPE LIMITS (TYP.)

RELOCATED GAS MAIN (BY OTHERS)

END FULL DEPTH RECONSTRUCTION, BEGIN MILL AND OVERLAY STA. 62+50

RELOCATED GAS MAIN (BY OTHERS)

TEMPORARY GAS MAIN (BY OTHERS)

CONSTRUCTION EASEMENT

BRIDGE NO. 2932

56+00 57+00 58+00 59+00 60+00 61+00 62+00 63+00 64+00 65+00 66+00 67+00 68+00 69+00 70+00

CONSTRUCTION ℄ CT ROUTE 2A (POQUETANUCK ROAD)

S81° 59'00.76"E

S81° 37'59.27"E

N50° 11'23.09"E

66+00 CONSTRUCTION ℄ CT ROUTE 2A (POQUETANUCK ROAD)

N50° 11'38.44"E

POQUETANUCK COVE

HALSEY BROOK

PROP. HIGHWAY LINE

P.C. 67+67.77 N 738690.79 E 1191630.06

CURVE NO. 1		
U.S. ROUTE 2A		
P.C.	STA.	60+80.01
	N	738,361.64
	E	1,191,052.65
C.C.	N	738,707.92
	E	1,191,103.58
P.T.	STA.	63+73.67
	N	738,438.65
	E	1,191,327.18
△		48° 04'22.4" LT
T		156.10'
L		293.66'
R		350.00'

B.M. 403 Elev. 5.19
S.E. CORNER OF CHD
NAVD 1988

B.M. 404 Elev. 7.98
R.R. SPIKE IN 32" OAK
NAVD 1988

B.M. 402 Elev. 8.73
R.R. SPIKE IN 18" OAK
NAVD 1988

C.P. #6 (STEEL PIN)
N-738,433.76
E-1,191,353.14

C.P. #7 (CONTROL NAIL)
N-738,343.22
E-1,191,078.44

C.P. #8 (STEEL PIN)
N-738,407.60
E-1,190,610.27

LEGEND

- MILLING AND OVERLAY
- FULL DEPTH RECONSTRUCTION
- PAVEMENT REMOVAL

NOTE:

1. TEMPORARY OVERHEAD UTILITIES (BY OTHERS) MIN. ELEV. 15.6 FEET

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

FINAL DESIGN REVIEW

REV.	DATE	REVISION DESCRIPTION	SHEET NO.

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Plotted Date: 3/1/2019

DESIGNER/DRAFTER: ML
CHECKED BY: SG
SCALE IN FEET
0 40 80
SCALE 1"=40'

STATE OF CONNECTICUT
DEPARTMENT OF TRANSPORTATION

Filename: ...\02_UTL_MSH_0113_0108_UTL-1.dgn

SIGNATURE/ BLOCK:

AI Engineers, Inc.
919 MIDDLE STREET
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PROJECT TITLE:
REHABILITATION OF BRIDGE NO. 02932 ROUTE 2A OVER HALSEY BROOK

TOWN: **PRESTON**

PROJECT NO. **0113-0108**

DRAWING NO. **UTL-1**

DRAWING TITLE: **TEMPORARY UTILITY RELOCATION PLAN**

SHEET NO.

UTILITY TEST PIT DATA

TEST PIT NO.	BASELINE STATION	BASELINE OFFSET	NORTHING	EASTING	GROUND ELEVATION	TOP OF PIPE ELEVATION	UTILITY DESCRIPTION	RELOCATION ANTICIPATECD
ELECTRIC (EVERSOURCE)								
E-1A	61+13.27	21.05 LT	738,379.40	1,191,086.80	-	4.24	7" HPFF CABLE	NO
E-1B	61+13.26	21.05 LT	738,378.97	1,191,091.17	-	4.91	7" HPFF CABLE	NO
E-2A	61+17.92	20.82 LT	738,384.22	1,191,158.15	-	4.33	7" HPFF CABLE	NO
E-2B	61+89.58	21.73 LT	738,384.49	1,191,158.89	5.42	-	7" HPFF CABLE	NO
E-3A	62+10.92	20.96 LT	738,387.33	1,191,177.68	-	5.11	7" HPFF CABLE	NO
E-3B	62+12.13	21.41 LT	738,388.09	1,191,178.96	5.92	-	7" HPFF CABLE	NO
E-3C	62+11.09	24.65 LT	738,391.02	1,191,177.27	-	4.93	7" HPFF CABLE	NO
GAS (NORWICH GAS COMPANY)								
G-1A	61+27.62	7.35 RT	738,350.59	1,191,100.00	-	3.82	12" STEEL	YES
G-1B	61+25.29	7.30 RT	738,350.63	1,191,100.69	6.91	-	12" STEEL	YES
G-1C	61+28.77	7.67 RT	738,350.26	1,191,101.18	-	3.90	12" STEEL	YES
G-1D	61+29.11	8.68 RT	738,349.24	1,191,101.52	-	4.04	12" STEEL	YES
G-2A	61+54.76	14.84 RT	738,343.91	1,191,128.20	-	4.93	12" STEEL	YES
G-2B	61+54.88	14.24 RT	738,344.52	1,191,128.29	-	4.83	12" STEEL	YES
G-2C	61+55.01	13.97 RT	738,344.80	1,191,128.41	-	4.78	12" STEEL	YES
G-2D	61+54.2	13.81 RT	738,344.90	1,191,127.55	7.14	-	12" STEEL	YES
G-3A	61+78.85	15.57 RT	738,345.74	1,191,153.28	7.33	-	12" STEEL	YES
G-3B	61+79.07	14.74 RT	738,346.60	1,191,153.40	-	4.37	12" STEEL	YES
G-4A	61+29.42	19.03 RT	738,338.90	1,191,101.79	-	5.40	12" STEEL	YES
G-4B	61+30.22	20.24 RT	738,337.68	1,191,102.73	-	5.48	12" STEEL	YES
G-4C	61+31.42	20.37 RT	738,337.55	1,191,103.90	-	5.48	12" STEEL	YES
G-5A	61+29.42	19.03 RT	738,338.43	1,191,124.53	-	5.68	12" STEEL	YES
G-5B	61+30.32	20.24 RT	738,338.44	1,191,127.17	-	5.67	12" STEEL	YES
G-5C	61+31.42	20.37 RT	738,339.64	1,191,128.26	-	5.55	12" STEEL	YES

NOTE:

THIS UTILITY INFORMATION IS BASED ON LIMITED FIELD INVESTIGATIONS AND IS PRESENTED FOR INFORMATIONAL PURPOSES ONLY. IN SOME CASES THE FACILITY WAS NOT COMPLETELY EXPOSED TO POSITIVELY VERIFY ITS SIZE OR MATERIAL TYPE. THE CONTRACTOR IS STILL REQUIRED TO COORDINATE ITS CONSTRUCTION ACTIVITIES SO THAT THE UTILITIES ARE PROTECTED AT ALL TIMES.

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

FINAL DESIGN REVIEW

REV.	DATE	REVISION DESCRIPTION	SHEET NO.

Plotted Date: 3/1/2019

DESIGNER/DRAFTER: SP

CHECKED BY: SG

STATE OF CONNECTICUT
DEPARTMENT OF TRANSPORTATION

Filename: ...\03_UTL_MSH_0113_0108_UTL-2.dgn

SIGNATURE/ BLOCK:

AI Engineers, Inc.
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PROJECT TITLE:
REHABILITATION OF BRIDGE NO. 02932 ROUTE 2A OVER HALSEY BROOK

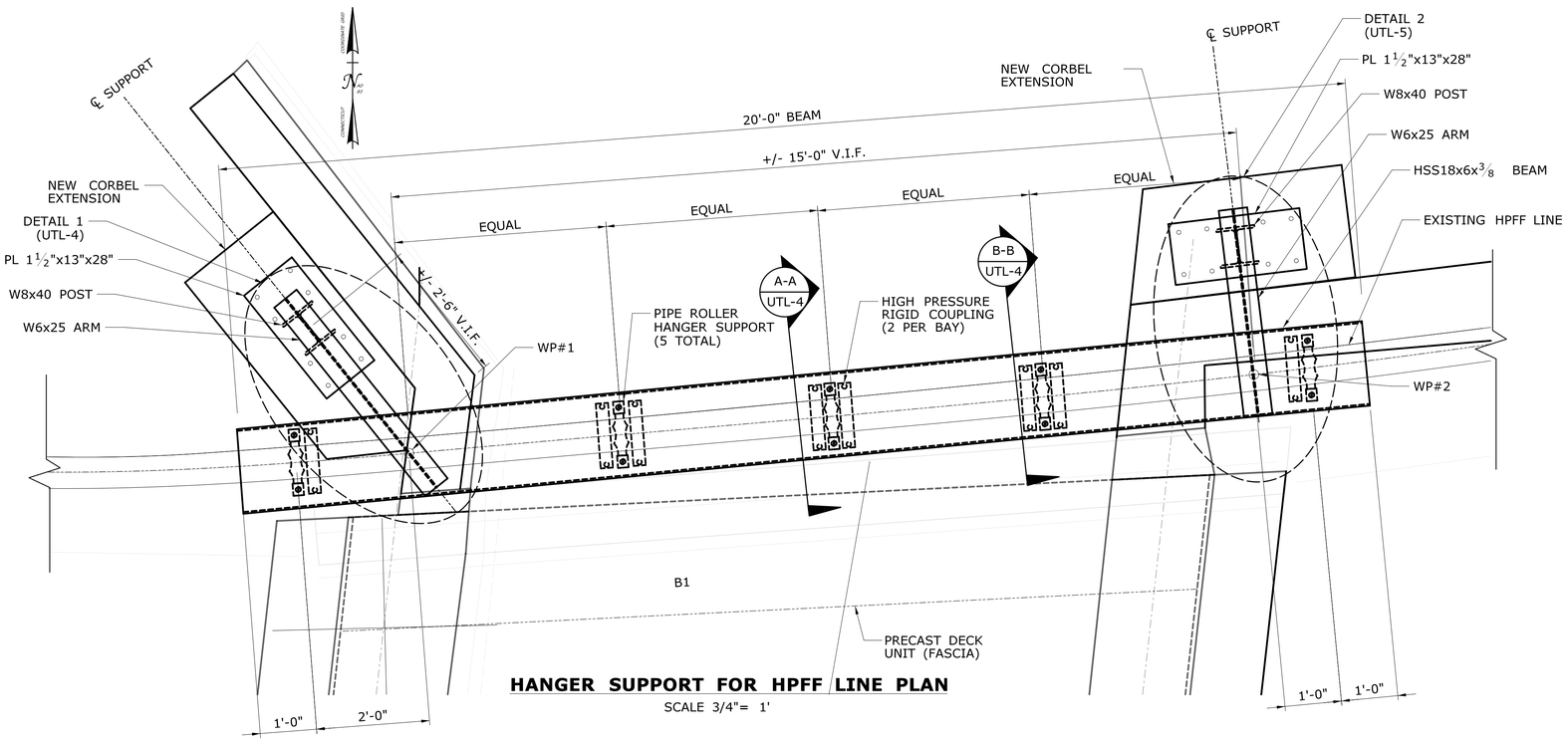
TOWN: **PRESTON**

DRAWING TITLE: **UTILITY TEST PIT DATA**

PROJECT NO. **0113-0108**

DRAWING NO. **UTL-2**

SHEET NO.



HANGER SUPPORT FOR HPFF LINE PLAN

SCALE 3/4"= 1'

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.

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 AWS D1.1 CODE.
3. 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.

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

SUGGESTED SEQUENCE OF CONSTRUCTION

1. CONSTRUCT WINGWALL EXTENSION (NEW CORBEL EXTENSION).
2. INSTALL STEEL POSTS AND ARMS.
3. ERECT HSS SUPPORT BEAM.
4. INSTALL PROPOSED HPFF ROLLER SUPPORT SYSTEM.
5. REMOVE EXISTING HPFF BRACKETS.
6. REMOVE EXISING PROTECTION HALF-PIPES.
7. INSTALL PROPOSED PROTECTION HALF-PIPE SECTION AND COUPLING CONNECTIONS.

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: 3/1/2019

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

STATE OF CONNECTICUT
DEPARTMENT OF TRANSPORTATION

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SIGNATURE/ BLOCK:

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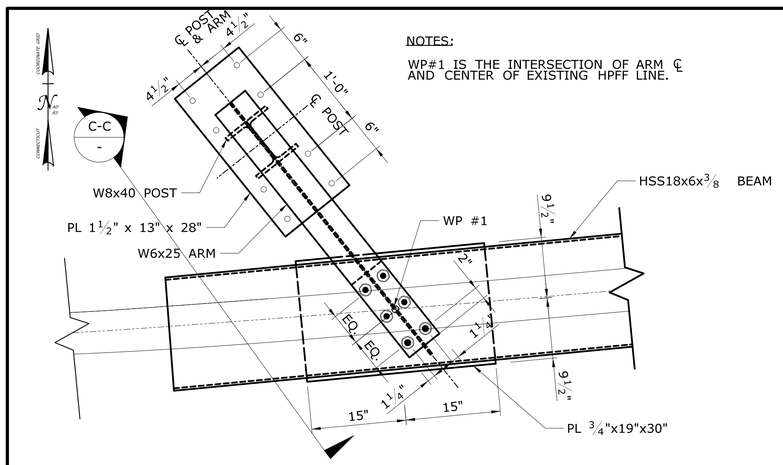
PROJECT TITLE:
REHABILITATION OF BRIDGE NO. 02932 ROUTE 2A OVER HALSEY BROOK

TOWN: **PRESTON**

DRAWING TITLE: **HPFF LINE TEMPORARY/PERMANENT SUPPORT**

PROJECT NO. **0113-0108**
DRAWING NO. **UTL-3**
SHEET NO.

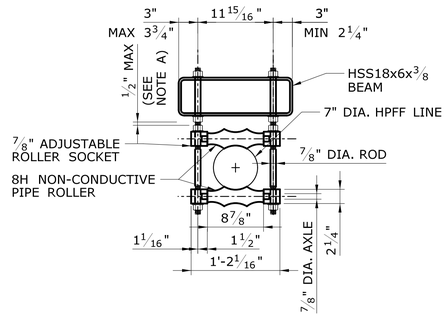


NOTES:

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

DETAIL 1

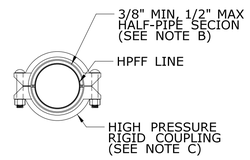
SCALE 1"=1'



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".

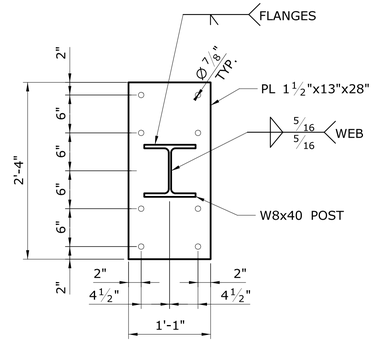
NOTE C:
CONTRACTOR TO PROPOSE TO ENGINEER THE SIZE AND TYPE OF COUPLER TO BE USED BASED UPON THE SIZE OF HALF-PIPES FOR REVIEW AND APPROVAL.

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.

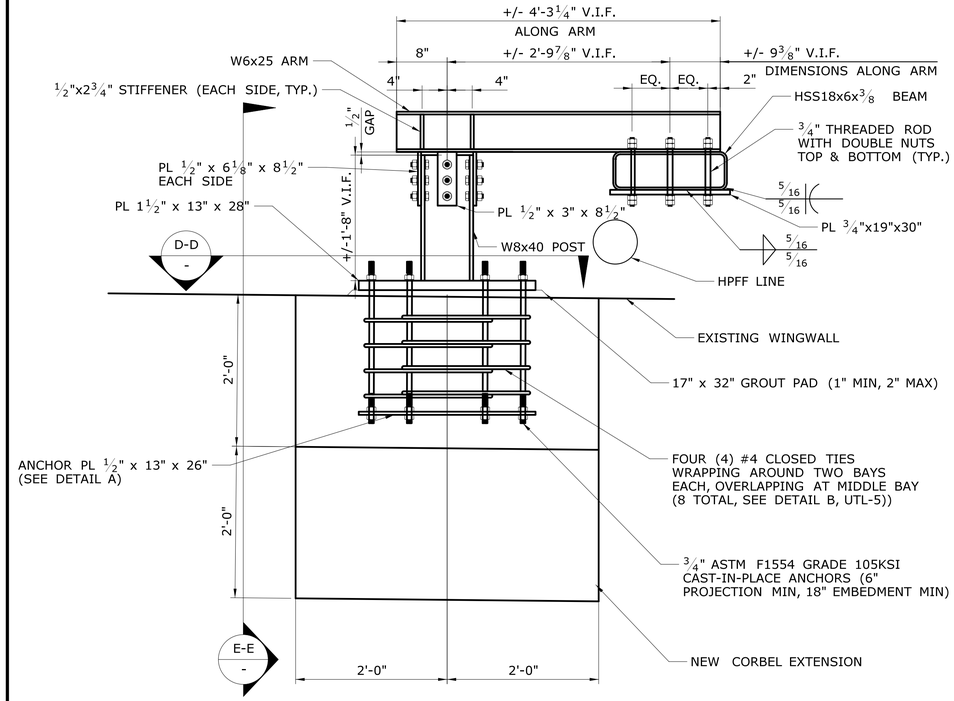
2. MAXIMUM ½" GAP BETWEEN ROLLER SUPPORT AND COUPLER.

3. MINIMUM OF 2 COUPLERS PER BAY.



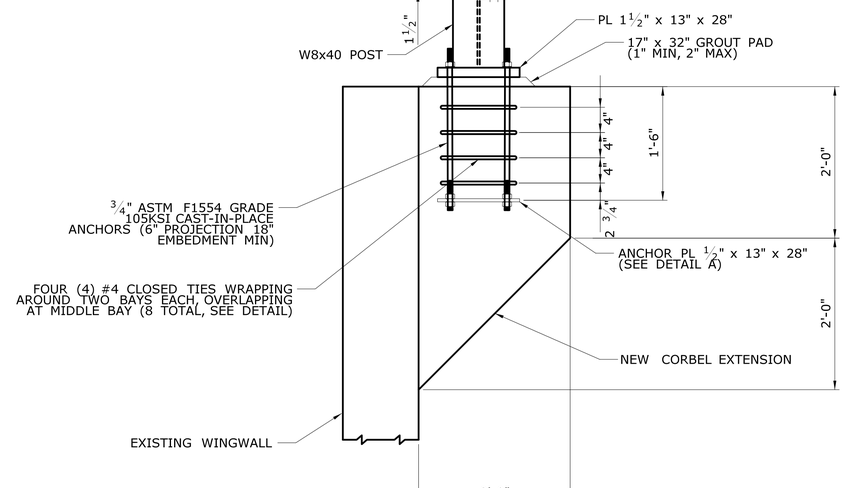
SECTION D-D

SCALE 1"=1'



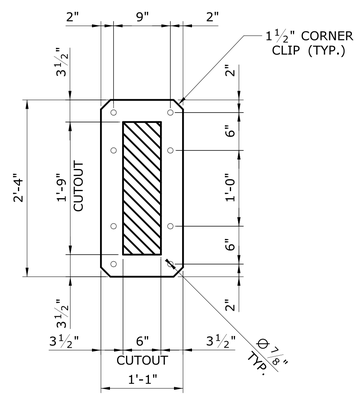
SECTION C-C

SCALE 1"=1'



SECTION E-E

SCALE 1"=1'



DETAIL A

SCALE 1"=1'

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

FINAL DESIGN REVIEW

REV.	DATE	REVISION DESCRIPTION	SHEET NO.

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Plotted Date: 3/1/2019

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

STATE OF CONNECTICUT
DEPARTMENT OF TRANSPORTATION

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SIGNATURE/ BLOCK:

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919 MIDDLE STREET
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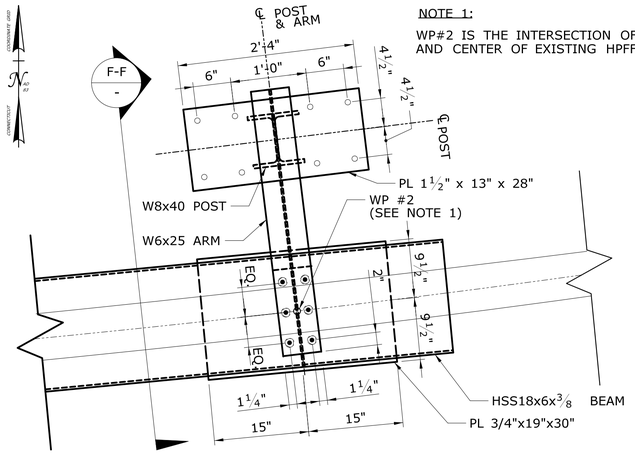
PROJECT TITLE:
REHABILITATION OF BRIDGE NO. 02932 ROUTE 2A OVER HALSEY BROOK

TOWN: **PRESTON**

DRAWING TITLE: **HPFF LINE TEMP./PERM. SUPPORT DETAILS - 1**

PROJECT NO. **0113-0108**
DRAWING NO. **UTL-4**
SHEET NO.

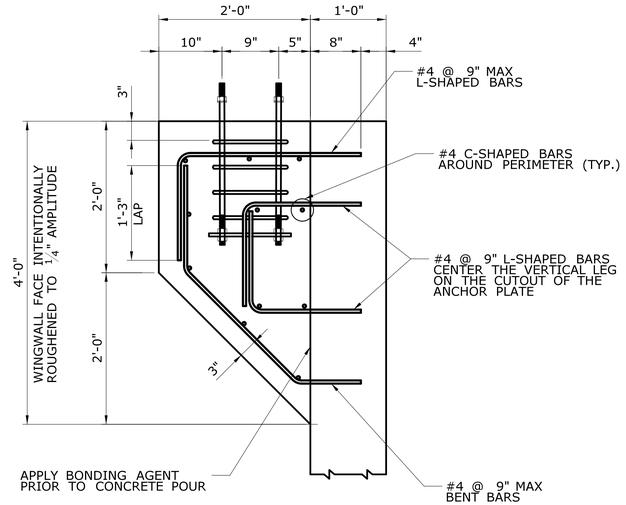


NOTE 1:

WP#2 IS THE INTERSECTION OF ARM ℄ AND CENTER OF EXISTING HPFF LINE.

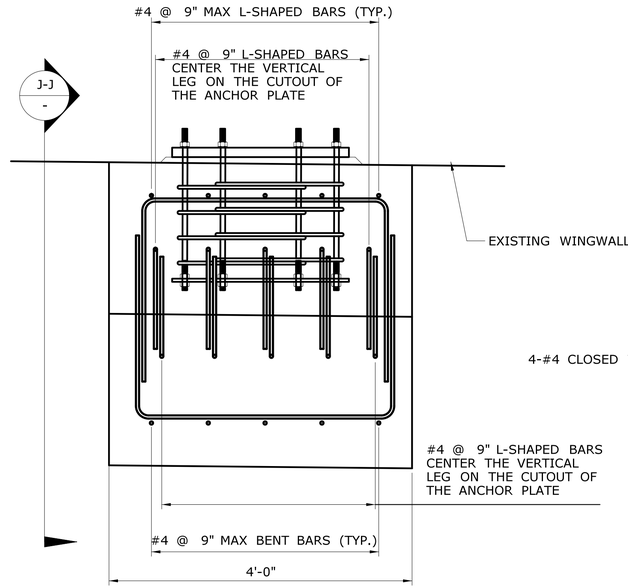
DETAIL 2

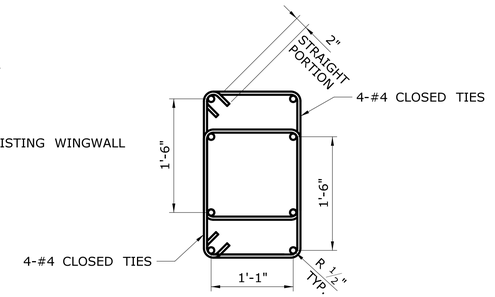
SCALE 1"=1'



SECTION J-J

SCALE 1"=1'



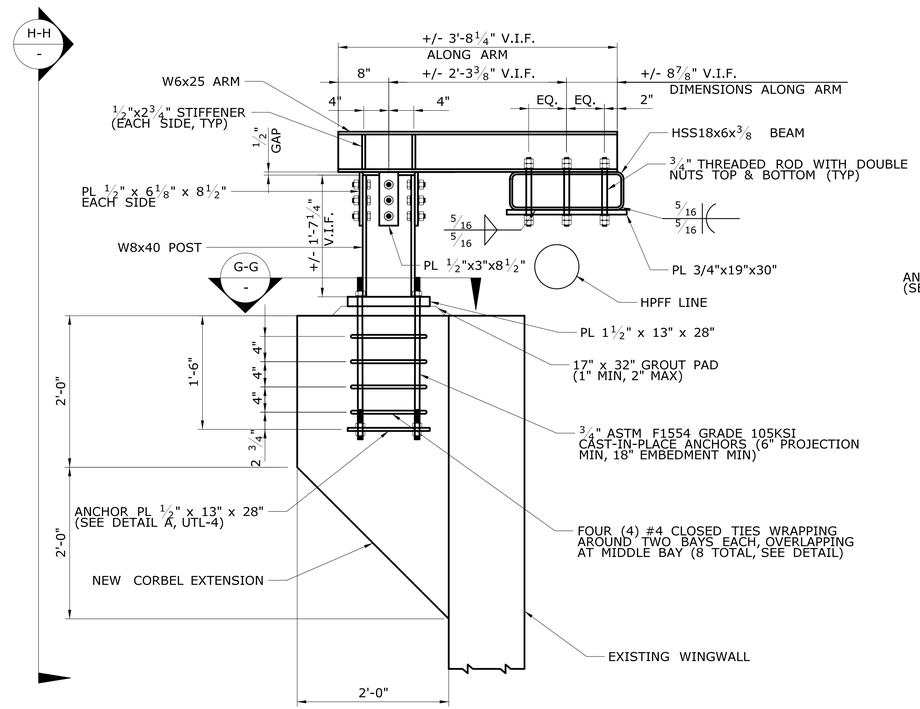


DETAIL B

SCALE 1"=1'

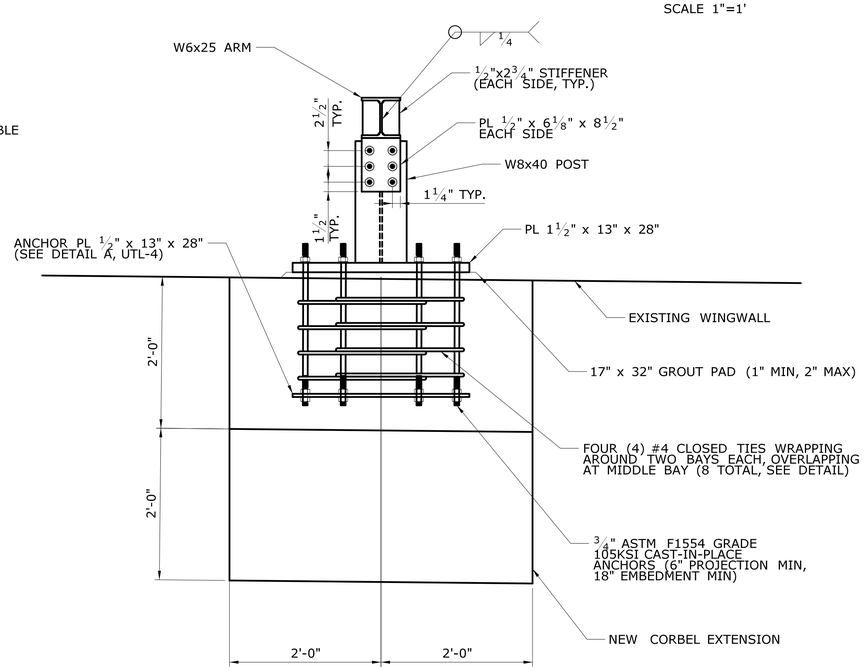
CONCRETE CORBEL EXTENSION REINFORCING DETAILS

SCALE 1"=1'



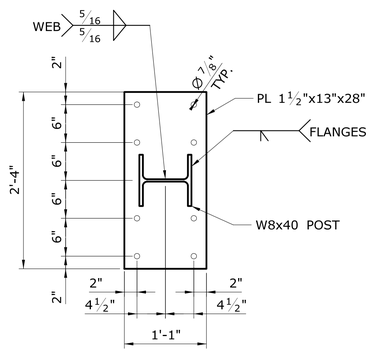
SECTION F-F

SCALE 1"=1'



SECTION H-H

SCALE 1"=1'



SECTION G-G

SCALE 1"=1'

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

FINAL DESIGN REVIEW

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SCALE AS NOTED

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DEPARTMENT OF TRANSPORTATION

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SIGNATURE/ BLOCK:

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PROJECT TITLE:

REHABILITATION OF BRIDGE NO. 02932 ROUTE 2A OVER HALSEY BROOK

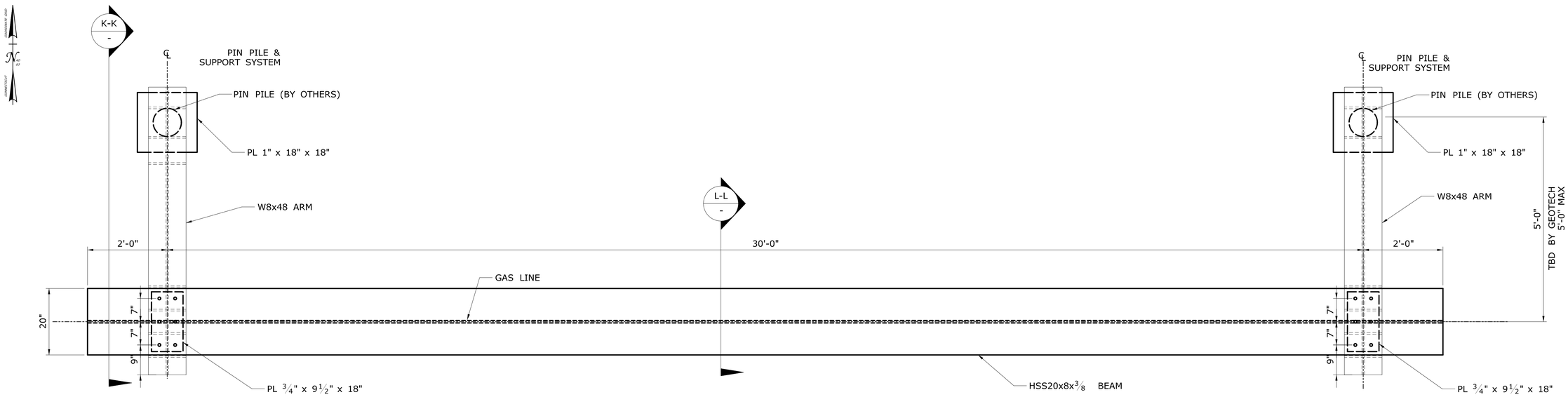
TOWN: **PRESTON**

PROJECT NO. **0113-0108**

DRAWING NO. **UTL-5**

DRAWING TITLE: **HPFF LINE TEMP./PERM. SUPPORT DETAILS - 2**

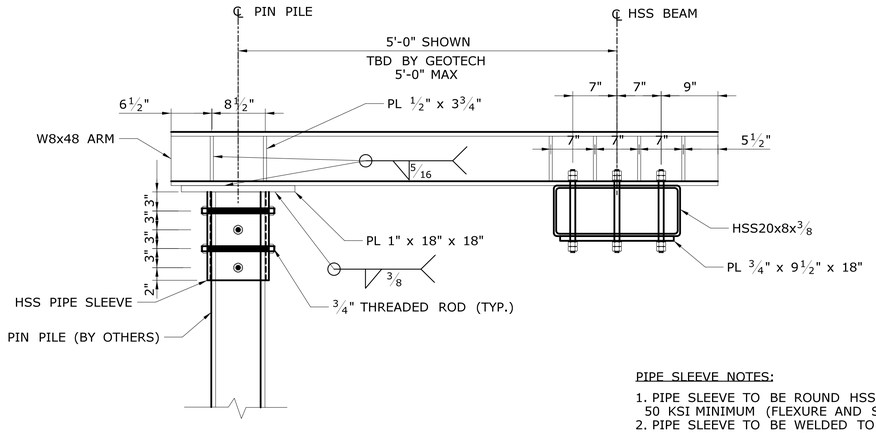
SHEET NO.



TEMPORARY SUPPORT FOR GAS LINE PLAN

SCALE ¾"=1'-0"

NOTE:
EXISTING/NEW BRIDGE NOT SHOWN FOR CLARITY.

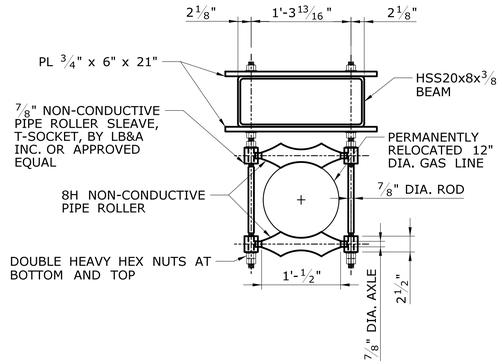


SECTION K-K

SCALE 1"=1'-0"

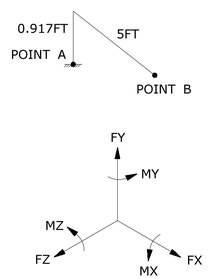
PIPE SLEEVE NOTES:

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 L-L

SCALE 1"=1'-0"



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	+/- 1.5	-4.0	0	0	0	+/-19.0
B	FREE END OF CANTILEVER AT CL HSS BEAM	+/- 1.5	-3.1	0	0	0	+/-3.5

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

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CHECKED BY: BX
SCALE AS NOTED

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PROJECT TITLE:
REHABILITATION OF BRIDGE NO. 02932 ROUTE 2A OVER HALSEY BROOK

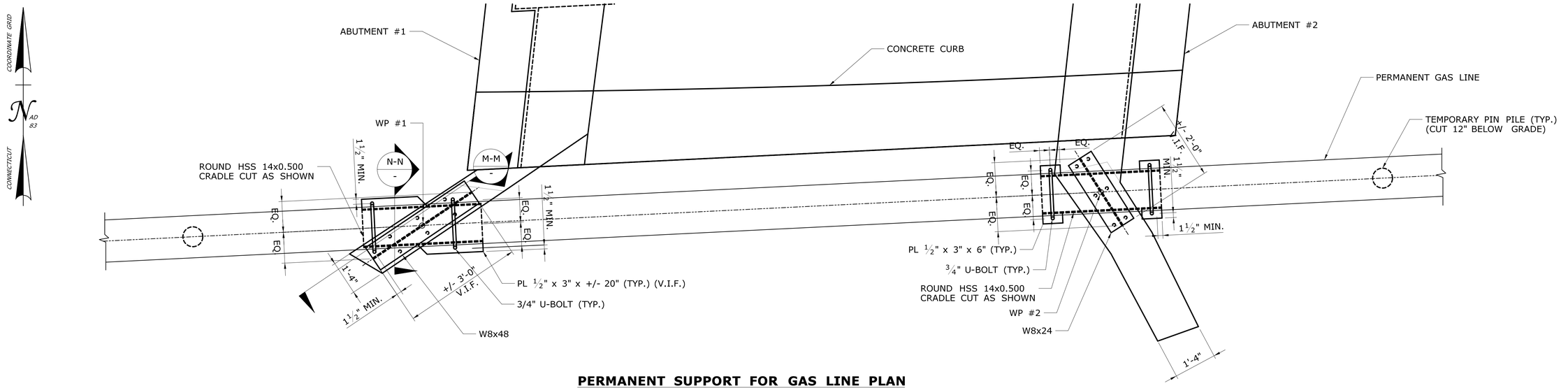
TOWN: **PRESTON**

PROJECT NO. **0113-0108**

DRAWING NO. **UTL-6**

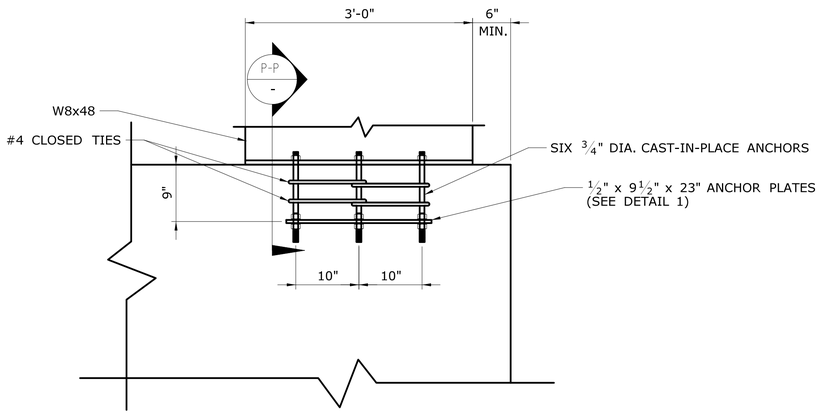
DRAWING TITLE: **GAS LINE TEMPORARY SUPPORT DETAILS**

SHEET NO.



PERMANENT SUPPORT FOR GAS LINE PLAN

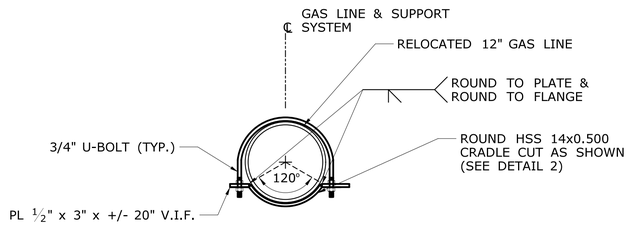
SCALE ¾"=1'-0"



NOTE:
GAS LINE, PIPE SECTION, AND
U-BOLT NOT SHOWN FOR CLARITY.

SECTION M-M

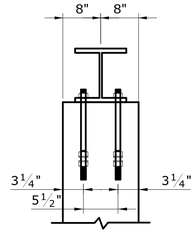
SCALE 1"=1'-0"



NOTE:
REST OF THE BEAM NOT SHOWN FOR CLARITY

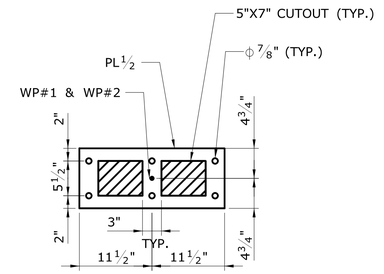
SECTION N-N

SCALE 1"=1'-0"



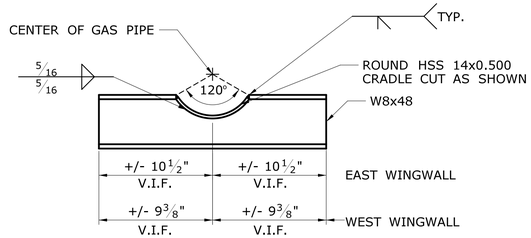
SECTION P-P

SCALE 1"=1'-0"



DETAIL 3

SCALE 1"=1'-0"



DETAIL 4

N.T.S.

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: 3/1/2019

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

STATE OF CONNECTICUT
DEPARTMENT OF TRANSPORTATION

Filename: ...\08_UTL_MSH_0113-0108_UTL_7.dgn

SIGNATURE/BLOCK: OFFICE OF ENGINEERING
APPROVED BY:

PROJECT TITLE: REHABILITATION OF BRIDGE NO. 02932 ROUTE 2A OVER HALSEY BROOK

TOWN: PRESTON
DRAWING TITLE: GAS LINE TEMPORARY SUPPORT DETAILS

PROJECT NO. 0113-0108
DRAWING NO. UTL-7
SHEET NO.

Geocomp

Appendix B

Boring and Test Pit Logs

125 Nagog Park | Acton, MA 01720 | Tel 978 635 0012 | Fax 978 635 0266

Driller:	Mike St. John	**Connecticut DOT Boring Report**		Hole No.:	B-1-1
Inspector:	C. Gibb	Town:	Preston, Connecticut	Stat./Offset:	61+61.3/-11.9'
Engineer:	M. Chartier	Project No.:	113-108	Northing:	738372.00
Start Date:	12/09/2016 9:04 AM	Route No.:	2A	Easting:	1191132.21
Finish Date:	12/09/2016 1:30 PM	Bridge No.:	02932	Surface Elevation:	6.2 NAVD88
Project Description:	Preston Bridge No. 02932 over Dickerman's Brook				
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	SAMPLES: Pen. (in.)	SAMPLES: Rec. (in.)	SAMPLES: RQD %	Casing Blows per 6"	Generalized Strata Description	Material Description and Notes	Well Construction	Elevation (ft)
0							Asphalt			5
	S-1	16 14 6 9	24	16			Embankment Fill	S-1: Brown to dark brown c-f SAND, little f Gravel, trace Silt, medium dense, moist		
5	S-2	1 1 0 1	24	13		Casing Spun 0' to 13.5'		S-2: Dark brown f SAND, some Silt, trace f Gravel, loose, wet		0
10	S-3	12 3 1 1	24	9			Alluvial Deposit	S-3: Dark brown to black c-f SAND, some m-f Gravel, little Silt, trace Wood Fragments, loose, wet		-5
15	S-4	5 2 2 10	24	2		30 30 40 35 35 40 35		S-4: Brown c-f SAND, some f Gravel, trace Silt, loose, wet		-10
20	S-5	100/0"	0	0		45 50 55 55 65 85 70 50 45 50 45 50 50 45 50 45	Terrace Deposit	S-5: No Recovery (Split spoon was bouncing)		-15
25	S-6	99 100/4"	10	7				S-6: Grayish brown c-f SAND, some m-f Gravel, little Silt, very dense, wet		-20
30								End of Boring at 30' bgs.		

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: 30 ft Rock: 0 ft

No. of Soil Samples: 6 No. of Core Runs: 0

1. Roller bit refusal at 30' bgs due to mechanical issues. Boring terminated at 30' bgs.
2. Upon completion, the boring was backfilled with excess drill cuttings. A layer of crushed stone was placed below the asphalt surface 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.

Driller:	Mike St. John	**Connecticut DOT Boring Report**		Hole No.:	B-1-2A
Inspector:	C. Gibb	Town:	Preston, Connecticut	Stat./Offset:	61+20.7/-6.4'
Engineer:	M. Chartier	Project No.:	113-108	Northing:	738365.53
Start Date:	12/02/2016 1:58 PM	Route No.:	2A	Easting:	1191093.57
Finish Date:	12/02/2016 2:10 PM	Bridge No.:	02932	Surface Elevation:	6.4 NAVD88
Project Description:	Preston Bridge No. 02932 over Dickerman's Brook				
Casing Size/Type:	N/A	Sampler Type/Size:	0	Core Barrel Type:	N/A
Hammer Wt.:	N/A Fall: N/A	Hammer Wt.:	140 lb. Fall: 30 in.		
Groundwater Observations:	N/A				

Depth (ft)	Sample Type/No.	SAMPLES: Blows on Sampler per 6 inches	SAMPLES: Pen. (in.)	SAMPLES: Rec. (in.)	SAMPLES: RQD %	Casing Blows per 6"	Generalized Strata Description	Material Description and Notes	Well Construction	Elevation (ft)
0							Asphalt			5
	S-1	50 37 100/6"	18	10			Embankment Fill	S-1: Brown C-F SAND, trace f Gravel, dense, moist		
5								End of Boring at 3' bgs. Borehole shifted approximately 2' to the west.		0
10										-5
15										-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: 3 ft Rock: 0 ft

No. of Soil Samples: 1 No. of Core Runs: 0

1. Auger refusal at 3' bgs. Boring terminated at 3' bgs.
2. Upon completion, the boring was backfilled with excess drill cuttings. A layer of crushed stone was placed below the asphalt surface 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.

Driller:	Mike St. John	**Connecticut DOT Boring Report**		Hole No.:	B-1-2B
Inspector:	C. Gibb	Town:	Preston, Connecticut	Stat./Offset:	61+17.0/-6.2
Engineer:	M. Chartier	Project No.:	113-108	Northing:	738365.53
Start Date:	12/02/2016 2:14 PM	Route No.:	2A	Easting:	1191089.97
Finish Date:	12/02/2016 3:13 PM	Bridge No.:	02932	Surface Elevation:	6.4 NAVD88
Project Description:	Preston Bridge No. 02932 over Dickerman's Brook				
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:	5.5 ft. depth after 0 hours				

Depth (ft)	Sample Type/No.	SAMPLES: Blows on Sampler per 6 inches	SAMPLES: Pen. (in.)	SAMPLES: Rec. (in.)	SAMPLES: RQD %	Casing Blows per 6"	Generalized Strata Description	Material Description and Notes	Well Construction	Elevation (ft)
0							Asphalt			5
							Embankment Fill			
5	S-1	2 5 5 6	24	7				S-1: Dark brown C-F SAND, some Silt, trace Wood Fragments, loose, wet		0
10	S-2	100/1"	1	0				S-2: No Recovery		-5
								End of Boring at 11' bgs. Borehole shifted approximately 12' to the east.		
15										-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: 11 ft Rock: 0 ft

No. of Soil Samples: 2 No. of Core Runs: 0

1. Auger refusal at 11' bgs. Boring terminated at 11' bgs.
2. Upon completion, the boring was backfilled with excess drill cuttings. A layer of crushed stone was placed below the asphalt surface 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.

Driller:	Mike St. John	**Connecticut DOT Boring Report**		Hole No.:	B-1-2C
Inspector:	C. Gibb	Town:	Preston, Connecticut	Stat./Offset:	61+29.7/-6.8'
Engineer:	M. Chartier	Project No.:	113-108	Northing:	738365.53
Start Date:	12/05/2016 8:54 AM	Route No.:	2A	Easting:	1191102.57
Finish Date:	12/06/2016 12:00 PM	Bridge No.:	02932	Surface Elevation:	6.4 NAVD88
Project Description:	Preston Bridge No. 02932 over Dickerman's Brook				
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	SAMPLES: Pen. (in.)	SAMPLES: Rec. (in.)	SAMPLES: RQD %	Casing Blows per 6"	Generalized Strata Description	Material Description and Notes	Well Construction	Elevation (ft)
0							Asphalt			5
							Embankment Fill	Auger 0-10' with a 4" O.D. Solid Stem Auger. No samples were taken from 0-10'.		
5						Casing Spun 0' to 10'				0
10	S-1	2 2 3 4	24	24		14 10 10 12		S-1: Dark brown c-f SAND, some f gravel, some silt, trace Wood Fragments, loose, wet		-5
						15 11 20 18 16 14	Alluvial Deposit			
15	S-2	19 19 33 61	24	11		35 30 26 25	Terrace Deposit	S-2: Brown c-f SAND, some m-f gravel, trace silt, very dense, wet		-10
						26 28 30 28 26 26				
20	S-3	86 94 90 88	24	12		45 55 55 65		S-3: Brown c-f SAND, some m-f gravel, trace silt, very dense, wet		-15
						85 75 85 80 80 75				
25	S-4	87 100/6"	12	5		80 85 90 95		S-4: Brown c-f SAND, some m-f gravel, trace silt, very dense, wet		-20
						90 85 75 80 80 90				
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: 45 ft Rock: 0 ft

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

1. Casing damaged during driving 40' to 45' and roller bit could not be advanced. Casing and roller bit refusal at 45'. Borehole was terminated at 45' bgs.
2. Upon completion, the boring was backfilled with excess drill cuttings. A layer of crushed stone was placed below the asphalt surface and coldpatched at the surface.
3. Station values are based upon those shown along CT Rt. 2A on the "PD 30% Structure Plans_CT_PRE_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.

Driller:	Mike St. John	**Connecticut DOT Boring Report**		Hole No.:	B-1-2C
Inspector:	C. Gibb	Town:	Preston, Connecticut	Stat./Offset:	61+29.7/-6.8'
Engineer:	M. Chartier	Project No.:	113-108	Northing:	738365.53
Start Date:	12/05/2016 8:54 AM	Route No.:	2A	Easting:	1191102.57
Finish Date:	12/06/2016 12:00 PM	Bridge No.:	02932	Surface Elevation:	6.4 NAVD88
Project Description:	Preston Bridge No. 02932 over Dickerman's Brook				
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	SAMPLES: Pen. (in.)	SAMPLES: Rec. (in.)	SAMPLES: RQD %	Casing Blows per 6"	Generalized Strata Description	Material Description and Notes	Well Construction	Elevation (ft)
30						85				
	S-5	84 75 99 100/6"	24	12		75 80 85		S-5: Brown c-f SAND, some m-f gravel, some silt, very dense, wet		-25
						80 75 75 85 80 80				
35	S-6	75 67 27 19	24	7		70 60 65 65 70 60 65 60 65 70		S-6: Brown c-f SAND, some m-f gravel, little silt, very dense, wet		-30
40	S-7	21 28 20 35	24	8		60 55 55 45 55 50 45 40 50 45		S-7: Brown c-f SAND, some m-f gravel, little silt, dense, wet		-35
45								End of Boring at 45' bgs. Borehole shifted approximately 4' to the west.		-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: 45 ft Rock: 0 ft

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

1. Casing damaged during driving 40' to 45' and roller bit could not be advanced. Casing and roller bit refusal at 45'. Borehole was terminated at 45' bgs.
2. Upon completion, the boring was backfilled with excess drill cuttings. A layer of crushed stone was placed below the asphalt surface and coldpatched at the surface.
3. Station values are based upon those shown along CT Rt. 2A on the "PD 30% Structure Plans_CT_PRE_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.

Driller:	Mike St. John	**Connecticut DOT Boring Report**		Hole No.:	B-1-2D
Inspector:	C. Gibb	Town:	Preston, Connecticut	Stat./Offset:	61+24.00/-6.8
Engineer:	M. Chartier	Project No.:	113-108	Northing:	738365.53
Start Date:	12/06/16 1:05 PM	Route No.:	2A	Easting:	1191097.78
Finish Date:	12/06/2016 1:10 PM	Bridge No.:	02932	Surface Elevation:	6.4 NAVD88
Project Description:	Preston Bridge No. 02932 over Dickerman's Brook Cove				
Casing Size/Type:	HW 4"	Sampler Type/Size:	1.5" Split Spoon Sampler	Core Barrel Type:	NQ
Hammer Wt.:	300 lb. Fall: 24"	Hammer Wt.:	140 lb. Fall:		
Groundwater Observations:	6.0 ft depth after 0 hours				

Depth (ft)	Sample Type/No.	SAMPLES: Blows on Sampler per 6 inches	SAMPLES: Pen. (in.)	SAMPLES: Rec. (in.)	SAMPLES: RQD %	Casing Blows per 6"	Generalized Strata Description	Material Description and Notes	Well Construction	Elevation (ft)
0										5
5										0
10								Drill 0' to 45'. No samples taken during drilling 0' to 45'		-5
15										-10
20						Casing Spun 0' to 40'				-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: 45 Rock: 10

No. of Soil Samples: 0 No. of Core Runs: 2

1. Casing refusal at 44.5'. Rock core at 45 feet. Core barrel advance times are given in the "Blows on Sampler per 6 inches" column in minutes per foot.
2. Upon completion, the boring was backfilled with excess drill cuttings. A layer of crushed stone was placed below the asphalt surface and coldpatched at the surface.
3. Station values are based upon those shown along CT Rt. 2A on the "PD 30% Structure Plans_CT_PRE_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.

Driller:	Mike St. John	**Connecticut DOT Boring Report**		Hole No.:	B-1-2D
Inspector:	C. Gibb	Town:	Preston, Connecticut	Stat./Offset:	61+24.00/-6.8
Engineer:	M. Chartier	Project No.:	113-108	Northing:	738365.53
Start Date:	12/06/16 1:05 PM	Route No.:	2A	Easting:	1191097.78
Finish Date:	12/06/2016 1:10 PM	Bridge No.:	02932	Surface Elevation:	6.4 NAVD88
Project Description:	Preston Bridge No. 02932 over Dickerman's Brook Cove				
Casing Size/Type:	HW 4"	Sampler Type/Size:	1.5" Split Spoon Sampler	Core Barrel Type:	NQ
Hammer Wt.:	300 lb. Fall: 24"	Hammer Wt.:	140 lb. Fall:		
Groundwater Observations:	6.0 ft depth after 0 hours				

Depth (ft)	Sample Type/No.	SAMPLES: Blows on Sampler per 6 inches	SAMPLES: Pen. (in.)	SAMPLES: Rec. (in.)	SAMPLES: RQD %	Casing Blows per 6"	Generalized Strata Description	Material Description and Notes	Well Construction	Elevation (ft)
30										-25
35										-30
40						50 55 60 45 45 55 50 60 80				-35
45	C-1	10.5 7.0 10.0 11.0 5.3	60	46	23		Bedrock	C-1: GNEISS, green, medium grained, slightly fractured, slightly weathered, very strong		-40
50	C-2	4.8 5.0 5.8 6.8 7.3	60	60	60			C-2: GNEISS, green, medium grained, slightly fractured, slightly weathered, very strong		-45
55								End of Boring at 55' bgs		-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: 45 Rock: 10

No. of Soil Samples: 0 No. of Core Runs: 2

1. Casing refusal at 44.5'. Rock core at 45 feet. Core barrel advance times are given in the "Blows on Sampler per 6 inches" column in minutes per foot.
2. Upon completion, the boring was backfilled with excess drill cuttings. A layer of crushed stone was placed below the asphalt surface and coldpatched at the surface.
3. Station values are based upon those shown along CT Rt. 2A on the "PD 30% Structure Plans_CT_PRE_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

Driller:	Mike St. John	**Connecticut DOT Boring Report**		Hole No.:	B-1-3
Inspector:	C. Gibb	Town:	Preston, Connecticut	Stat./Offset:	61+91.6/-11.8'
Engineer:	M. Chartier	Project No.:	113-108	Northing:	738376.72
Start Date:	12/01/2016 8:25 AM	Route No.:	2A	Easting:	1191160.16
Finish Date:	12/02/2016 12:00 PM	Bridge No.:	02932	Surface Elevation:	6.2 NAVD88
Project Description:	Preston Bridge No. 02932 over Dickerman's Brook				
Casing Size/Type:	HW 4"	Sampler Type/Size:	1.5" Split Spoon Sampler	Core Barrel Type:	NQ
Hammer Wt.:	300 lb. Fall: 24 in.	Hammer Wt.:	140 lb. Fall: 30 in.		
Groundwater Observations:	5.0 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							Asphalt			5
	S-1	13 12 7 4	24	16			Embankment Fill	S-1: Tan c-f SAND, some m-f gravel, medium dense, moist		
						Casing Spun 0' to 10'				
5	S-2	2 2 4 9	24	17				S-2: Dark brown c-f SAND, some silt, trace fibrous organics, loose, wet		0
								S-3: Dark brown c-f SAND, some m-f gravel, very dense, wet (Gravel stuck in split spoon tip)		
10	S-3	50/5"	5	2		10 6 2 2 3 2 4 3 5 3				-5
15	S-4	16 41 77 59	24	9		20 40 60 50 60 65 50 60 55 70	Terrace Deposit	S-4: Brown C-F SAND, some f gravel, very dense, wet		-10
20	S-5	57 100/2"	8	5		90 120 130 130 125 150 140 125 130 130		S-5: Brown c-f SAND and m-f GRAVEL, little silt, very dense, wet		-15
25	S-6	14 41 100/4"	16	6		100 80 70 60 65 55 55 60 70 65		S-6: Brown c-f SAND and m-f GRAVEL, little 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 ft Rock: 15 ft

No. of Soil Samples: 10 No. of Core Runs: 3

1. Casing refusal at 49' bgs. Roller bit 1' into rock. Began rock core at 50' bgs. Core barrel advance times are given in the "Blows on Sampler per 6 inches" column in minutes per foot. Boring terminated at 65' bgs.
2. Upon completion, the boring was backfilled with excess drill cuttings. A layer of crushed stone was placed below the asphalt surface and coldpatched at the surface.
3. Station values are based upon those shown along CT Rt. 2A on the "PD 30% Structure Plans_CT_PRE_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.

Driller:	Mike St. John	**Connecticut DOT Boring Report**		Hole No.:	B-1-3
Inspector:	C. Gibb	Town:	Preston, Connecticut	Stat./Offset:	61+91.6/-11.8'
Engineer:	M. Chartier	Project No.:	113-108	Northing:	738376.72
Start Date:	12/01/2016 8:25 AM	Route No.:	2A	Easting:	1191160.16
Finish Date:	12/02/2016 12:00 PM	Bridge No.:	02932	Surface Elevation:	6.2 NAVD88
Project Description:	Preston Bridge No. 02932 over Dickerman's Brook				
Casing Size/Type:	HW 4"	Sampler Type/Size:	1.5" Split Spoon Sampler	Core Barrel Type:	NQ
Hammer Wt.:	300 lb. Fall: 24 in.	Hammer Wt.:	140 lb. Fall: 30 in.		
Groundwater Observations:	5.0 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)
30	S-7	100/5"	5	5		80 120 150 160 170 170 190		S-7: Brown c-f SAND and m-f GRAVEL, little silt, very dense, wet		-25
35	S-8	99 100/4"	10	7		150 160 150 100 90 60 50		S-8A: Dark gray c-f GRAVEL, trace c-f sand, very dense, wet S-8B: Brown c-f SAND, little silt, very dense, wet		-30
40	S-9	99 100/1"	7	6		50 60 55 50 60 65 90		S-9: Dark gray c-f GRAVEL, little c-f sand, trace silt, very dense, wet (Gravel stuck in split spoon tip)		-35
45	S-10	60 78 92 100/6"	24	18		125 150 160 180 180 150 165 150 150 100 110 120 90 90 90 100 100		S-10: Gray c-f SAND, some m-f gravel, some silt, very dense, wet		-40
50	C-1	4.5 4.0 5.0 3.5 3.5	60	14	6		Weathered Rock Bedrock	C-1: GNEISS, dark gray, medium grained, highly fractured, slightly weathered, weak		-45
55	C-2	4.0 4.0 4.0 4.0 5.0	60	48	21			C-2: GNEISS, dark gray, medium grained, moderatley to highly fractured, slightly weathered, strong		-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: 50 ft Rock: 15 ft

No. of Soil Samples: 10 No. of Core Runs: 3

1. Casing refusal at 49' bgs. Roller bit 1' into rock. Began rock core at 50' bgs. Core barrel advance times are given in the "Blows on Sampler per 6 inches" column in minutes per foot. Boring terminated at 65' bgs.
2. Upon completion, the boring was backfilled with excess drill cuttings. A layer of crushed stone was placed below the asphalt surface and coldpatched at the surface.
3. Station values are based upon those shown along CT Rt. 2A on the "PD 30% Structure Plans_CT_PRE_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.

Driller:	Mike St. John	**Connecticut DOT Boring Report**		Hole No.:	B-1-3
Inspector:	C. Gibb	Town:	Preston, Connecticut	Stat./Offset:	61+91.6/-11.8'
Engineer:	M. Chartier	Project No.:	113-108	Northing:	738376.72
Start Date:	12/01/2016 8:25 AM	Route No.:	2A	Easting:	1191160.16
Finish Date:	12/02/2016 12:00 PM	Bridge No.:	02932	Surface Elevation:	6.2 NAVD88
Project Description:	Preston Bridge No. 02932 over Dickerman's Brook				
Casing Size/Type:	HW 4"	Sampler Type/Size:	1.5" Split Spoon Sampler	Core Barrel Type:	NQ
Hammer Wt.:	300 lb. Fall: 24 in.	Hammer Wt.:	140 lb. Fall: 30 in.		
Groundwater Observations:	5.0 ft depth after 0 hours				

Depth (ft)	Sample Type/No.	SAMPLES: Blows on Sampler per 6 inches	SAMPLES: Pen. (in.)	SAMPLES: Rec. (in.)	SAMPLES: RQD %	Casing Blows per 6"	Generalized Strata Description	Material Description and Notes	Well Construction	Elevation (ft)
60	C-3	5.0 5.0 5.0 6.0 7.0	60	6	0			C-3: GNEISS, dark gray, medium grained, highly fractured, slightly weathered, strong		-55
65								End of Boring at 65' bgs.		-60
70										-65
75										-70
80										-75
85										-80
90										

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 ft Rock: 15 ft

No. of Soil Samples: 10 No. of Core Runs: 3

1. Casing refusal at 49' bgs. Roller bit 1' into rock. Began rock core at 50' bgs. Core barrel advance times are given in the "Blows on Sampler per 6 inches" column in minutes per foot. Boring terminated at 65' bgs.
2. Upon completion, the boring was backfilled with excess drill cuttings. A layer of crushed stone was placed below the asphalt surface and coldpatched at the surface.
3. Station values are based upon those shown along CT Rt. 2A on the "PD 30% Structure Plans_CT_PRE_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.

Driller:	Mike St. John	**Connecticut DOT Boring Report**		Hole No.:	B-1-4
Inspector:	C. Gibb	Town:	Preston, Connecticut	Stat./Offset:	61+61.5/7.1'
Engineer:	M. Chartier	Project No.:	113-108	Northing:	738353.18
Start Date:	12/07/2016 12:50 PM	Route No.:	2A	Easting:	1191134.93
Finish Date:	12/07/2016 2:30 PM	Bridge No.:	02932	Surface Elevation:	7.2 NAVD88
Project Description:	Preston Bridge No. 02932 over Dickerman's Brook				
Casing Size/Type:	HW 4"	Sampler Type/Size:	1.5" Split Spoon Sampler	Core Barrel Type:	NQ
Hammer Wt.:	300 lb. Fall: 24 in.	Hammer Wt.:	140 lb. Fall: 30 in.		
Groundwater Observations:	5.5 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							Asphalt			
	S-1	21 12 19 32	24	7			Embankment Fill	S-1: Brown c-f SAND, some m-f gravel, trace silt, medium dense, moist		5
						Casing Spun 0' to 10'				
5	S-2	3 4 3 2	24	16				S-2: Dark brown c-f SAND, some m-f gravel, some silt, loose, wet		0
								S-3: Dark brown to dark gray C-F SAND, some m-f gravel, trace silt and wood fragments, medium dense, wet		
10	S-3	20 8 10 12	24	9		30 40 25 25 35 30 25 40 30 20	Alluvial Deposit			-5
15	S-4	29 83 64 68	24	15		30 40 35 45 50 40 45 30 45 40	Terrace Deposit	S-4: Brown to gray c-f SAND, some m-f gravel, trace silt, very dense, wet		-10
20	S-5	47 100/4"	10	4		55 60 60 75 60 55 50 60 60 60		S-5: Gray to light gray c-f SAND, some m-f gravel, little silt, very dense, wet		-15
25	S-6	56 99 100/2"	14	7		70 85 60 75 70 65 65 70 70 65		S-6: Brown c-f SAND, some f gravel, trace 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 ft Rock: 10 ft

No. of Soil Samples: 10 No. of Core Runs: 3

1. Casing refusal at 47' bgs. Roller bit 3' into rock. Began rock core at 50' bgs. Core barrel advance times are given in the "Blows on Sampler per 6 inches" column in minutes per foot. Boring terminated at 60' bgs.
2. Upon completion, the boring was backfilled with excess drill cuttings. A layer of crushed stone was placed below the asphalt surface and coldpatched at the surface.
3. Station values are based upon those shown along CT Rt. 2A on the "PD 30% Structure Plans_CT_PRE_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.

Driller:	Mike St. John	**Connecticut DOT Boring Report**		Hole No.:	B-1-4
Inspector:	C. Gibb	Town:	Preston, Connecticut	Stat./Offset:	61+61.5/7.1'
Engineer:	M. Chartier	Project No.:	113-108	Northing:	738353.18
Start Date:	12/07/2016 12:50 PM	Route No.:	2A	Easting:	1191134.93
Finish Date:	12/07/2016 2:30 PM	Bridge No.:	02932	Surface Elevation:	7.2 NAVD88
Project Description:	Preston Bridge No. 02932 over Dickerman's Brook				
Casing Size/Type:	HW 4"	Sampler Type/Size:	1.5" Split Spoon Sampler	Core Barrel Type:	NQ
Hammer Wt.:	300 lb. Fall: 24 in.	Hammer Wt.:	140 lb. Fall: 30 in.		
Groundwater Observations:	5.5 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)
30	S-7	49 98 72 100/6"	24	11		70 65 60 75 60 65 80 65 60 65		S-7: Gray m-f GRAVEL, some c-f sand, little silt, very dense, wet		-25
35	S-8	100/3"	3	0		70 65 80 75 60 70 65 70 85 70		S-8: No Recovery (Split spoon was bouncing)		-30
40	S-9	100/0"	0	0		85 90 75 80 90 90 80 75 70 65		S-9: No Recovery (Split spoon was bouncing)		-35
45	S-10	69 95 100/6"	18	7		90 110 100 100		S-10: Gray m-f GRAVEL, some c-f sand, little silt, very dense, wet		-40
							Weathered Rock			
50	C-1	5.5 6.8 6.3 6.0 6.3	60	60	57		Bedrock	C-1: GNEISS, green, medium grained, slightly fractured, slightly weathered, very strong		-45
55	C-2	6.5 6.0 7.0 8.5 9.5	60	53	41			C-2: GNEISS, green, medium grained, slightly fractured, slightly weathered, very strong		-50
60								End of Boring at 60' bgs.		

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 ft Rock: 10 ft

No. of Soil Samples: 10 No. of Core Runs: 3

1. Casing refusal at 47' bgs. Roller bit 3' into rock. Began rock core at 50' bgs. Core barrel advance times are given in the "Blows on Sampler per 6 inches" column in minutes per foot. Boring terminated at 60' bgs.
2. Upon completion, the boring was backfilled with excess drill cuttings. A layer of crushed stone was placed below the asphalt surface and coldpatched at the surface.
3. Station values are based upon those shown along CT Rt. 2A on the "PD 30% Structure Plans_CT_PRE_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.

Driller:	Scott Marino	**Connecticut DOT Boring Report**		Hole No.:	B-1-5
Inspector:	R. Lavorati	Town:	Preston, Connecticut	Stat./Offset:	61+35.6/-10.7
Engineer:	M. Chartier	Project No.:	113-108	Northing:	738369.24
Start Date:	12/13/18 11:30 AM	Route No.:	2A	Easting:	1191108.38
Finish Date:	12/13/18 2:55 PM	Bridge No.:	02932	Surface Elevation:	6.3 NAVD88
Project Description:	Preston Bridge No. 02932 over Dickerman's Brook				
Casing Size/Type:	HW 4"	Sampler Type/Size:	1.5" Split Spoon Sampler	Core Barrel Type:	NX
Hammer Wt.:	300 lb. Fall: 30 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	SAMPLES: Pen. (in.)	SAMPLES: Rec. (in.)	SAMPLES: RQD %	Casing Blows per 6"	Generalized Strata Description	Material Description and Notes	Well Construction	Elevation (ft)
0						2	Fill	Solid stem augered to 10' bgs.; Hammered casing to 10' bgs.		5
						2				
						2				
						1				
						2				
5						2				0
						2				
						1				
						1				
						1				
						1				
						2				
						2				
						2				
						2				
						1				
						2				
						1				
10						10				-5
						50				
	C-1	1.6 2.4 2.7 2.5 2.7	60	44	60		Concrete	C-1: gray/black/blue Concrete		
15	C-2	0.9 0.1	12	6	50			C-2: gray/black/blue Concrete		
	S-1	6 50/5"	11	4				S-1: brown/black c-f SAND, some silt, trace fine gravel, very dense, moist		-10
	C-3	2.3 4.0 3.8 2.8 1.4	60	41	58		Granite	C-3: gray/black GRANITE		
20										-15
	C-4	0.8 2.7 2.7 3.0 1.5	60	18	0			C-4: gray/black GRANITE		
25										-20
	S-2	11 5 6 7	24	11			Terrace	S-2: brown/black c-f SAND, some fine gravel, some silt, medium dense, moist		
	S-3	14 15 14 10	24	6				S-3: brown/black c-f SAND, some fine		
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: 15 ft. Rock: 6' Conc./10' Rock

No. of Soil Samples: 4 No. of Core Runs: 4

1. Core barrel advance times are given in the "Blows on Sampler per 6 inches" column in minutes per foot. Boring terminated at 31' 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_PRE_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.

Driller:	Scott Marino	**Connecticut DOT Boring Report**		Hole No.:	B-1-5
Inspector:	R. Lavorati	Town:	Preston, Connecticut	Stat./Offset:	61+35.6/-10.7
Engineer:	M. Chartier	Project No.:	113-108	Northing:	738369.24
Start Date:	12/13/18 11:30 AM	Route No.:	2A	Easting:	1191108.38
Finish Date:	12/13/18 2:55 PM	Bridge No.:	02932	Surface Elevation:	6.3 NAVD88
Project Description:	Preston Bridge No. 02932 over Dickerman's Brook				
Casing Size/Type:	HW 4"	Sampler Type/Size:	1.5" Split Spoon Sampler	Core Barrel Type:	NX
Hammer Wt.:	300 lb. Fall: 30 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	SAMPLES: Pen. (in.)	SAMPLES: Rec. (in.)	SAMPLES: RQD %	Casing Blows per 6"	Generalized Strata Description	Material Description and Notes	Well Construction	Elevation (ft)
30	S-4	Attempted SPT @ 31' bgs; Hole collapsed @ 29' bgs	24	8				gravel, some silt, medium dense, moist S-4: brown/black c-f SAND, some fine gravel, some silt, moist End of Boring @ 31'		-25
35										-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: 15 ft. Rock: 6' Conc./10' Rock

No. of Soil Samples: 4 No. of Core Runs: 4

1. Core barrel advance times are given in the "Blows on Sampler per 6 inches" column in minutes per foot. Boring terminated at 31' 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_PRE_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.

Driller:	Scott Marino	**Connecticut DOT Boring Report**		Hole No.:	B-1-6
Inspector:	R. Lavorati	Town:	Preston, Connecticut	Stat./Offset:	61+55.7/-10.8
Engineer:	M. Chartier	Project No.:	113-108	Northing:	738370.14
Start Date:	12/13/18 9:10 AM	Route No.:	2A	Easting:	1191126.84
Finish Date:	12/13/18 11:10 AM	Bridge No.:	02932	Surface Elevation:	6.3 NAVD88
Project Description:	Preston Bridge No. 02932 over Dickerman's Brook				
Casing Size/Type:	HW 4"	Sampler Type/Size:	1.5" Split Spoon Sampler	Core Barrel Type:	NX
Hammer Wt.:	300 lb. Fall: 30 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	SAMPLES: Pen. (in.)	SAMPLES: Rec. (in.)	SAMPLES: RQD %	Casing Blows per 6"	Generalized Strata Description	Material Description and Notes	Well Construction	Elevation (ft)
0						2	Fill	Solid stem augered to 6' bgs. Hammered casing to 6' bgs.		5
						2				
						2				
						1				
						2				
						1				
						2				
						1				
						1				
5						2				0
						10				
						50				
	C-1	2.6 2.5 3.1 3.1 3.1	60	58	73		Concrete	C-1: gray/black/blue Concrete		
10										-5
	C-2	1.5 2.4 2.6 3.1 3.4	60	60	95			C-2: gray/black/blue Concrete		
15										-10
	C-3	2.9 3.1 1.4 1.1 0.8	60	31.5	48			C-3: gray/black/blue Concrete		
20										
	S-1	38 50/5"	11	7			Terrace	S-1: black/brown fine GRAVEL, some c-f sand, trace silt, very dense, moist		-15
	S-2	27 50/5"	11	6				S-2: brown/black c-f SAND, some silt, trace fine gravel, very dense, moist		
25								End of Boring @ 23' 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: 8 ft. Rock: 15' Conc.

No. of Soil Samples: 2 No. of Core Runs: 3

1. Core barrel advance times are given in the "Blows on Sampler per 6 inches" column in minutes per foot. Boring terminated at 23' 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_PRE_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.

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.

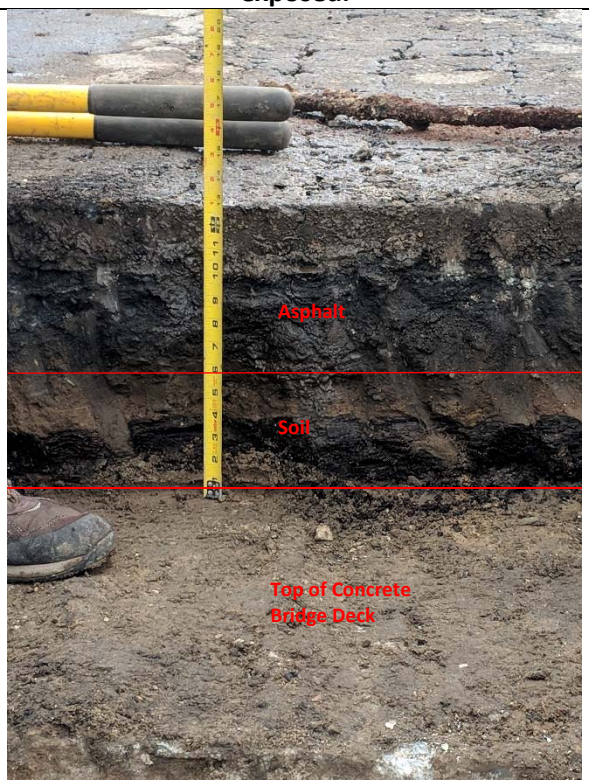
At 1:15 PM, Laydon said that they will come back Friday to finish the remaining test pits.

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.

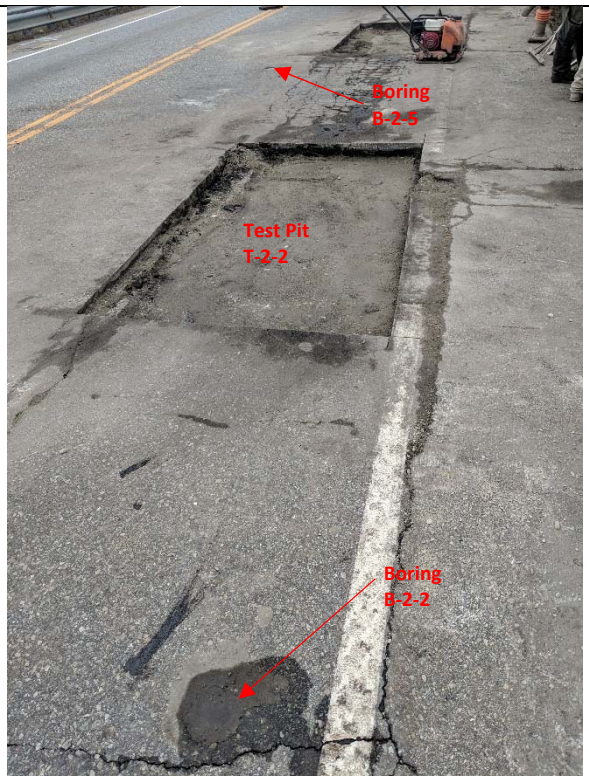
Bridge 02931, Test Pit T-2-2, facing south, looking down.
Back of the abutment and exposed rail line.

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

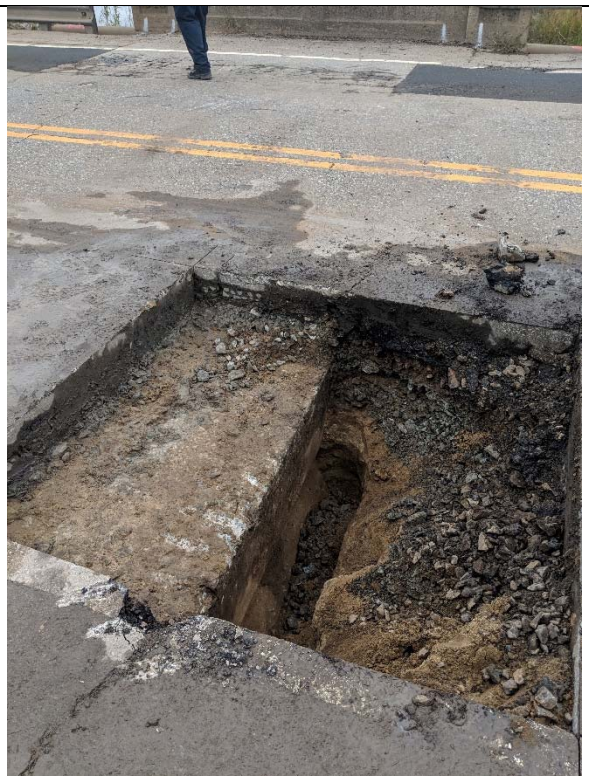
Bridge 02931, Test Pit T-2-2, facing west, looking down.
Depth of test pit.

Bridge 02931, Test Pit T-2-2, facing west.
Looking across test pit.

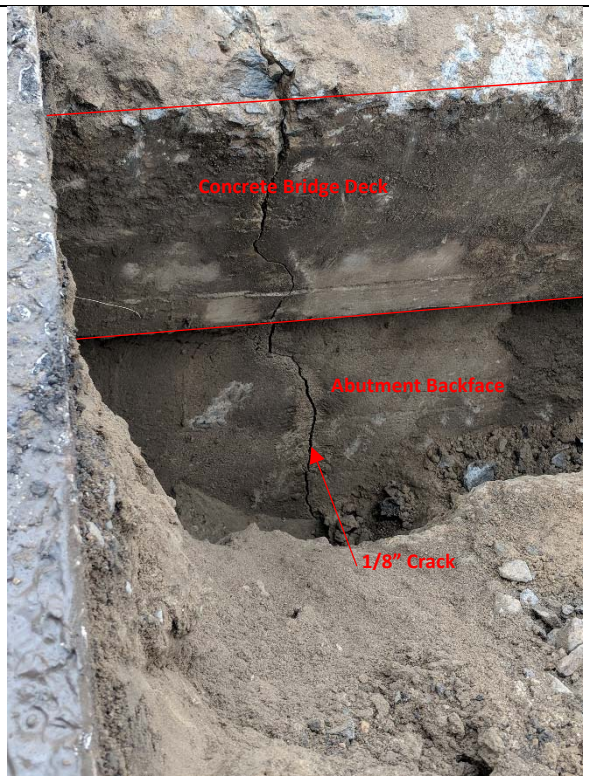
Bridge 02931, Test Pit T-2-2, facing north, looking down.
Test pit during excavation.



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

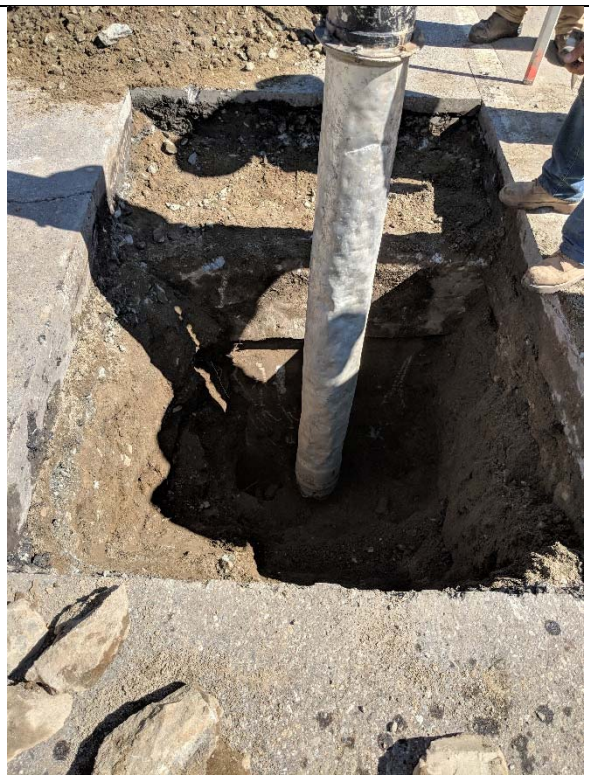
Bridge 02932, T-1-1, facing down
Water at bottom of Test Pit

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

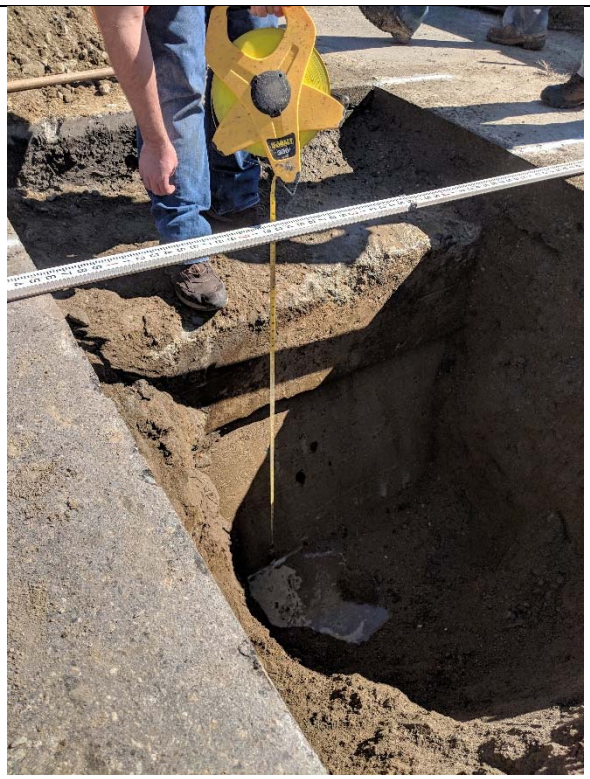
Bridge 02932, T-1-2, facing northwest
Thickness of bridge deck

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

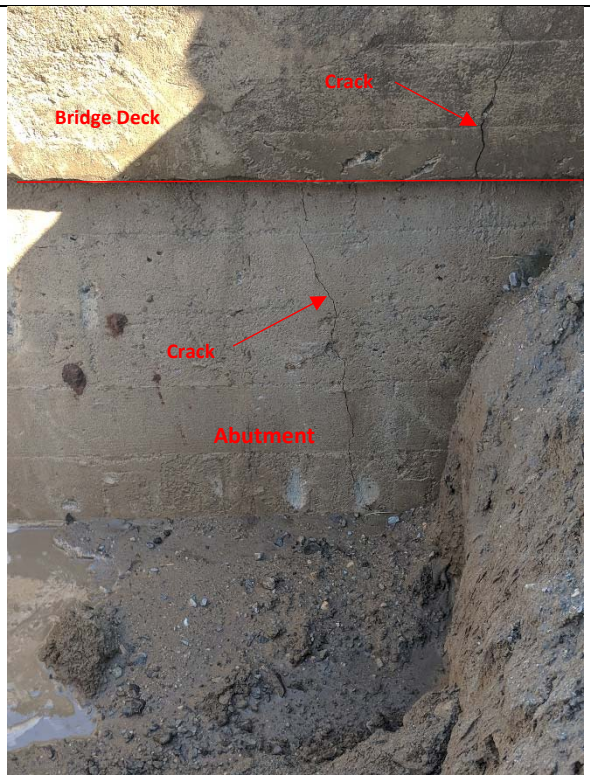


Bridge 02931, T-2-3, facing east
Vacuum excavating the test pit



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

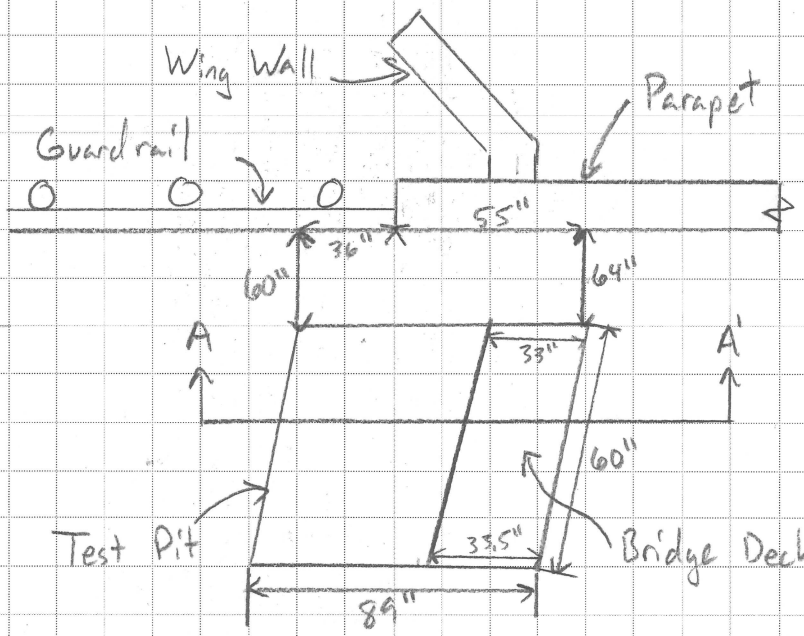
Geocomp

CALCULATIONS

Job Number 220693
Sheet 1 of 6
Date 10/8/16
Computed By RTL
Checked By MC

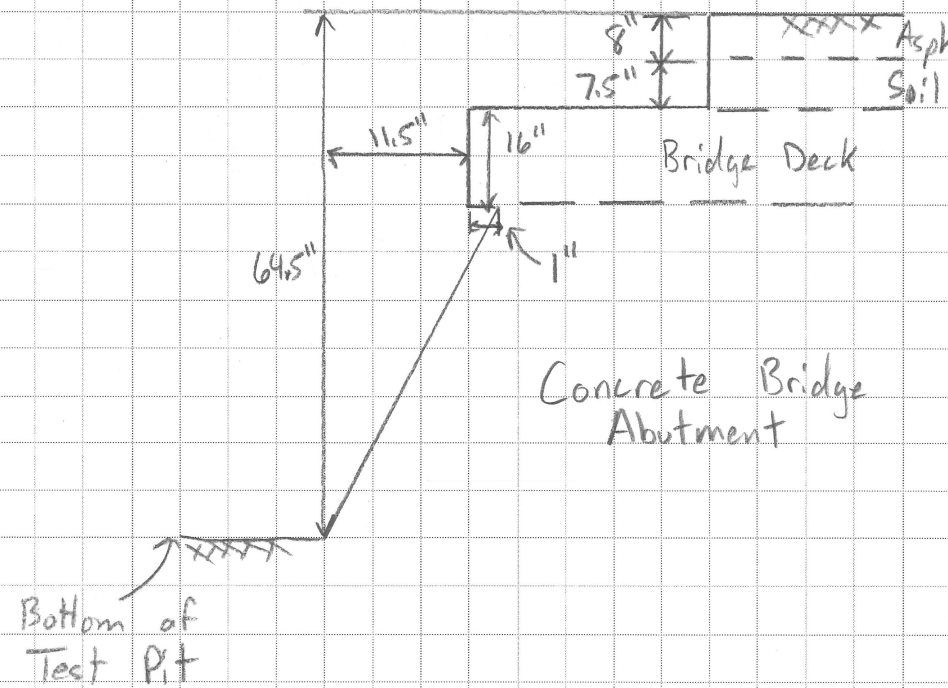
Client CME
Project 220693 - Preston Bridges
Subject Test Pit T-1-1, Bridge 02932

Plan View
(scale as shown)



Units are in inches

Cross Section View AA'
(scale as shown)



Units are in inches

Geocomp

CALCULATIONS

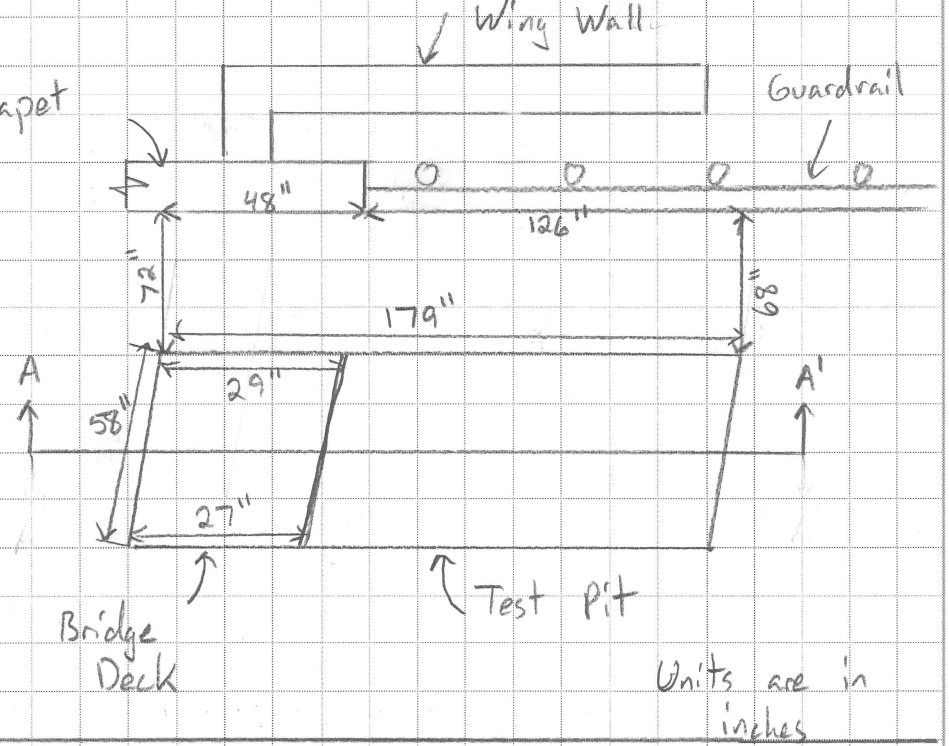
Job Number	220693
Sheet	2 of 6
Date	10/8/18
Computed By	RTL
Checked By	MC

Client: CME

Project: 220693 - CME Bridges

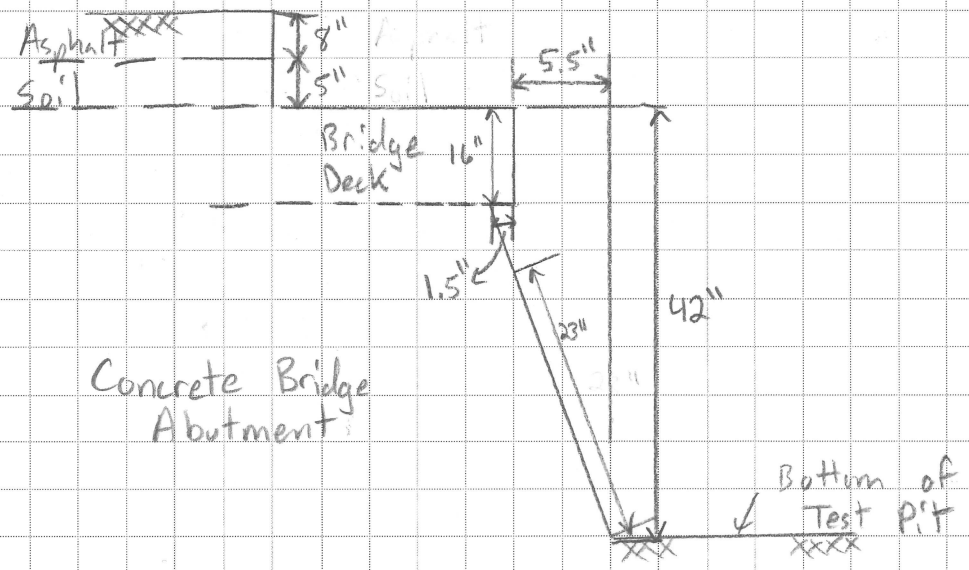
Subject: Test Pit T-1-2, Bridge 02932

Plan View
(scale as shown)



Units are in inches

Cross Section View AA'
(scale as shown)



Units are in inches

Geocomp

Appendix C

Laboratory Test Results

125 Nagog Park | Acton, MA 01720 | Tel 978 635 0012 | Fax 978 635 0266

GeoTesting EXPRESS

Technologies to manage risk for infrastructure

Boston
Atlanta
Chicago
Los Angeles
New York

www.geotesting.com

Transmittal

TO:

Cody Gibb

Geocomp Consulting

125 Nagog Park

Acton, MA 01720

DATE: 1/3/2017	GTX NO: 305775
RE: Preston Bridge No. 02932	

COPIES	DATE	DESCRIPTION
	1/3/2017	**December 2016 Laboratory Test Report**

REMARKS:

SIGNED:

Joe Tomei, Laboratory Manager

CC:

APPROVED BY:

Nancy Hubbard, Project Manager

GeoTesting EXPRESS

Technologies to manage risk for infrastructure

Boston
Atlanta
Chicago
Los Angeles
New York
www.geotesting.com

January 3, 2017

Cody Gibb
Geocomp Consulting
125 Nagog Park
Acton, MA 01720

RE: Preston Bridge No. 02932, Preston, CT (GTX-305775)

Dear Cody:

Enclosed are the test results you requested for the above referenced project. GeoTesting Express, Inc. (GTX) received nine samples from you on 12/14/2016. These samples were labeled as follows:

Boring	Sample	Depth
B-1-1	S-3	10-12 ft
B-1-1	S-6	25-27 ft
B-1-2B	S-1	5-7 ft
B-1-2C	S-5	30-32 ft
B-1-3	S-5	20-22 ft
B-1-4	S-2	5-7 ft
B-1-4	S-7	30-32 ft
B-1-4	S-10	45-47 ft
B-1-4	C-1	50-55 ft

GTX performed the following tests on these samples:

8 ASTM D422 - Grain Size Analyses - Sieve Only
1 ASTM D7012C- Uniaxial Compressive Strength of Rock

A copy of your test request is attached.

The results presented in this report apply only to the items tested. This report shall not be reproduced except in full, without written approval from GeoTesting Express. The remainder of these samples will be retained for a period of sixty (60) days and will then be discarded unless otherwise notified by you. Please call me if you have any questions or require additional information. Thank you for allowing GeoTesting Express the opportunity of providing you with testing services. We look forward to working with you again in the future.

Respectfully yours,

Joe Tomei
Laboratory Manager

GeoTesting EXPRESS

Technologies to manage risk for infrastructure

Boston
Atlanta
Chicago
Los Angeles
New York

www.geotesting.com

Geotechnical Test Report **1/3/2017**

GTX-305775

Preston Bridge No. 02932

Preston, CT

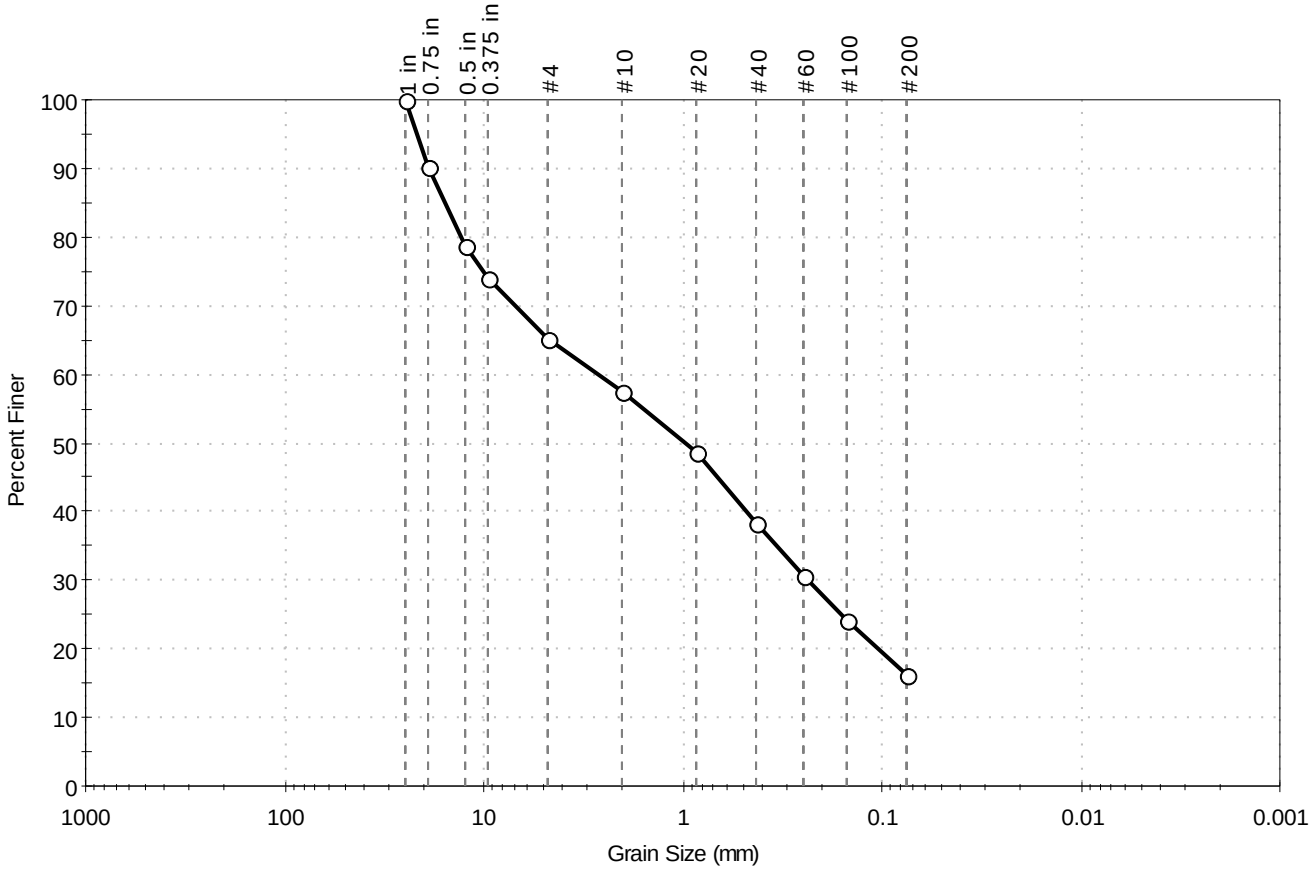
Client Project No.: 220693

Prepared for:

Geocomp Consulting

Client:	Geocomp Consulting				
Project:	Preston Bridge No. 02932				
Location:	Preston, CT			Project No:	GTX-305775
Boring ID:	B-1-1	Sample Type:	jar	Tested By:	jbr
Sample ID:	S-3	Test Date:	12/19/16	Checked By:	emm
Depth :	10-12 ft	Test Id:	400776		
Test Comment:	---				
Visual Description:	Moist, black silty sand with gravel				
Sample Comment:	---				

Particle Size Analysis - ASTM D422



%Cobble	%Gravel	%Sand	%Silt & Clay Size
---	34.8	49.0	16.2

Sieve Name	Sieve Size, mm	Percent Finer	Spec. Percent	Complies
1 in	25.00	100		
0.75 in	19.00	90		
0.5 in	12.50	79		
0.375 in	9.50	74		
#4	4.75	65		
#10	2.00	57		
#20	0.85	49		
#40	0.42	38		
#60	0.25	31		
#100	0.15	24		
#200	0.075	16		

Coefficients

D_{85} = 15.6865 mm	D_{30} = 0.2352 mm
D_{60} = 2.6580 mm	D_{15} = N/A
D_{50} = 0.9718 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))

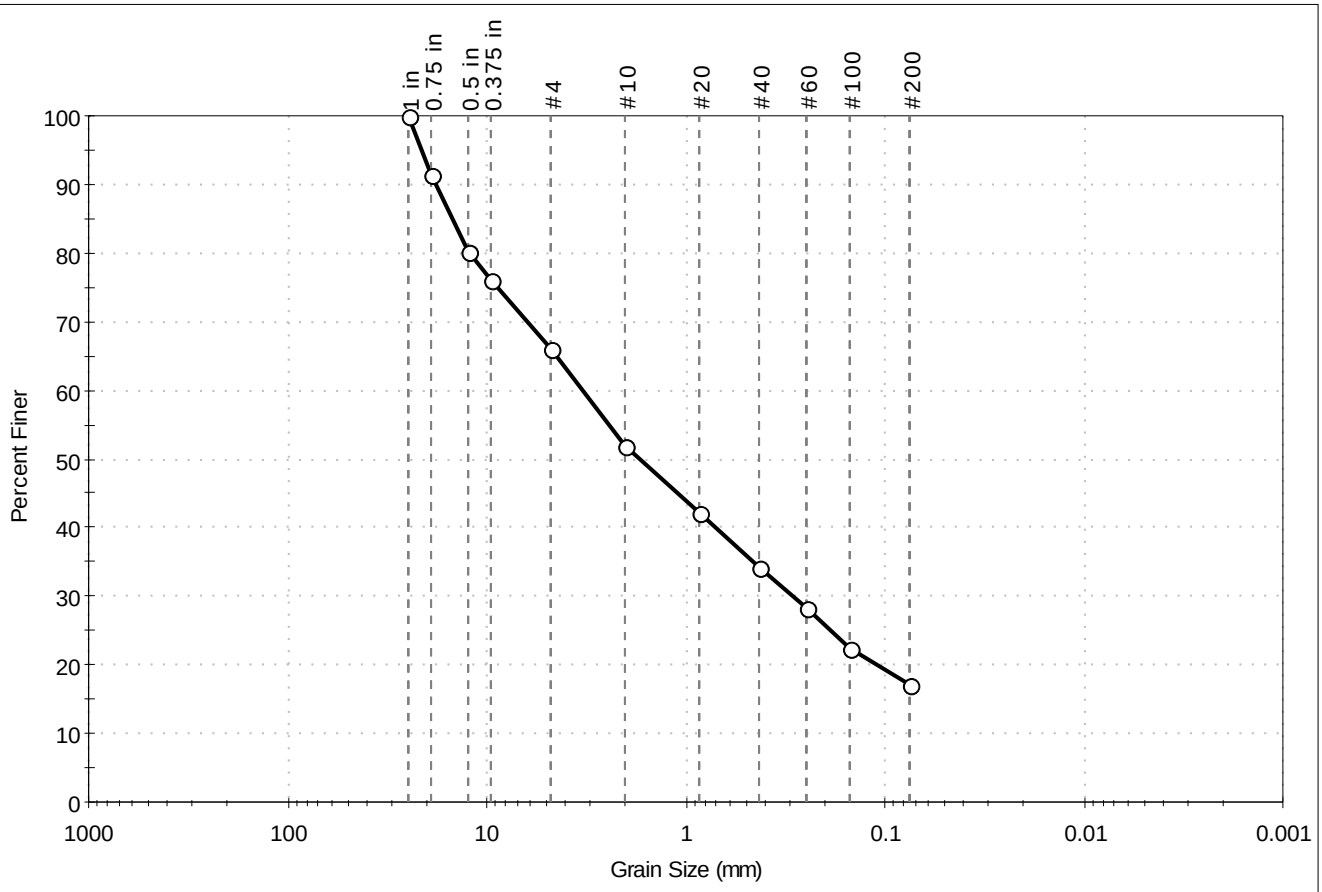
Sample / Test Description

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-1-1	Sample Type:	jar	Tested By:	jbr
Sample ID:	S-6	Test Date:	12/19/16	Checked By:	emm
Depth :	25-27 ft	Test Id:	400777		
Test Comment:	---				
Visual Description:	Moist, olive gray silty sand with gravel				
Sample Comment:	---				

Particle Size Analysis - ASTM D422



% Cobble	% Gravel	% Sand	% Silt & Clay Size
---	34.0	49.0	17.0

Sieve Name	Sieve Size, mm	Percent Finer	Spec. Percent	Complies
1 in	25.00	100		
0.75 in	19.00	92		
0.5 in	12.50	80		
0.375 in	9.50	76		
#4	4.75	66		
#10	2.00	52		
#20	0.85	42		
#40	0.42	34		
#60	0.25	28		
#100	0.15	22		
#200	0.075	17		

Coefficients

D_{85} = 14.8887 mm	D_{30} = 0.2880 mm
D_{60} = 3.2906 mm	D_{15} = N/A
D_{50} = 1.6962 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))

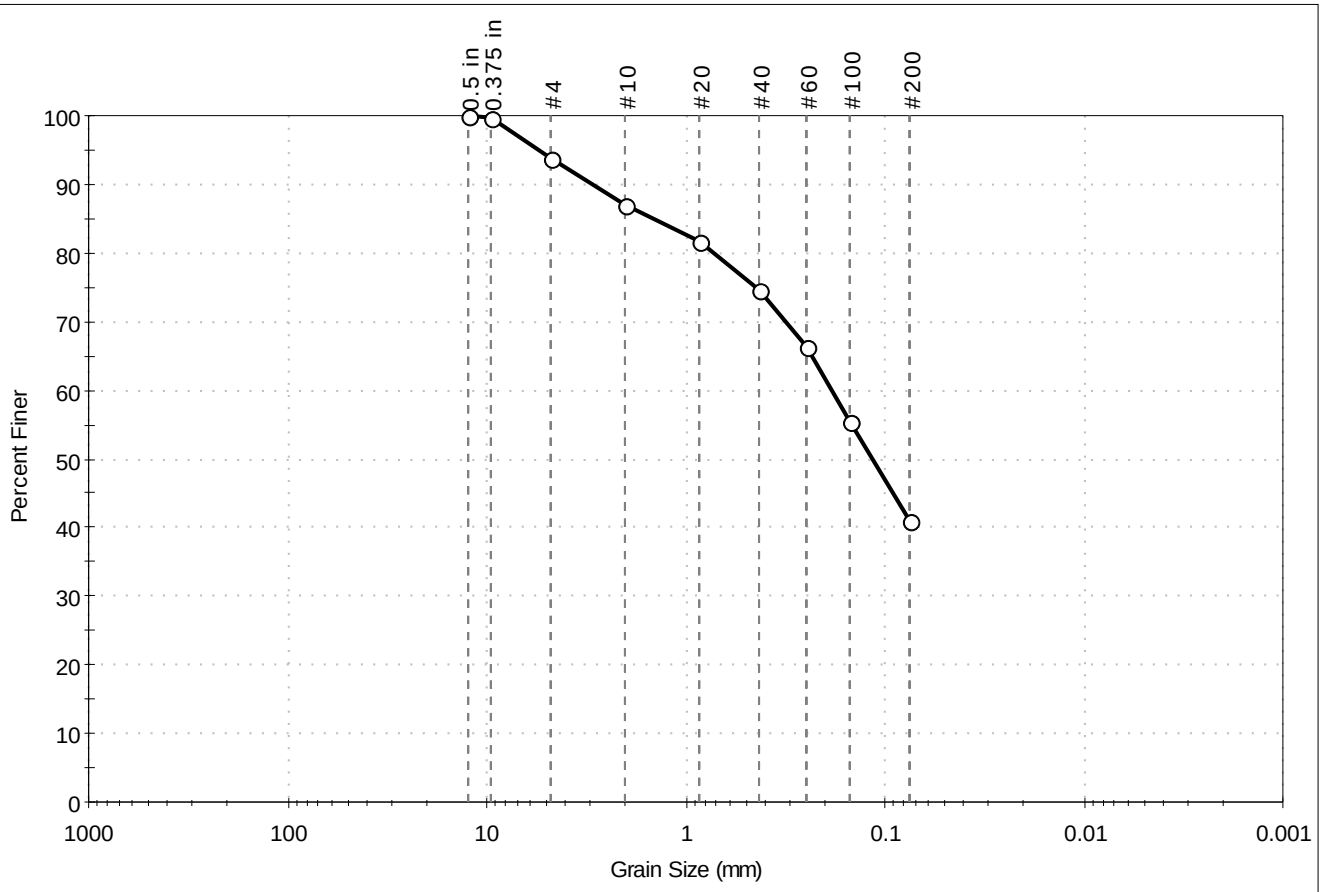
Sample / Test Description

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-1-2B	Sample Type:	jar	Tested By:	jbr
Sample ID:	S-1	Test Date:	12/19/16	Checked By:	emm
Depth :	5-7 ft	Test Id:	400778		
Test Comment:	---				
Visual Description:	Moist, dark olive gray silty sand				
Sample Comment:	---				

Particle Size Analysis - ASTM D422



%Cobble	%Gravel	%Sand	%Silt & Clay Size
---	6.2	52.7	41.1

Sieve Name	Sieve Size, mm	Percent Finer	Spec. Percent	Complies
0.5 in	12.50	100		
0.375 in	9.50	100		
#4	4.75	94		
#10	2.00	87		
#20	0.85	82		
#40	0.42	75		
#60	0.25	66		
#100	0.15	56		
#200	0.075	41		

Coefficients

D_{85} = 1.4512 mm D_{30} = N/A

D_{60} = 0.1846 mm D_{15} = N/A

D_{50} = 0.1149 mm D_{10} = N/A

C_u = N/A C_c = N/A

Classification

ASTM N/A

AASHTO Silty Soils (A-4 (0))

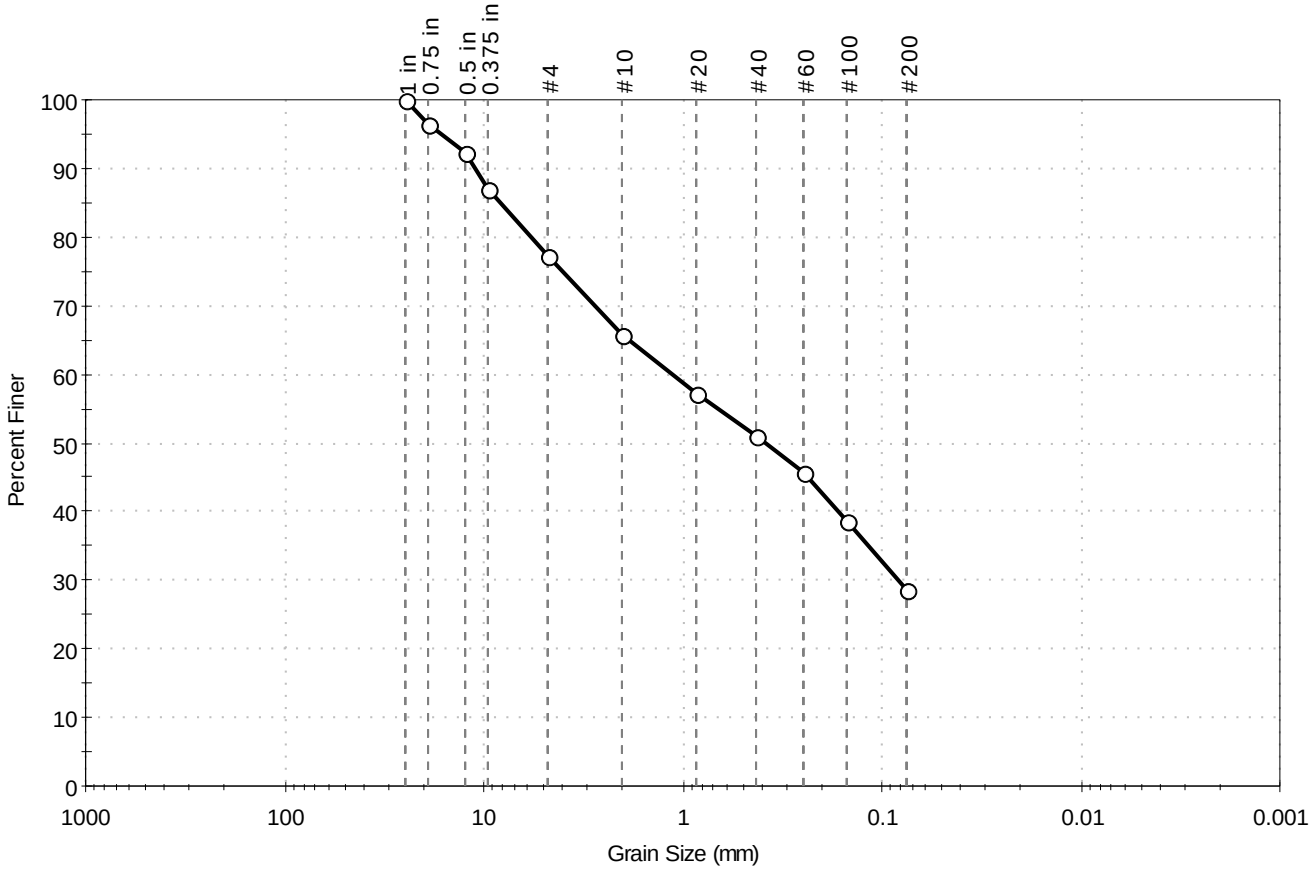
Sample / Test Description

Sand/Gravel Particle Shape : ANGULAR

Sand/Gravel Hardness : HARD

Client:	Geocomp Consulting				
Project:	Preston Bridge No. 02932				
Location:	Preston, CT			Project No:	GTX-305775
Boring ID:	B-1-2C	Sample Type:	jar	Tested By:	jbr
Sample ID:	S-5	Test Date:	12/19/16	Checked By:	emm
Depth :	30-32 ft	Test Id:	400779		
Test Comment:	---				
Visual Description:	Moist, olive gray silty sand with gravel				
Sample Comment:	---				

Particle Size Analysis - ASTM D422



% Cobble	% Gravel	% Sand	% Silt & Clay Size
---	22.8	48.5	28.7

Sieve Name	Sieve Size, mm	Percent Finer	Spec. Percent	Complies
1 in	25.00	100		
0.75 in	19.00	96		
0.5 in	12.50	92		
0.375 in	9.50	87		
#4	4.75	77		
#10	2.00	66		
#20	0.85	57		
#40	0.42	51		
#60	0.25	46		
#100	0.15	39		
#200	0.075	29		

Coefficients

D_{85} = 8.1775 mm	D_{30} = 0.0821 mm
D_{60} = 1.1257 mm	D_{15} = N/A
D_{50} = 0.3875 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))

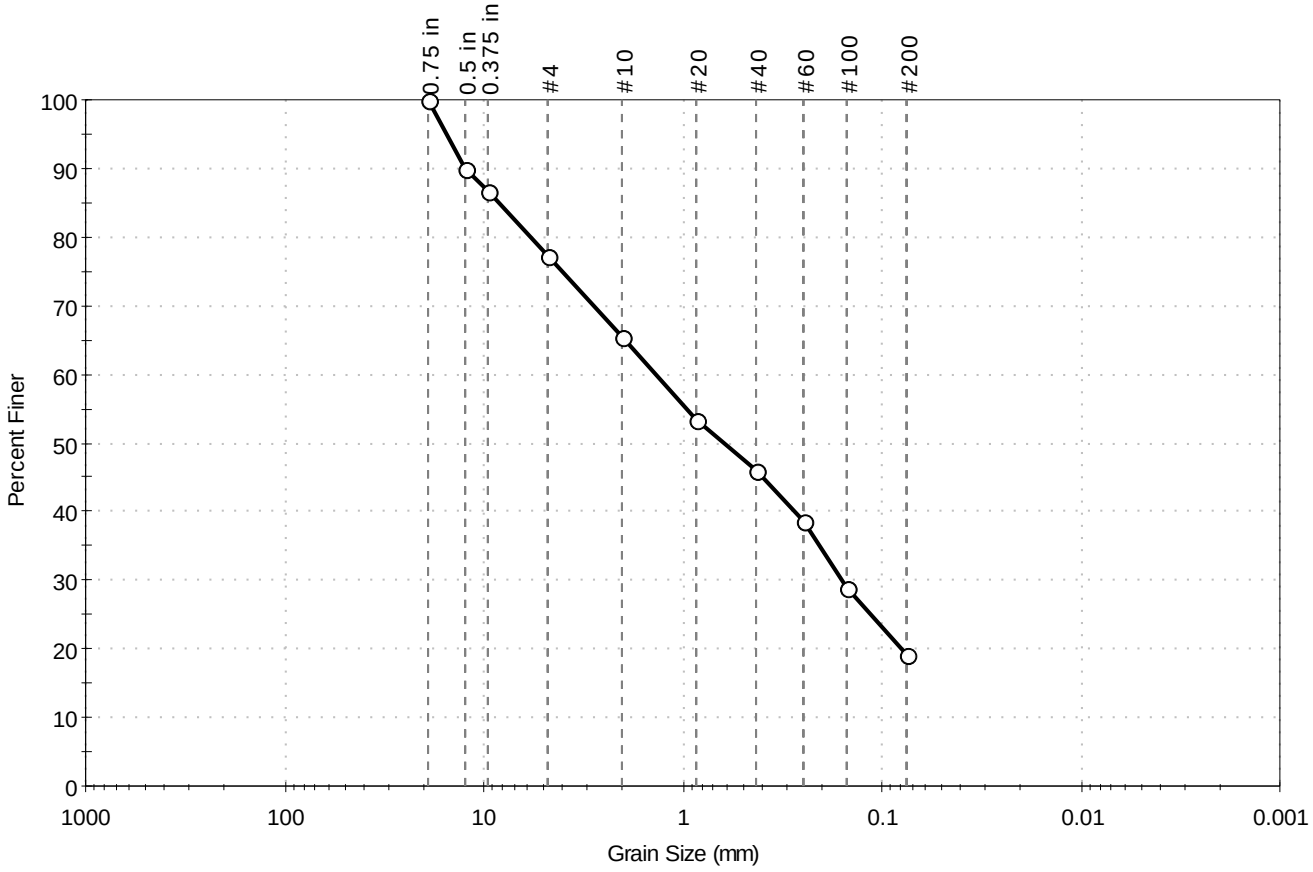
Sample / Test Description

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-1-3	Sample Type:	jar	Tested By:	jbr
Sample ID:	S-5	Test Date:	12/19/16	Checked By:	emm
Depth :	20-22 ft	Test Id:	400780		
Test Comment:	---				
Visual Description:	Moist, olive gray silty sand with gravel				
Sample Comment:	---				

Particle Size Analysis - ASTM D422



% Cobble	% Gravel	% Sand	% Silt & Clay Size
---	22.6	58.2	19.2

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	87		
#4	4.75	77		
#10	2.00	65		
#20	0.85	53		
#40	0.42	46		
#60	0.25	39		
#100	0.15	29		
#200	0.075	19		

Coefficients

D_{85} = 8.3946 mm	D_{30} = 0.1579 mm
D_{60} = 1.3602 mm	D_{15} = N/A
D_{50} = 0.6180 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))

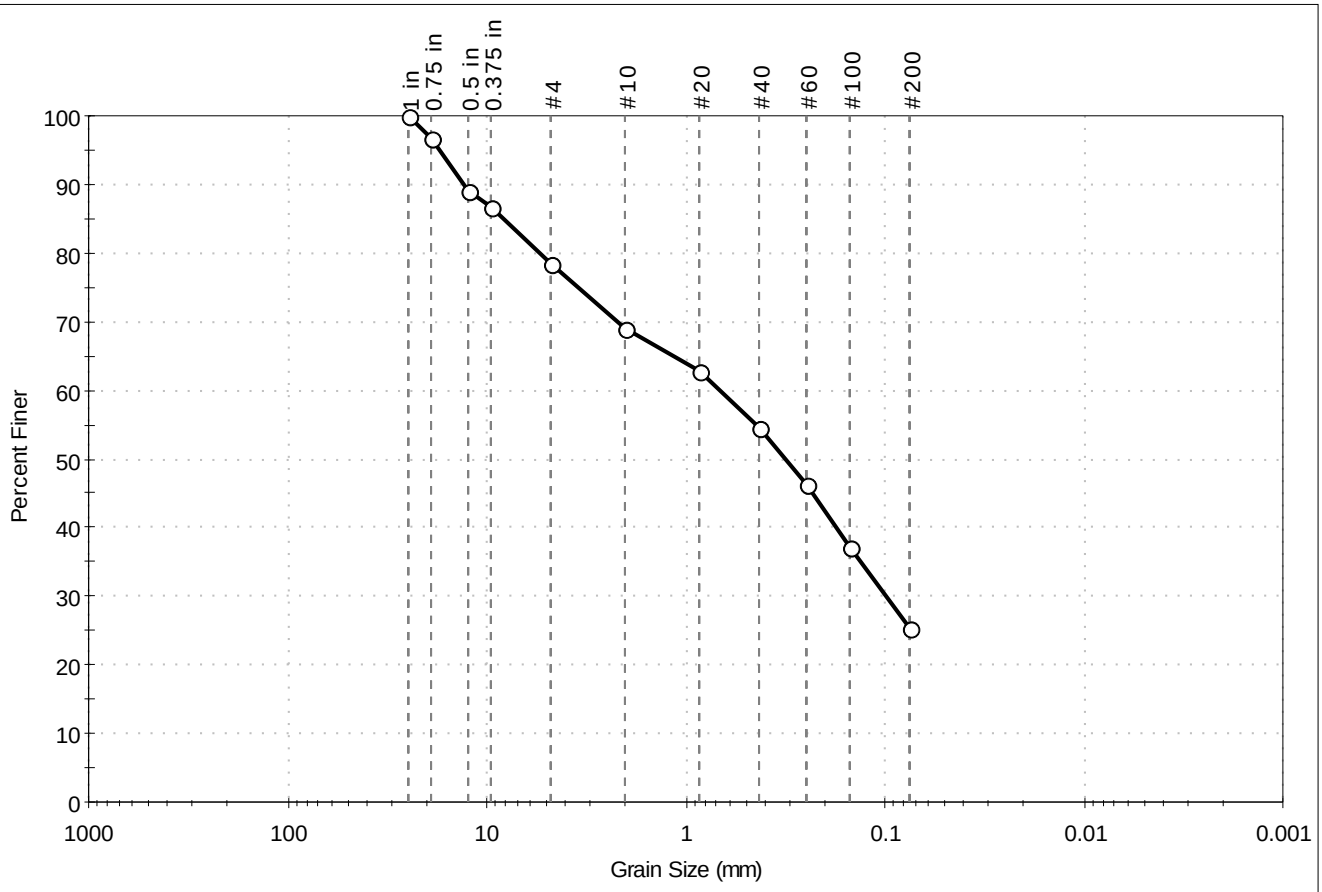
Sample / Test Description

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-1-4	Sample Type:	jar	Tested By:	jbr
Sample ID:	S-2	Test Date:	12/19/16	Checked By:	emm
Depth :	5-7 ft	Test Id:	400781		
Test Comment:	---				
Visual Description:	Moist, dark brown silty sand with gravel				
Sample Comment:	---				

Particle Size Analysis - ASTM D422



% Cobble	% Gravel	% Sand	% Silt & Clay Size
---	21.6	52.9	25.5

Sieve Name	Sieve Size, mm	Percent Finer	Spec. Percent	Complies
1 in	25.00	100		
0.75 in	19.00	97		
0.5 in	12.50	89		
0.375 in	9.50	87		
#4	4.75	78		
#10	2.00	69		
#20	0.85	63		
#40	0.42	55		
#60	0.25	46		
#100	0.15	37		
#200	0.075	25		

Coefficients

D_{85} = 8.2772 mm D_{30} = 0.0984 mm

D_{60} = 0.6742 mm D_{15} = N/A

D_{50} = 0.3150 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))

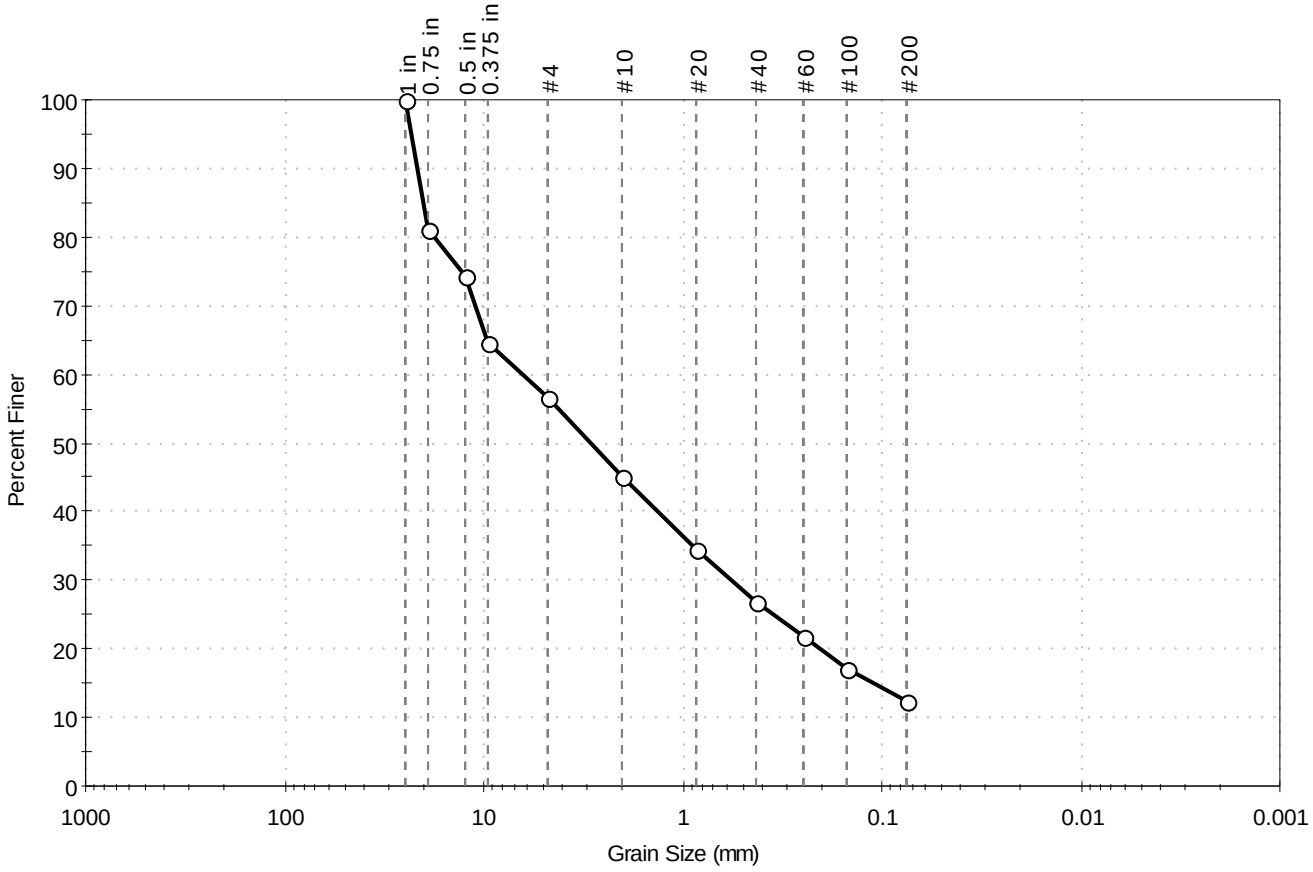
Sample / Test Description

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-1-4	Sample Type:	jar	Tested By:	jbr
Sample ID:	S-7	Test Date:	12/19/16	Checked By:	emm
Depth :	30-32 ft	Test Id:	400782		
Test Comment:	---				
Visual Description:	Moist, olive gray silty sand with gravel				
Sample Comment:	---				

Particle Size Analysis - ASTM D422



% Cobble	% Gravel	% Sand	% Silt & Clay Size
---	43.2	44.3	12.5

Sieve Name	Sieve Size, mm	Percent Finer	Spec. Percent	Complies
1 in	25.00	100		
0.75 in	19.00	81		
0.5 in	12.50	74		
0.375 in	9.50	65		
#4	4.75	57		
#10	2.00	45		
#20	0.85	34		
#40	0.42	27		
#60	0.25	22		
#100	0.15	17		
#200	0.075	12		

Coefficients

D_{85} = 20.1050 mm	D_{30} = 0.5652 mm
D_{60} = 6.3251 mm	D_{15} = 0.1102 mm
D_{50} = 2.8862 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-a (0))

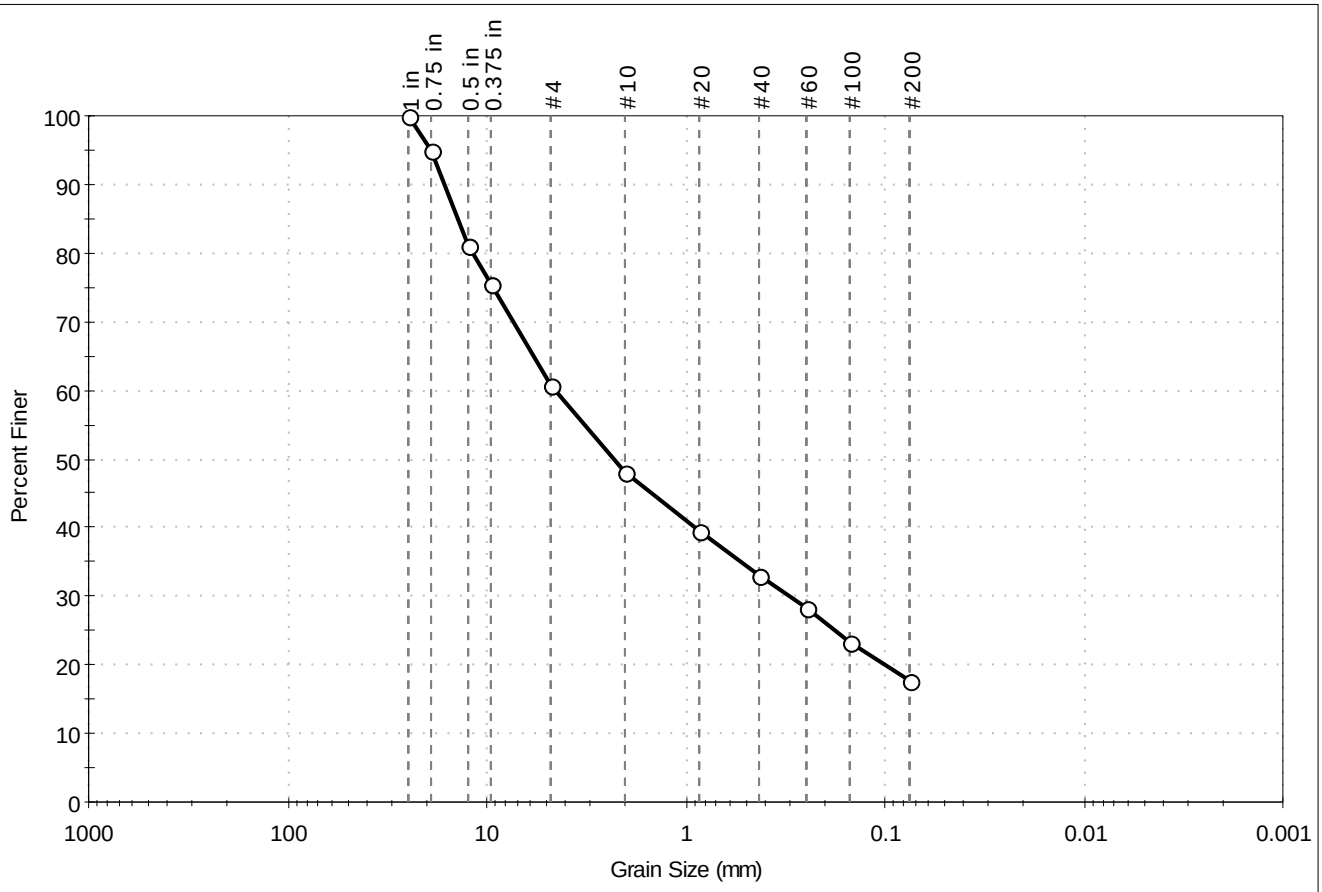
Sample / Test Description

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-1-4	Sample Type:	jar	Tested By:	jbr
Sample ID:	S-10	Test Date:	12/19/16	Checked By:	emm
Depth :	45-47 ft	Test Id:	400783		
Test Comment:	---				
Visual Description:	Moist, olive gray silty sand with gravel				
Sample Comment:	---				

Particle Size Analysis - ASTM D422



% Cobble	% Gravel	% Sand	% Silt & Clay Size
---	39.2	43.2	17.6

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	81		
0.375 in	9.50	75		
#4	4.75	61		
#10	2.00	48		
#20	0.85	39		
#40	0.42	33		
#60	0.25	28		
#100	0.15	23		
#200	0.075	18		

Coefficients

D_{85} = 14.0819 mm	D_{30} = 0.2993 mm
D_{60} = 4.4988 mm	D_{15} = N/A
D_{50} = 2.2843 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-1-4	Sample Type:	---	Tested By:	rlc
Sample ID:	C-1	Test Date:	12/16/16	Checked By:	jsc
Depth :	50-55 ft	Test Id:	400784		
Test Comment:	---				
Visual Description:	See photograph(s)				
Sample Comment:	---				

Bulk Density and Compressive Strength of Rock Core Specimens by ASTM D7012 Method C

Boring ID	Sample Number	Depth	Bulk Density, pcf	Compressive strength, psi	Failure Type	Meets ASTM D4543	Note(s)
B-1-4	C-1	50-55 ft	176	14714	3	Yes	---

Notes: Density determined on core samples by measuring dimensions and weight and then calculating.

All specimens tested at the approximate as-received moisture content and at standard laboratory temperature.

The axial load was applied continuously at a stress rate that produced failure in a test time between 2 and 15 minutes.

Failure Type: 1 = Intact Material Failure; 2 = Discontinuity Failure; 3 = Intact Material and Discontinuity Failure (See attached photographs)

Client:	Geocomp Consulting	Test Date:	12/15/2016
Project Name:	Preston Bridge No. 02932	Tested By:	rlc
Project Location:	Preston, CT	Checked By:	jsc
GTX #:	305775		
Boring ID:	B-1-4		
Sample ID:	C-1		
Depth:	50-55 ft		
Visual Description:	See photographs		

UNIT WEIGHT DETERMINATION AND DIMENSIONAL AND SHAPE TOLERANCES OF ROCK CORE SPECIMENS BY ASTM D4543

BULK DENSITY

	1	2	Average
Specimen Length, in:	4.37	4.37	4.37
Specimen Diameter, in:	1.98	1.98	1.98
Specimen Mass, g:	624.32		
Bulk Density, lb/ft^3	176	**Minimum Diameter Tolerence Met?**	YES
Length to Diameter Ratio:	2.2	**Length to Diameter Ratio Tolerance Met?**	YES

DEVIATION FROM STRAIGHTNESS (Procedure S1)

Maximum gap between side of core and reference surface plate:
Is the maximum gap ≤ 0.02 in.? YES

Maximum difference must be < 0.020 in.
Straightness Tolerance Met? YES

END FLATNESS AND PARALLELISM (Procedure FP1)

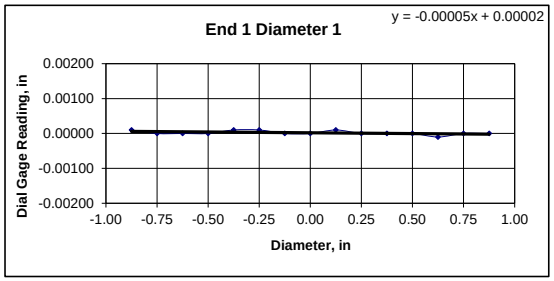
END 1	-0.875	-0.750	-0.625	-0.500	-0.375	-0.250	-0.125	0.000	0.125	0.250	0.375	0.500	0.625	0.750	0.875
Diameter 1, in	0.00010	0.00000	0.00000	0.00000	0.00010	0.00010	0.00000	0.00000	0.00010	0.00000	0.00000	0.00000	-0.00010	0.00000	0.00000
Diameter 2, in (rotated 90°)	0.00000	0.00000	-0.00010	-0.00020	0.00000	0.00000	0.00000	0.00000	-0.00010	-0.00020	-0.00010	-0.00020	-0.00010	-0.00020	-0.00030

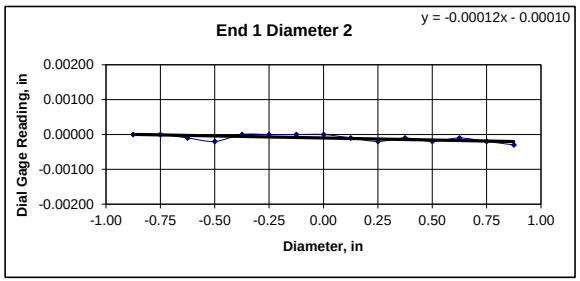
Difference between max and min readings, in:
0° = 0.00020 90° = 0.00030

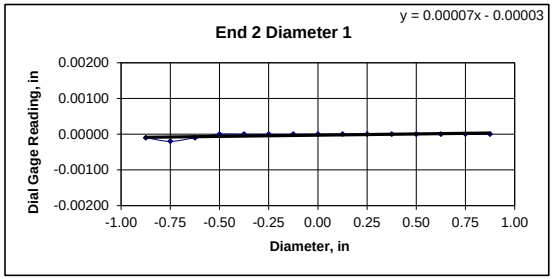
END 2	-0.875	-0.750	-0.625	-0.500	-0.375	-0.250	-0.125	0.000	0.125	0.250	0.375	0.500	0.625	0.750	0.875
Diameter 1, in	-0.00010	-0.00020	-0.00010	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
Diameter 2, in (rotated 90°)	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	-0.00010	-0.00020	-0.00020

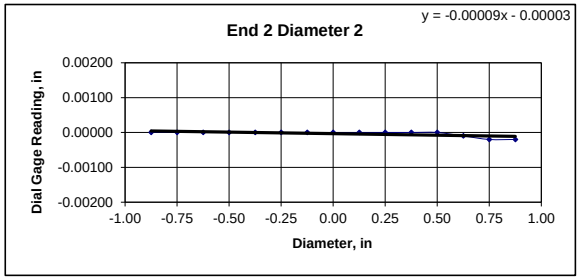
Difference between max and min readings, in:
0° = 0.0002 90° = 0.0002

Maximum difference must be < 0.0020 in. Difference = ± 0.00015
Flatness Tolerance Met? YES









DIAMETER 1

End 1:
Slope of Best Fit Line 0.00005
Angle of Best Fit Line: 0.00286

End 2:
Slope of Best Fit Line 0.00007
Angle of Best Fit Line: 0.00401

Maximum Angular Difference: 0.00115

Parallelism Tolerance Met? YES
Spherically Seated

DIAMETER 2

End 1:
Slope of Best Fit Line 0.00012
Angle of Best Fit Line: 0.00688

End 2:
Slope of Best Fit Line 0.00009
Angle of Best Fit Line: 0.00516

Maximum Angular Difference: 0.00172

Parallelism Tolerance Met? YES
Spherically Seated

PERPENDICULARITY (Procedure P1) (Calculated from End Flatness and Parallelism measurements above)

END 1	Difference, Maximum and Minimum (in.)	Diameter (in.)	Slope	Angle°	Perpendicularity Tolerance Met?
Diameter 1, in	0.00020	1.980	0.00010	0.006	YES
Diameter 2, in (rotated 90°)	0.00030	1.980	0.00015	0.009	YES
END 2					
Diameter 1, in	0.00020	1.980	0.00010	0.006	YES
Diameter 2, in (rotated 90°)	0.00020	1.980	0.00010	0.006	YES

Maximum angle of departure must be ≤ 0.25°
Perpendicularity Tolerance Met? YES

Client:	Geocomp Consulting
Project Name:	Preston Bridge No. 02932
Project Location:	Preston, CT
GTX #:	305775
Test Date:	12/16/2016
Tested By:	rlc
Checked By:	jsc
Boring ID:	B-1-4
Sample ID:	C-1
Depth, ft:	50-55

After cutting and grinding

After break

GeoTesting EXPRESS

ROCK CHAIN OF CUSTODY & TEST REQUEST

GeoTesting Express, Inc.
125 Nagog Park
Acton, MA 01720
800 434 1062 Toll Free
978 635 0266 Fax

2662 Holcomb Bridge Road, Suite 310
Alpharetta, GA 30022
770 645 6575 Tel
770 645 6570 Fax

www.geotesting.com

CLIENT	
Company: Geocomp Corporation	
Address: 125 Nagog Park	
City, State, Zip: Acton, MA 01720	
Contact: Cody Gibb	Phone:978-893-1234
E-mail: cgibb@geocomp.com	Cell: 401-225-5790

INVOICE (complete if different from Client)	
Company:	
Address:	
City, State, Zip:	
Contact:	Phone:
E-mail:	Cell:

PROJECT		
Project Name: Preston Bridge No. 02932	Client Project #: 220693	Purchase Order#:
Project Location: Preston, Connecticut	GTX Sales Order #:	Requested Turnaround:
On-site Contact:	E-mail:	Phone:

ROCK

Boring No.	Sample ID/Run No.	Depth	CERCHAR Abrasivity (ASTM D 7625)* 55HRC/40HRC	Direct Shear (ASTM D5607)*	Direct Tensile Strength (ASTM D 2936)	Elastic Moduli in Triaxial Compression (ASTM D 7012B)	Elastic Moduli in Uniaxial Compression (ASTM D 7012D)	Unit Weight (ISRM)	Petrographic Analysis (ISRM)	Point Load Index (ASTM D 5731)* Diametral, Axial, Lump/Block	Punch Penetration (Handewith)	Slake Durability (ASTM D 4644)	Splitting (Brazilian) Tensile Strength (ASTM D 3967)	Schmidt Hammer (ASTM D 5873)	Total Hardness (Schmidt Hammer and Taber Abrasion)	Triaxial Compression (ASTM D 7012A)	Unconfined Compression (ASTM D 7012C)	Other:	Other:
B-1-4	C-1	50'-55'															X		

*Specify Test Conditions (Undisturbed or Remolded, Density and Moisture, Test Normal Loads, Test Confining Stresses, etc.):
X = New test assignments

AUTHORIZE BY SIGNING AND DATING:

SIGNATURE: _____ **PRINT NAME:** Cody Gibb **DATE:** 12/14/2016

For GTX Use Only
Incoming Sample Inspection Performed ☐
Adverse conditions: _____

Relinquished By:	**DATE:** / **TIME:**	**Received By:**	**DATE:** 12/14/16 / **TIME:**
Relinquished By:	**DATE:** / **TIME:**	**Received By:**	**DATE:** / **TIME:**

GeoTesting EXPRESS

SOIL CHAIN OF CUSTODY & TEST REQUEST

GeoTesting Express, Inc.
125 Nagog Park
Acton, MA 01720
800 434 1062 Toll Free
978 635 0266 Fax

2358 Perimeter Park Drive, Suite 320
Atlanta, GA 30341
770 645 6575 Tel
770 645 6570 Fax

www.geotesting.com

CLIENT		INVOICE (complete if different from Client)	
Company: Geocomp		Company:	
Address: 125 Nagog Park		Address:	
City, State, Zip: Acton, Ma 01720		City, State, Zip:	
Contact: Cody Gibb	Phone: 978-893-1234	Contact:	Phone:
E-mail: cgibb@geocomp.com	Cell: 401-225-5790	E-mail:	Cell:

PROJECT		
Project Name: Preston Bridge No. 02932	Client Project #: 220693	Purchase Order#:
Project Location: Preston, Connecticut	GTX Sales Order #:	Requested Turnaround:
On-site Contact:	E-mail:	Phone:

SOIL			Atterberg Limits (ASTM D 4318)	USCS – Classification (ASTM D 2487)	Grain Size (ASTM D 422) (Sieve Only) (Sieve & Hydrometer) please circle one	Density (ASTM D 2937) (ASTM D 7263) please circle one	Moisture Content (ASTM D 2216)	Organic Content (ASTM D 2974)	pH (ASTM D 4972)	Specific Gravity (ASTM D 854)	Electrical Resistivity (ASTM G 57)	Direct Simple Shear (Static) (ASTM D 6528)	Cyclic Direct Simple Shear	Direct Shear* (ASTM D 3080)	Triaxial Shear* (UU – ASTM D 2850) (CU – ASTM D 4767) (CD – ASTM D7181)	Constant Rate of Strain Consolidation (ASTM D 4186)	Permeability/ Hydraulic Conductivity* (Fixed Wall – ASTM D 2434) (Flexible Wall – ASTM D 5084) Please circle one	Resonant Column (ASTM D 4015)	X-Ray	Torvane
Boring ID	Sample ID	Depth																		
B-1-1	S-3	10'-12'			X[1]															
B-1-1	S-6	25'-27'			X[1]															
B-1-2B	S-1	5'-7'			X[1]															
B-1-2C	S-5	30'-32'			X[1]															
B-1-3	S-5	20-22'			X															
B-1-4	S-2	5'-7'			X[1]															
B-1-4	S-7	30'-32'			X[1]															
B-1-4	S-10	45'-47'			X[1]															

For samples not used in tests and remaining samples, please hold onto them.
X = New test assignments
X = Previously assigned test assignments
1. **Two jars of soil are provided for sample testing.**

12/14/16

AUTHORIZE BY SIGNING AND DATING:

SIGNATURE: _____ **PRINT NAME:** Cody Gibb **DATE:** 12/14/2016

GeoTesting EXPRESS

WARRANTY and LIABILITY

GeoTesting Express (GTX) warrants that all tests it performs are run in general accordance with the specified test procedures and accepted industry practice. GTX will correct or repeat any test that does not comply with this warranty. GTX has no specific knowledge as to conditioning, origin, sampling procedure or intended use of the material.

GTX may report engineering parameters that require us to interpret the test data. Such parameters are determined using accepted engineering procedures. However, GTX does not warrant that these parameters accurately reflect the true engineering properties of the *in situ* material. Responsibility for interpretation and use of the test data and these parameters for engineering and/or construction purposes rests solely with the user and not with GTX or any of its employees.

GTX's liability will be limited to correcting or repeating a test which fails our warranty. GTX's liability for damages to the Purchaser of testing services for any cause whatsoever shall be limited to the amount GTX received for the testing services. GTX will not be liable for any damages, or for any lost benefits or other consequential damages resulting from the use of these test results, even if GTX has been advised of the possibility of such damages. GTX will not be responsible for any liability of the Purchaser to any third party.

Commonly Used Symbols

A	pore pressure parameter for $\Delta\sigma_1 - \Delta\sigma_3$
B	pore pressure parameter for $\Delta\sigma_3$
CAI	CERCHAR Abrasiveness Index
CIU	isotropically consolidated undrained triaxial shear test
CR	compression ratio for one dimensional consolidation
CSR	cyclic stress ratio
C_c	coefficient of curvature, $(D_{30})^2 / (D_{10} \times D_{60})$
C_u	coefficient of uniformity, D_{60}/D_{10}
C_c	compression index for one dimensional consolidation
C_α	coefficient of secondary compression
c_v	coefficient of consolidation
c	cohesion intercept for total stresses
c'	cohesion intercept for effective stresses
D	diameter of specimen
D	damping ratio
D_{10}	diameter at which 10% of soil is finer
D_{15}	diameter at which 15% of soil is finer
D_{30}	diameter at which 30% of soil is finer
D_{50}	diameter at which 50% of soil is finer
D_{60}	diameter at which 60% of soil is finer
D_{85}	diameter at which 85% of soil is finer
d_{50}	displacement for 50% consolidation
d_{90}	displacement for 90% consolidation
d_{100}	displacement for 100% consolidation
E	Young's modulus
e	void ratio
e_c	void ratio after consolidation
e_o	initial void ratio
G	shear modulus
G_s	specific gravity of soil particles
H	height of specimen
H_R	Rebound Hardness number
i	gradient
I_S	Uncorrected point load strength
$I_{S(50)}$	Size corrected point load strength index
H_A	Modified Taber Abrasion
H_T	Total hardness
K_o	lateral stress ratio for one dimensional strain
k	permeability
LI	Liquidity Index
m_v	coefficient of volume change
n	porosity
PI	plasticity index
P_c	preconsolidation pressure
p	$(\sigma_1 + \sigma_3) / 2$, $(\sigma_v + \sigma_h) / 2$
p'	$(\sigma'_1 + \sigma'_3) / 2$, $(\sigma'_v + \sigma'_h) / 2$
p'_c	p' at consolidation
Q	quantity of flow
q	$(\sigma_1 - \sigma_3) / 2$
q_f	q at failure
q_o, q_i	initial q
q_c	q at consolidation
S_r	Post cyclic undrained shear strength
T	temperature
t	time
U, UC	unconfined compression test
UU, Q	unconsolidated undrained triaxial test
u_a	pore gas pressure
u_e	excess pore water pressure
u, u_w	pore water pressure
V	total volume
V_g	volume of gas
V_s	volume of solids
V_s	shear wave velocity
V_v	volume of voids
V_w	volume of water
V_o	initial volume
v	velocity
W	total weight
W_s	weight of solids
W_w	weight of water
w	water content
w_c	water content at consolidation
w_f	final water content
w_l	liquid limit
w_n	natural water content
w_p	plastic limit
w_s	shrinkage limit
w_o, w_i	initial water content
α	slope of q_f versus p_f
α'	slope of q_f versus p_f'
γ_t	total unit weight
γ_d	dry unit weight
γ_s	unit weight of solids
γ_w	unit weight of water
ε	strain
ε_{vol}	volume strain
ε_h, ε_v	horizontal strain, vertical strain
μ	Poisson's ratio, also viscosity
σ	normal stress
σ'	effective normal stress
σ_c, σ'_c	consolidation stress in isotropic stress system
σ_h, σ'_h	horizontal normal stress
σ_v, σ'_v	vertical normal stress
σ'_{vc}	Effective vertical consolidation stress
σ_1	major principal stress
σ_2	intermediate principal stress
σ_3	minor principal stress
τ	shear stress
φ	friction angle based on total stresses
φ'	friction angle based on effective stresses
φ'_r	residual friction angle
φ_{ult}	φ for ultimate strength

Geocomp

Appendix D

Barrier Wall Footing Bearing Resistance and Settlement Calculations

125 Nagog Park | Acton, MA 01720 | Tel 978 635 0012 | Fax 978 635 0266

JOB	220693 - Bridge Replacement Bridge No. 02932, 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**

Settlement Calculations:

$$S_e = \frac{(q_o\,(1-\nu^2)\sqrt{A'})}{144 E_s \beta_z}$$ eqn. 10.6.2.4.2-1

where: q_o = applied vert. stress (ksf)
v = Poisson's Ratio
E_s = Young's Modulus (ksi)
β_z = Shape/Rigidity Factor

v = Poisson's Ratio =	0.30	(Table C10.4.6.3-1)
E_s = Young's Modulus (ksi) =	3.00	(Table C10.4.6.3-1)
β_z = Shape/Rigidity Factor =	1.41	(Table 10.6.2.4.2-1)

where:

B' = eff. width of footing (ft) =	4.00	(from bearing resistance)
L = length of footing (ft) =	175	
A' =(B'xL) = footing area (ft^2) =	700	ft^2
L/B' =	44	

Solve for q_o for a given settlement (S_e):

Se = given settlement (inches) =	0.25	inches
	0.50	inches
	0.75	inches
	1.00	inches
	2.00	inches

qo = applied vertical stress (ksf) =	0.5	ksf for 0.25 inches settlement
	1.1	ksf for 0.50 inches settlement
	1.6	ksf for 0.75 inches settlement
	2.1	ksf for 1.00 inches settlement
	4.2	ksf for 2.00 inches settlement

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Appendix E

Drilled Pile Bearing Resistance and Settlement Calculations

125 Nagog Park | Acton, MA 01720 | Tel 978 635 0012 | Fax 978 635 0266

PROJECT: Bridge No. 02932, Route 2A over Dickerman's (Halsey) Brook, Preston, CT	**Calculated By:** RTL
PROJECT NO.: 220693	**Checked By:** MGC
CLIENT: CME	**Date:** 3/19/2019
SUBJECT: LPILE Pile Analysis	**Page No.:** 1 of 4

Objective: To evaluate the stresses and deflections within the proposed pile/drilled shaft 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 02932, Route 2A over Halsey Brook, Section 02.03 - Structure", page S-02, dated 3/1/2019. (See Appendix A)
2. Drawings entitled "Connecticut State Highway Department, Town of Preston, Rehabilitation of Bridge 02932, Route 2A over Halsey Brook, Section 02.05 - Utility", page UTL-6, dated 3/1/2019. (See Appendix A)
3. AASHTO LRFD Bridge Design Specifications, 7th Edition.

Abutment Loading used for Analysis

	Loading @ Point A in 02.05 - Utility Drawings		
Load Case	Vertical Load (kips)	Horizontal Load (kips)	Overturning Moment (ft-kips)
1	4.0	1.5	19.0
2	4.0	1.5	-19.0
3	4.0	-1.5	19.0
4	4.0	-1.5	-19.0

Ground Slope Angle

Ground Slope Angle = 29 degrees

Pile Stick Up

Pile Stick Up = 5 feet

PROJECT: Bridge No. 02932, Route 2A over Dickerman's (Halsey) Brook, Preston, CT	**Calculated By:** RTL
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CLIENT: CME	**Date:** 3/19/2019
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 28 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 Shaft 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-1-1 through B-1-4. 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	---	---
Alluvial Deposit	Sand (Reese)	62.6	30	20	---	---
Terrace	Sand (Reese)	67.6	36	125	---	---

PROJECT: Bridge No. 02932, Route 2A over Dickerman's (Halsey) Brook, 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)	4	4	4	4
Horizontal Load (kips)	1.5	1.5	-1.5	-1.5
Overturning Moment (ft-kips)	19	-19	19	-19
Maximum Pile Lateral Deflection (in)	0.3	0.0	0.0	-0.3
Maximum Bending Moment (in-kip)	354	-228	228	-353
Depth to Fixity (ft)	21	18	20	21
Maximum Pile Shear (kips)	-3.3	1.5	-1.5	3.3

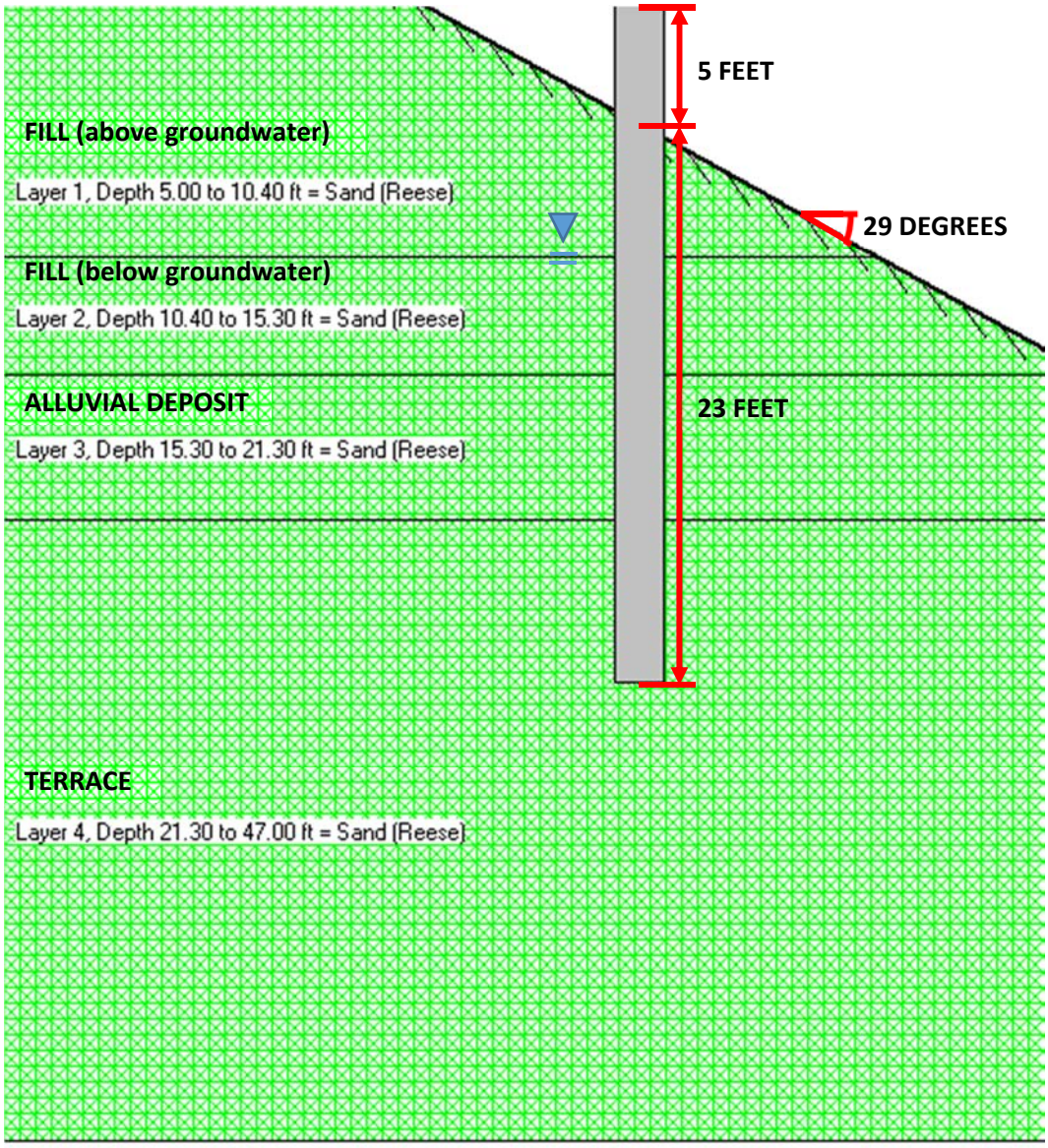
	Max Values	Load Case
Maximum Pile Lateral Deflection (in)	0.3	Case 1
Maximum Bending Moment (in-kip)	354	Case 1
Depth to Fixity (ft)	20	Case 1
Maximum Pile Shear (kips)	3.3	Case 1

PROJECT: Bridge No. 02932, Route 2A over Dickerman's (Halsey) Brook, Preston, CT	**Calculated By:** RTL
PROJECT NO.: 220693	**Checked By:** MGC
CLIENT: CME	**Date:** 3/19/2019
SUBJECT: LPILE Pile Analysis	**Page No.:** 4 of 4

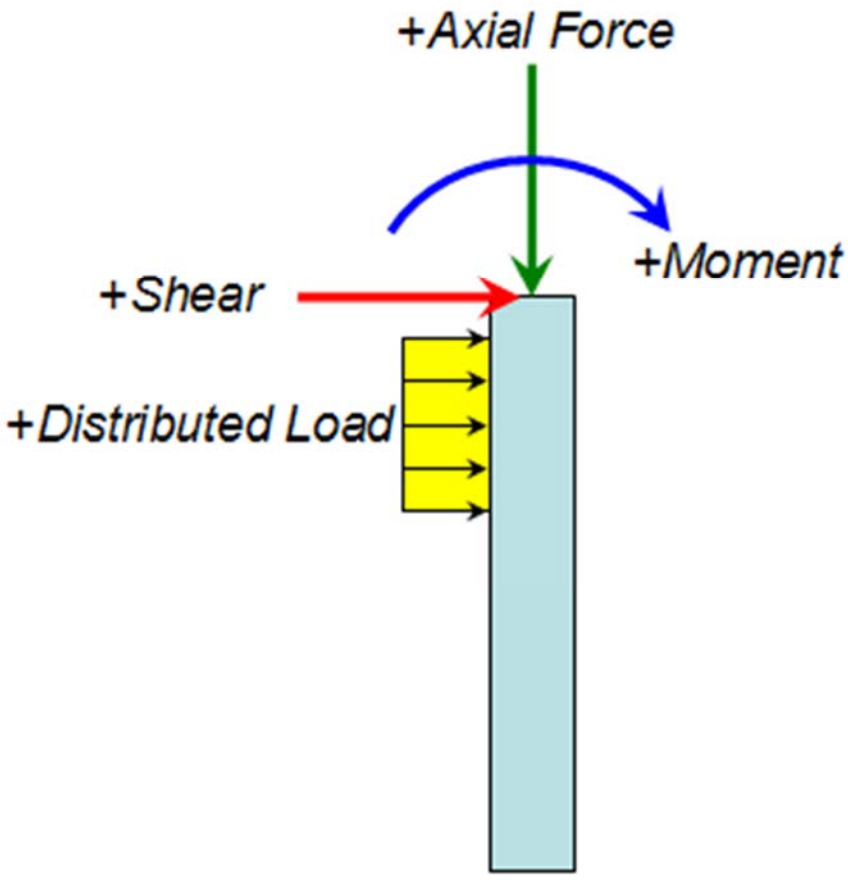
Attachments

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

ATTACHMENT 1 – ANALYZED PILE LAYOUT

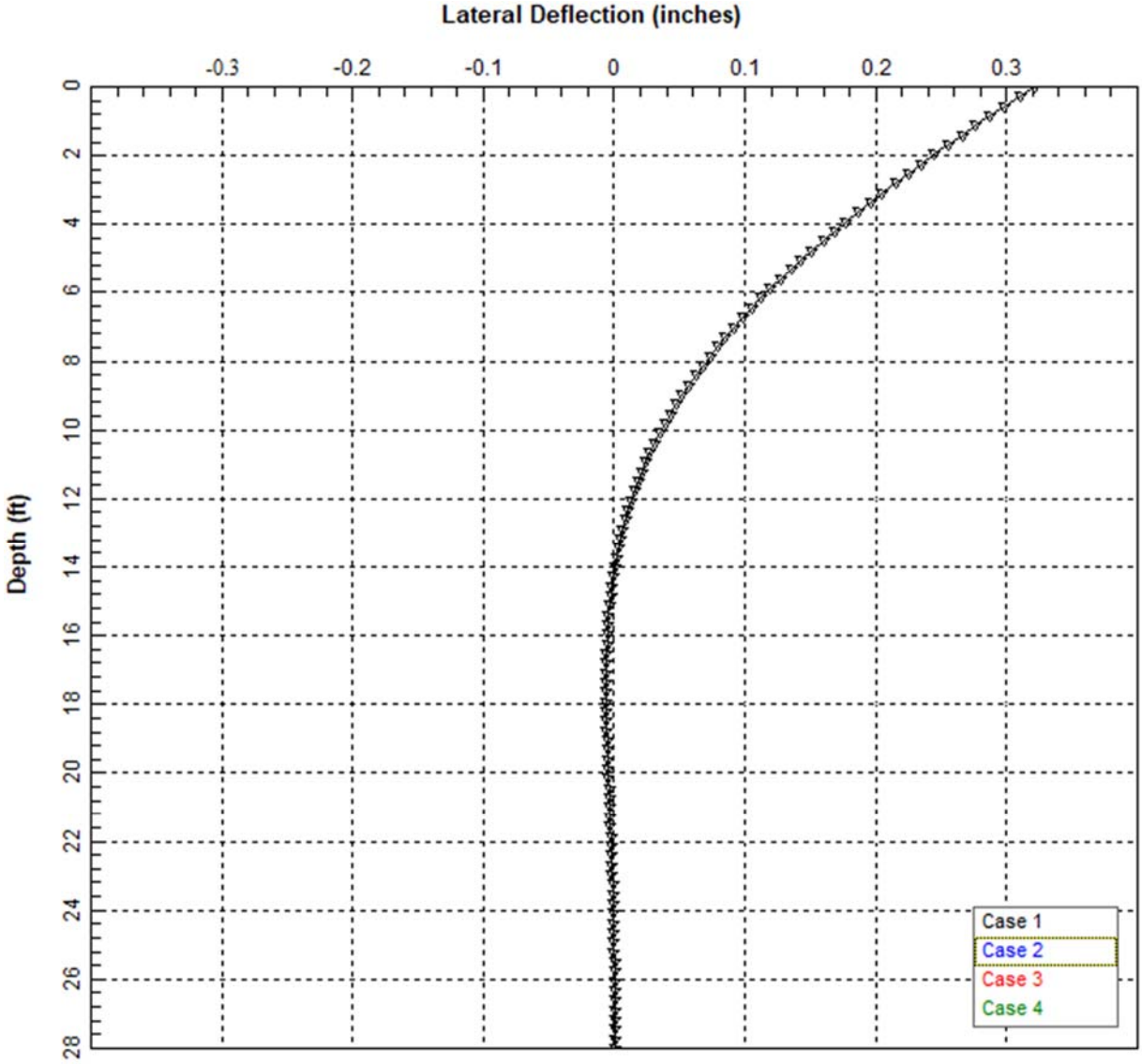


ATTACHMENT 2 – PILE LOADING ORIENTATION

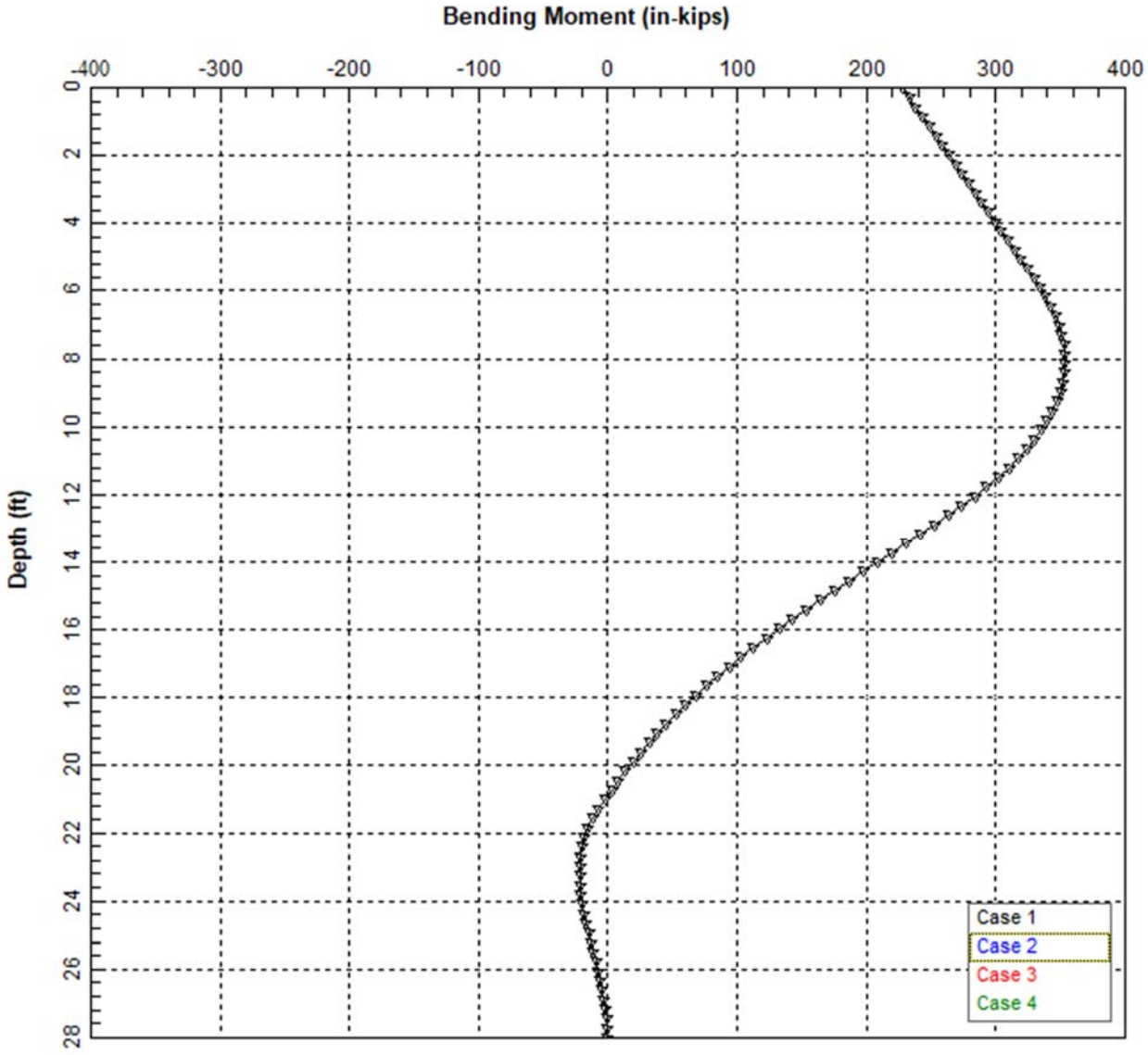


ATTACHMENT 3 – ANALYSIS

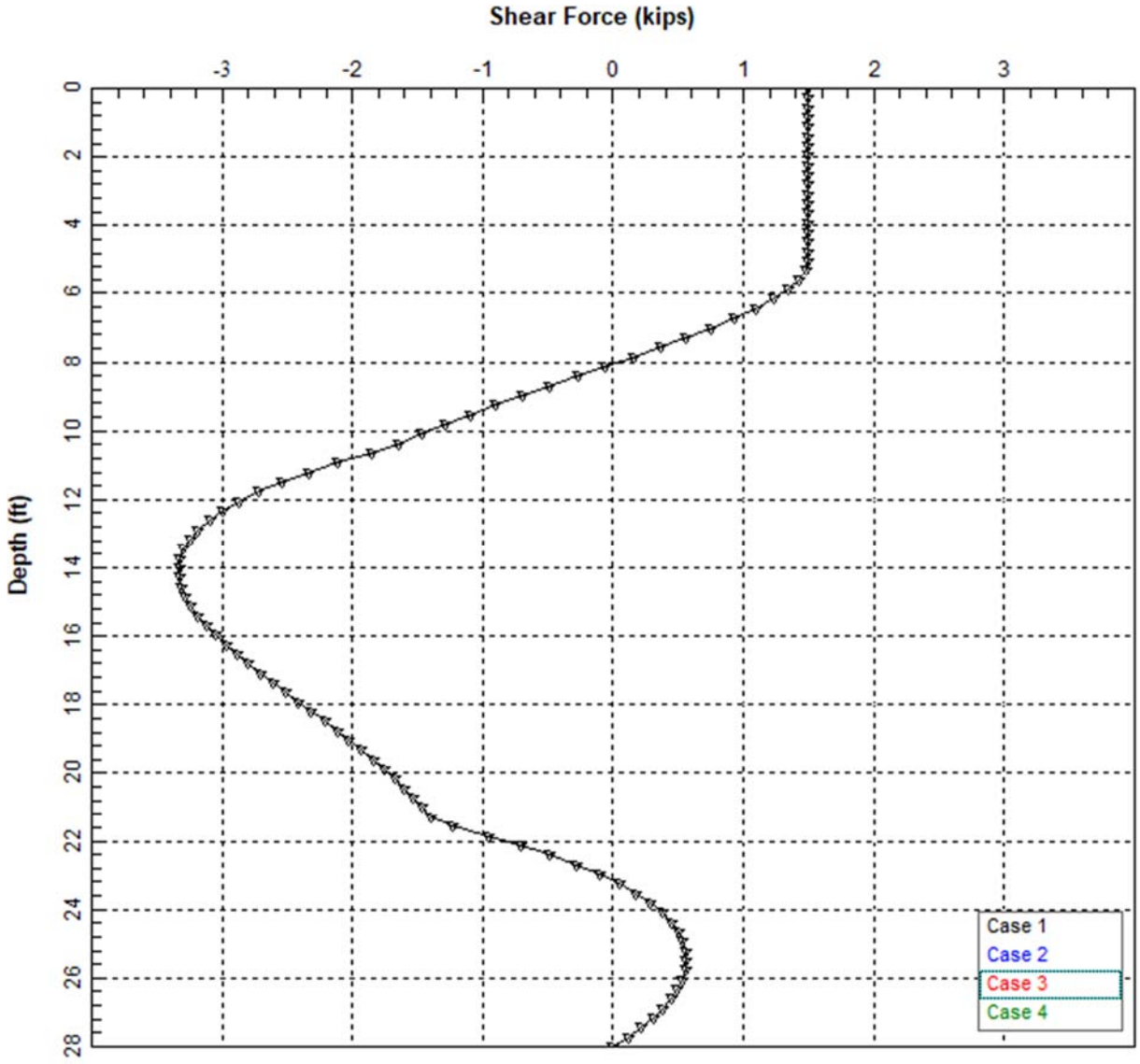
Lateral Pile Deflection vs. Depth of Pile



Bending Moment vs. Depth of Pile



Shear Force vs. Depth of Pile



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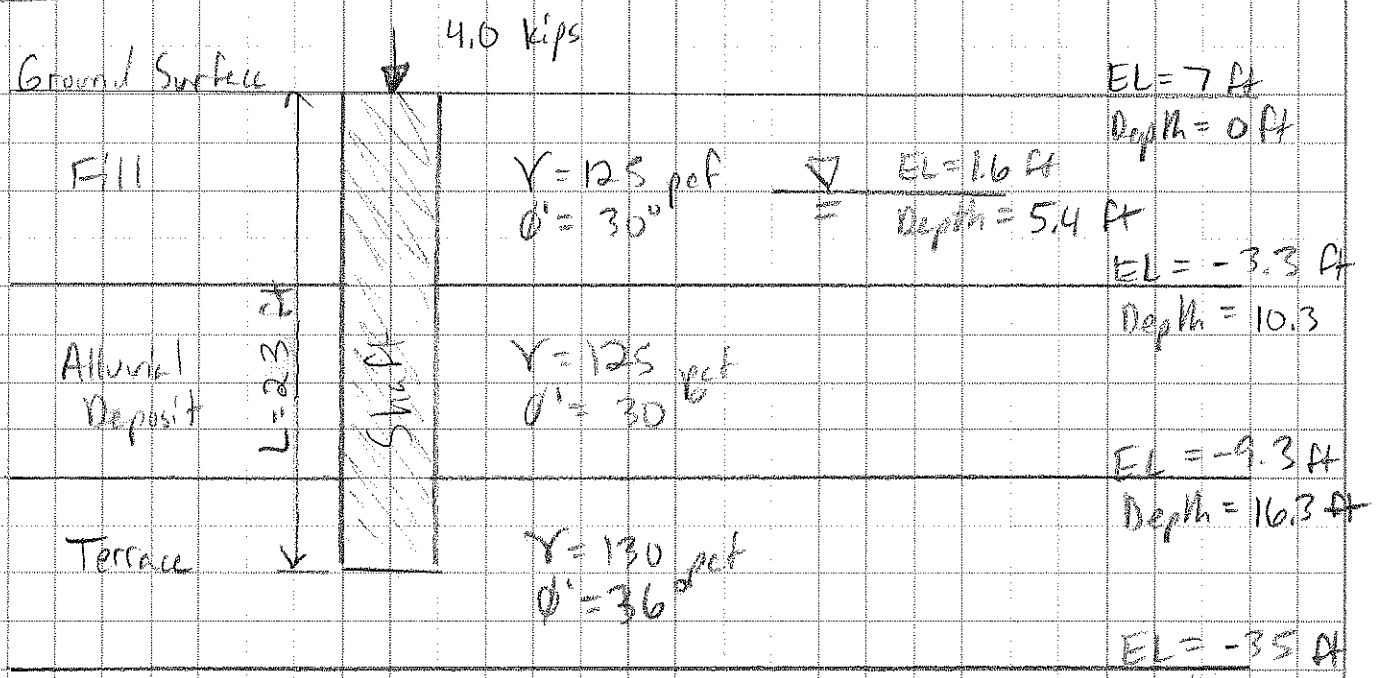
CALCULATIONS

Job Number 220693
Sheet 1 of 6
Date 3/18/19
Computed By RTL
Checked By AVG

Client CME
Project 220693 - Bridge 02432
Subject Drilled Shaft Bearing Capacity & Settlement

Given: Note: not to scale



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

Find: Bearing Capacity + Settlement

References:

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

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CALCULATIONS

Job Number 220693
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Client CME
Project 220693 - Bridge 02932
Subject Drilled Shaft Bearing Capacity & Settlement

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-1-1, B-1-4

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 Alluvial and Terrace deposits take load

EL (ft)	Depth (ft)	Effective Stress (psf)
7	0	0
1.6	5.4	$125(5.4-0) = 675$ psf
-3.3	10.3	$125(10.3-0) - 62.4(10.3-5.4) + 675 = 982$ psf
-9.3	16.3	$(125-62.4)(16.3-10.3) + 982 = 1357$ psf
-21	23	$(130-62.4)(23-16.3) + 1357 = 1810$ psf

Shaft Skin Stresses + Load
Depth 10.3' - 16.3'
Assume OCR = 1
$\beta = (1-\sin\phi)(OCR^{\sin\phi})\tan\phi$ Eqn 10.8.3.5.2B-2 ①

$\beta = (1-\sin(30))(1^{\sin(30)})\tan(30) = 0.289$

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CALCULATIONS

Job Number 220693
Sheet 3 of 6
Date 3/18/19
Computed By KTL
Checked By AVG

Client CME
Project 220693 - Bridge 02432
Subject Drilled Shaft Bearing Capacity & Settlement

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

q_s @ 10.3' = 0.289 (982) = 283 psf
q_s @ 16.3' = 0.289 (1357) = 392 psf

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

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

$R_s = \left(\frac{283 + 392}{2}\right)(6.28)(16.3 - 10.3) = 12,717$ lbs

≈ 12.7 kips

Depth 16.3' – 23'
Assume OCR = 2

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

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

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

q_s @ 16.3' = 0.450 (1357) = 611 psf
q_s @ 28' = 0.450 (1810) = 815 psf

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

$R_s = \left(\frac{611 + 815}{2}\right)(6.28)(23 - 16.3) = 30,000$ lbs

≈ 30 kips

Nominal Bearing Resistance @ 28' in Terrace Deposit

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

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CALCULATIONS

Job Number 220693
Sheet 4 of 6
Date 3/18/16
Computed By RTC
Checked By AVG

Client CME
Project 220693 - Bridge 02932
Subject Drilled Shaft Bearing Capacity & Settlement

N_{60}, Avg of Terrace ≥ 50; use 50

$q_p = 1.2(50) = 60$ 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

Elastic Compression of Shaft

$\delta = I_k Q_{TD} L / AE$ Eqn 11.31 (2)

$I_k = 0.67$
$Q_{TD} = 4$ kips
$L = 23$ ft

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

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

$\delta_s = (0.67)(4)(23)/(2184513) = 2.82 \times 10^{-5}$ ft
$= 3.39 \times 10^{-4}$ in

Following trial + error method (Page 290 (2))

A. Total deflection @ shaft head, $w_t = 0.00414$ in

B. Avg. deflection on sides, $w_s = w_t - \delta_s/2$
$= 0.00414 - 3.39 \times 10^{-4}/2$
$= 0.00397$ in

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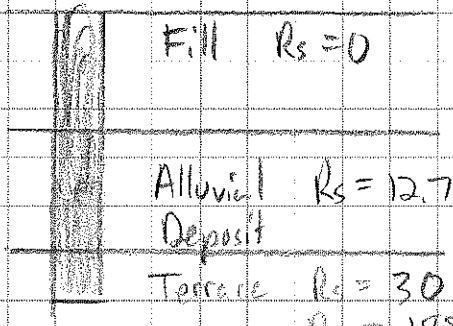
CALCULATIONS

Job Number 220693
Sheet 5 of 6
Date 3/18/19
Computed By RTL
Checked By AVG

Client CME
Project 220693 - Bridge 02932
Subject Drilled Shaft Bearing Capacity & Settlement

C.



$\Sigma(R_s) = 0 + 12.7 + 30 = 42.7$ kips

$R_p = 188$ kips

$R_T = \Sigma(R_s) + R_p = 42.7 + 188 = 231$ kips

Ultimate Capacity > Applied Load
231 kips > 4 kips

D. $W_B/B = \frac{0.00397}{24} \times 100\% = 0.017\%$

Using trendline for terrace and alluvial deposits

* 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 / Ultimate Load	Side Load
Alluvial Deposit	0.074	0.074(12.7) = 1.0
Terrace	0.074	0.074(30) = 2.2

E. Average deflection @ base, $W_B = W_T - \delta_s$
$= 0.00414 - 3.39 * 10^{-4}$
$= 3.8 \times 10^{-3}$

F. $W_B/B = \frac{3.8 \times 10^{-3}}{24} \times 100\% = 0.016\%$

Results

	Tip Load / Ultimate Load	Tip Load
Terrace	0.0044	0.0044(188) = 0.8

Geocomp

CALCULATIONS

Job Number 220693
Sheet 6 of 6
Client CME
Date 3/18/19
Project 220693 - Bridge D2932
Computed By RTL
Subject Drilled Shaft Bearing Capacity & Settlement
Checked By AVG

Σ(Load Transfers) = 1.0 + 2.2 + 0.8 ≈ 4.0 kips

4.0 kips calculated ≈ 4.0 kips applied ✓

SETTLEMENT = 0.004 in. < 0.1 in

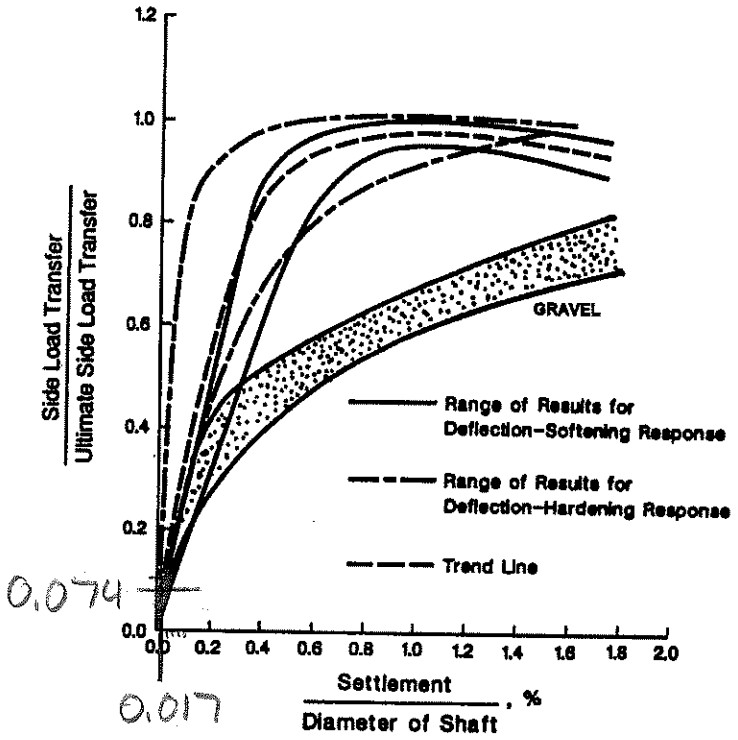


Figure 11.10. Normalized side load transfer for drilled shaft in cohesionless soil

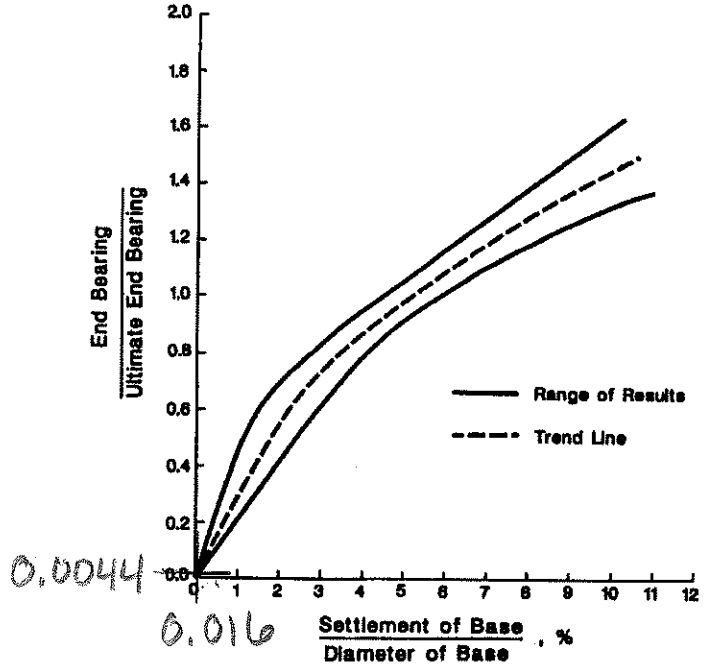


Figure 11.11. Normalized base load transfer for drilled shaft in cohesionless soil.

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 02932	Subject:	Drilled Shaft HP Pile Capacity		
Job Number:	220693	Originator:	RTL	Checker:	MC

Input Data:

Member Size:

Select: HP12x74

Member Loadings:

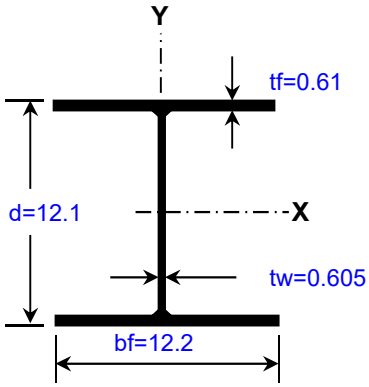
P =	4.00	kips
Mx =	30.00	ft-kips
My =	0.00	ft-kips

Design Parameters:

Fy =	50.00	ksi
Kx =	2.10	
Ky =	2.10	
Lx =	21.000	ft.
Ly =	21.000	ft.
Lb =	21.000	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 =	103.56	
Ky*Ly/ry =	181.23	
Cc =	107.00	
fa =	0.18	ksi
Fa =	4.55	ksi
Pa =	99.11	kips

For X-axis Bending:

Lc =	10.93	ft.
Lu =	20.45	ft.
Lb/rt =	77.30	
fbx =	3.84	ksi
Fbx =	29.21	ksi
Mrx =	228.36	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 = 13.92 ksi

Y-axis Euler Stress:

F'ey = 4.55 ksi

Stress Ratio:

S.R. = **0.172** Eqn. H1-3

Comments:

Stress Ratio =	0.172	< 1.0 therefore OK	
Allowable B.M.=	228.36	ft-kips	
Aweb=	7.32	in.^2	
Allowable Shear=	146.41	kips	Spec Eq. G2-1 Vn=0.4FyAwCv (Cv=1.0)