

TOWN OF WILTON

ADDENDUM NO. 1

RFP #2022-11

ISSUE DATE: December 14, 2022



**Request for Proposal to Replace
Arrowhead Road Bridge - Bridge #05501**

This addendum is being issued to address plan revisions related to structural details. It also includes approved Flood Management Certification, State Wage Rates and the Final Design Geotechnical Engineering Report for the project providing design recommendations for the temporary bridge foundations.

Addendum No. 1 is being issued to all potential bidders to provide the items and attachments set forth herein which shall act to qualify, clarify or otherwise modify the Documents previously issued regarding the above referenced project. These items, whether of omission, addition, substitution, or clarification, shall be incorporated into the proposals submitted by all proposers, and receipt of this document and its attachments must be acknowledged in the space provided on the Proposer's Schedule of Prices Form. Failure to do so may subject the Proposer to disqualification.

Frank Smeriglio, PE

Director of Public Works, Town Engineer

Town of Wilton

DECEMBER 14, 2022
REPLACEMENT OF BRIDGE NO. 05501
ARROWHED ROAD OVER NORWALK RIVER
STATE PROJECT NO. 0161-0143
TOWN PROJECT NO. RFP 2022-11
TOWN OF WILTON

ADDENDUM NO. 1

This addendum addresses plan revisions related to structural details. It also includes approved Flood Management Certification, State Wage Rates and the Final Design Geotechnical Engineering Report for the project providing design recommendations for the temporary bridge foundations.

PERMITS

- FLOOD MANAGEMENT CERTIFICATION (Approved December 8, 2022)

REPORTS

- FINAL DESIGN GEOTECHNICAL ENGINEERING REPORT

WAGE RATES

- STATE OF CONNECTICUT WAGE RATES

SPECIAL PROVISIONS

NEW SPECIAL PROVISIONS

The following Special Provisions are hereby added to the contract.

- ITEM #0406194A – JOINT AND CRACK SEALING OF BITUMINOUS CONCRETE PAVEMENT

CONTRACT ITEMS

NEW CONTRACT ITEMS

The following Contract Items are hereby added to the contract.

ITEM NO.	DESCRIPTION	QUANTITY
0406194A	JOINT AND CRACK SEALING OF BITUMINOUS CONCRETE PAVEMENT	108 LF

PLANS

REVISED PLANS

The following Plan Sheets are hereby deleted and replaced with the like-numbered Plan Sheets:

- DRAWING NO. REV-01 (SHEET NO. 02.01.A1)
- DRAWING NO. S-10 (SHEET NO. 05.10.A1)
- DRAWING NO. S-11 (SHEET NO. 05.11.A1)
- DRAWING NO. S-12 (SHEET NO. 05.12.A1)
- DRAWING NO. S-13 (SHEET NO. 05.13.A1)
- DRAWING NO. S-14 (SHEET NO. 05.14.A1)

There is no change to the Bid Opening Date and Time.

The Schedule of Prices has been revised to reflect these changes.

The Detailed Estimate Sheets do not reflect these changes.

There will be no change in the number of calendar days due to this Addendum.

The foregoing is hereby made a part of the contract.

REV. No.	SHEET No.	DATE mm/dd/yy	NEW	REV.	DEL.	DESCRIPTION	BY	REV. No.	SHEET No.	DATE mm/dd/yy	NEW	REV.	DEL.	DESCRIPTION	BY	REV. No.	SHEET No.	DATE mm/dd/yy	NEW	REV.	DEL.	DESCRIPTION	BY
1	05.10.A1	12/09/22		✓		REVISE TABLES																	
1	05.11.A1	12/09/22		✓		ADD STRANDS																	
1	05.12.A1	12/09/22		✓		REVISE STRANDS																	
1	05.13.A1	12/09/22		✓		ADD STRANDS																	
1	05.14.A1	12/09/22		✓		ADD STEP FOR CRACK SEAL																	

DESIGNED BY: D.J.L.

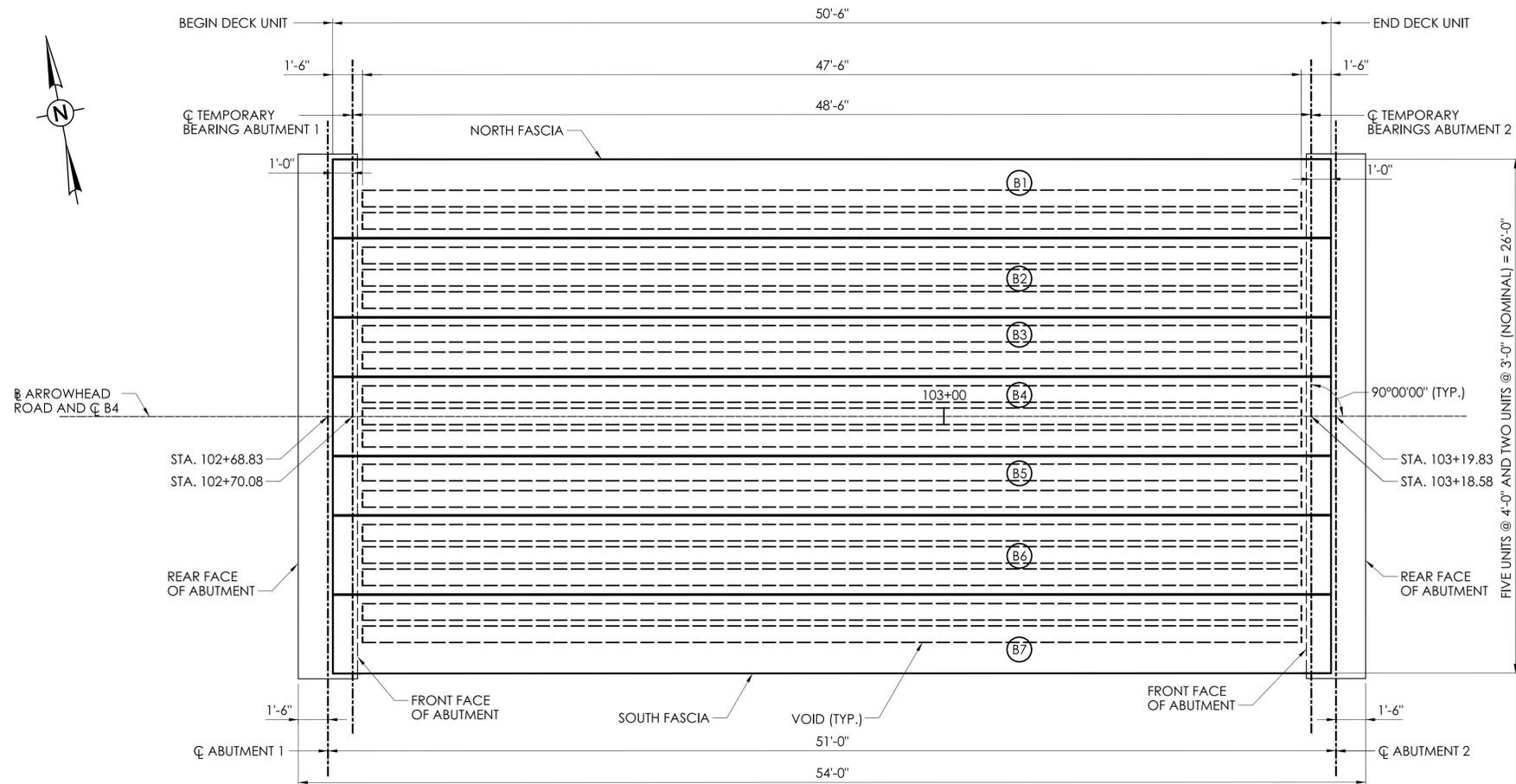
MOTT MACDONALD M M

175 Capital Blvd
4th Floor
Rocky Hill, CT 06067



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ADDENDUM NO. 1



PRESTRESSED DECK UNIT NOTES:

- PRESTRESSED DECK UNITS SHALL CONFORM TO THE FOLLOWING REQUIREMENTS:
F'ci = 8 KSI
F'c = 10 KSI
- PRESTRESSED STRANDS SHALL CONFORM TO THE FOLLOWING REQUIREMENTS. 0.6" 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) = 44,000 LBS. PER STRAND
- PRESTRESSED STRANDS SHALL BE PLACED 2" MINIMUM ON CENTER AND SHALL HAVE A MINIMUM COVER OF 2".
- ENDS OF THE DECK UNITS SHALL BE VERTICAL AFTER APPLICATION OF FULL DEAD LOAD.
- THE DRILLING OF HOLES IN PRESTRESSED DECK UNITS, OR THE USE OF POWDER ACTUATED TOOLS ON PRESTRESSED DECK UNITS WILL NOT BE PERMITTED.
- NO ADDITIONAL DEAD LOADS OR LIVE LOADS SHALL BE APPLIED TO THE PRESTRESSED DECK UNITS UNTIL UHPC KEYWAYS ARE FULLY FILLED AND UHPC IN THE LONGITUDINAL SHEAR KEYS HAVE REACHED A SEVEN-DAY COMPRESSIVE STRENGTH OF 14 KSI.
- THE DECK UNITS SHALL BE PLACED AT THE NOMINAL SPACING SHOWN ON THE PLANS WITH A 1/2" WIDE GAP BETWEEN THE BOTTOM OF THE UNITS. THE WIDTH OF THIS GAP CAN VARY DUE TO SWEEP OF THE BEAMS.
- MILD REINFORCING STEEL SHALL BE GALVANIZED ASTM A615 GRADE 60.
- SHEAR KEY SHALL BE OMITTED ON OUTSIDE FACE OF FASCIA BEAMS.
- THE CONTRACTOR SHALL MANUFACTURE AND CONSTRUCT DECK UNITS IN ACCORDANCE WITH SPECIAL PROVISIONS FOR "PRESTRESSED DECK UNITS".
- ALL INSERTS OR HOLES CAST INTO THE DECK UNITS FOR THE PURPOSE OF HANDLING AND SETTING THE UNITS SHALL BE SEALED WITH GROUT TO A SMOOTH FINISH UPON COMPLETION OF THE WORK.
- THE COST OF FURNISHING INSERTS SHALL BE INCLUDED IN THE ITEMS 0514223A AND 0514203A PRESTRESSED DECK UNITS.
- LIFTING HOOKS SHALL BE PLACED IN LINE WITH THE CENTER LINE OF THE TEMPORARY BEARINGS AND SHALL BE INSTALLED PER THE FABRICATOR'S STANDARD DETAILS. THE FABRICATOR IS FULLY RESPONSIBLE FOR THE DESIGN OF THE LIFTING DEVICES WHICH SHALL BE ADEQUATE FOR THE SAFETY FACTORS REQUIRED BY THE ERECTION PROCEDURE.

FINISHED GRADE ELEVATIONS (TOP OF PAVEMENT)

BEAM NO.	CL BEARING ABUTMENT 1	SPAN (L = 48'-6")									CL BEARING ABUTMENT 2
		0.1L	0.2L	0.3	0.4L	0.5L	0.6L	0.7L	0.8L	0.9L	
B1	141.92	142.00	142.06	142.11	142.15	142.18	142.20	142.20	142.19	142.17	142.13
B2	142.00	142.08	142.14	142.19	142.23	142.26	142.28	142.28	142.27	142.25	142.21
B3	142.07	142.15	142.21	142.26	142.30	142.33	142.35	142.35	142.34	142.32	142.28
B4	142.14	142.22	142.28	142.33	142.37	142.40	142.42	142.42	142.41	142.39	142.35
B5	142.07	142.15	142.21	142.26	142.30	142.33	142.35	142.35	142.34	142.32	142.28
B6	142.00	142.08	142.14	142.19	142.23	142.26	142.28	142.28	142.27	142.25	142.21
B7	141.92	142.00	142.06	142.11	142.15	142.18	142.20	142.20	142.19	142.17	142.13

CAMBER NOTES:

AT TRANSFER: CAMBER DUE TO PRESTRESS FORCE AT TRANSFER MINUS THE DEFLECTION DUE TO BEAM WEIGHT.
 AT ERECTION: CAMBER (DUE TO PRESTRESS FORCE AT TRANSFER MINUS DEFLECTION DUE TO BEAM WEIGHT) THAT IS PRESENT AT APPROXIMATELY 30-60 DAYS AFTER TRANSFER.
 FINAL: LONG-TERM CAMBER THAT IS PRESENT AFTER ALL DEAD LOADS ARE APPLIED TO THE STRUCTURE AND AFTER LONG TERM CREEP AND RELAXATION HAVE TAKEN PLACE.

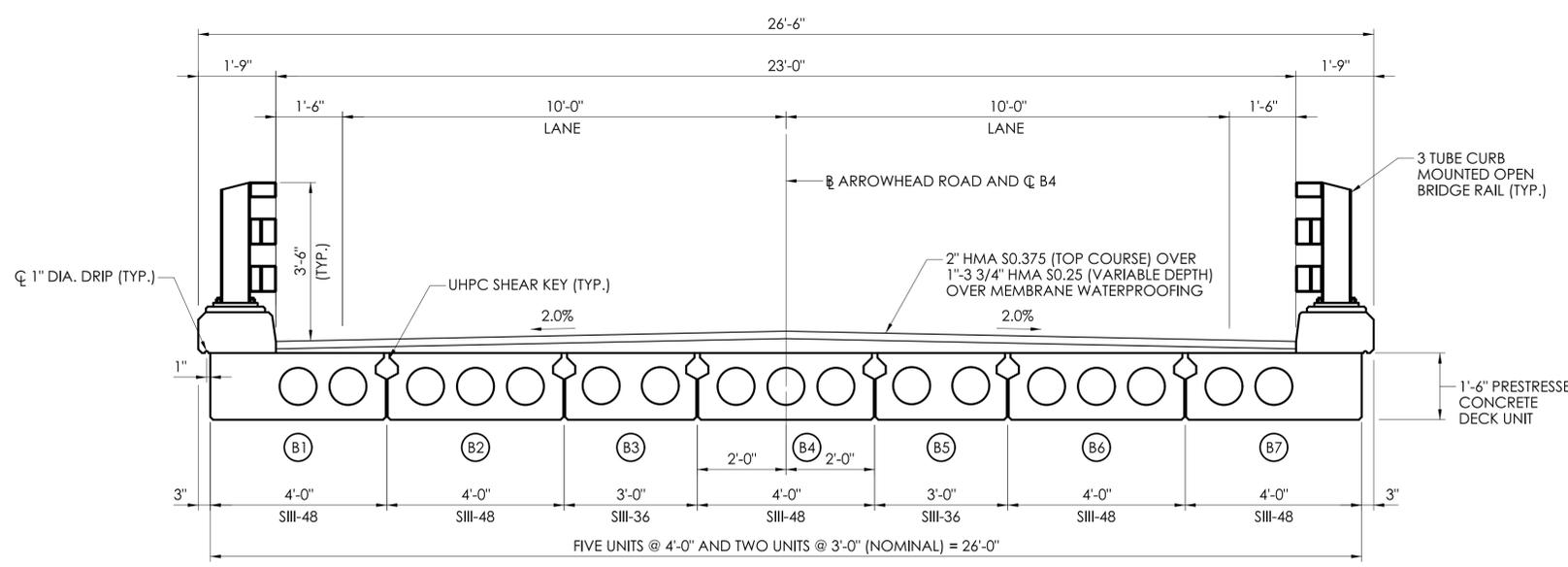
POSITIVE VALUES IN THE CAMBER TABLE INDICATE UPWARD CAMBER.

BEAM NO.	ESTIMATED CAMBER AT MIDSPAN (INCHES)		
	AT TRANSFER	AT ERECTION	FINAL
B1 & B7	1.18	1.68	1.45
B2, B4 & B6	1.20	1.73	1.56
B3 & B5	1.31	1.93	1.84

BEAM DEAD LOAD DEFLECTION TABLE NOTES:

"SELF" IS THE DEFLECTION DUE TO THE GIRDER SELF-WEIGHT AT 30 DAYS.
 "PDL" IS PRE-COMPOSITE DEAD LOAD DEFLECTION DUE TO THE WEIGHT OF THE CURB.
 "SDL" IS THE DEFLECTION DUE TO THE SUPERIMPOSED DEAD LOAD (RAILING LOADS AND ASPHALT OVERLAY)
 ALL DEFLECTIONS ARE IN INCHES AND ARE COMPUTED AT THE MIDSPAN OF THE GIRDER.
 POSITIVE DEFLECTION VALUES INDICATE DOWNWARD DEFLECTION.

BEAM NO.	DEAD LOAD DEFLECTIONS AT MIDSPAN (INCHES)		
	SELF	PDL	SDL
B1 & B7	1.67	0.81	0.41
B2, B4 & B6	1.51	0.78	0.40
B3 & B5	1.56	0.77	0.40



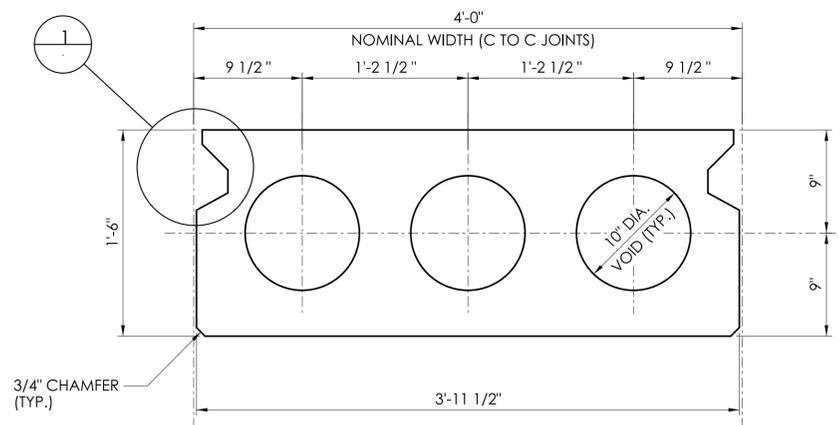
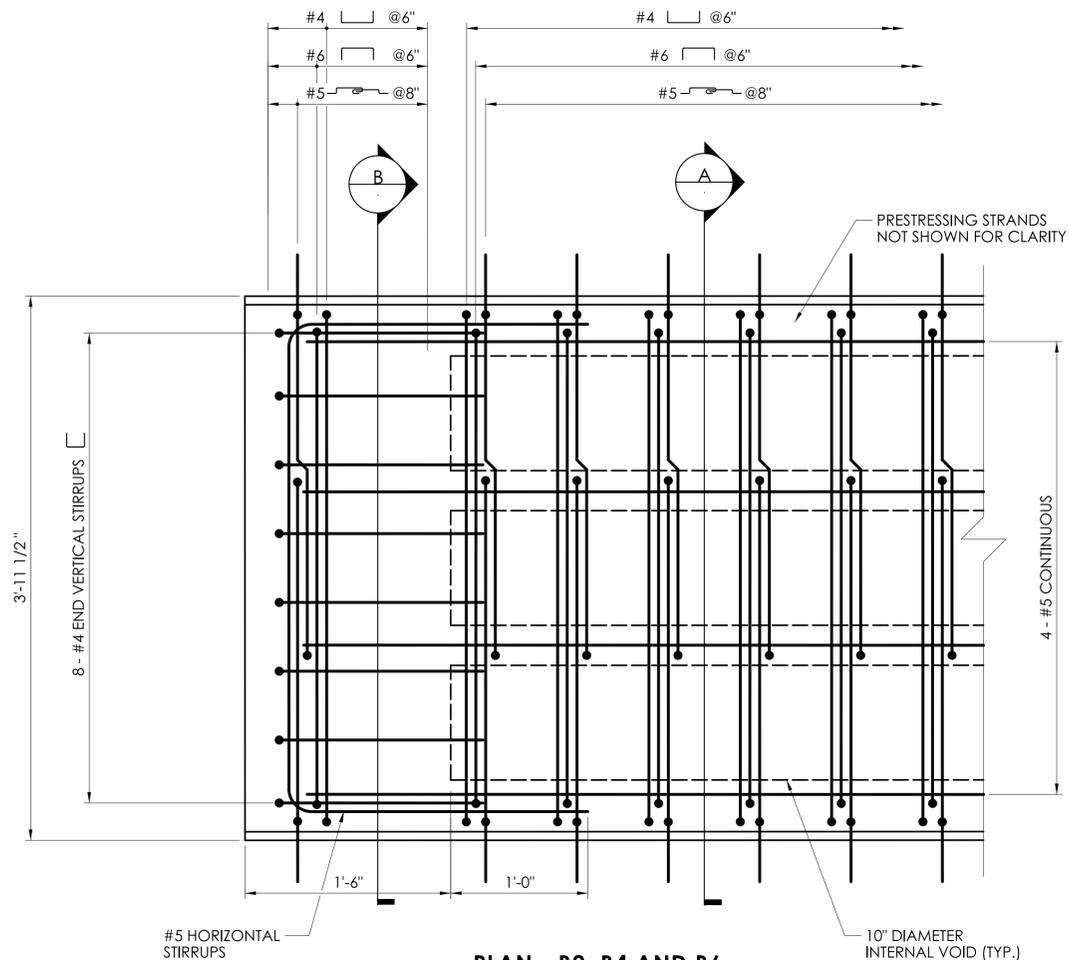
STRAND TABLE				
BEAM	NO. STRANDS	CENTER OF GRAVITY OF STRANDS		
		DEBONDED	BONDED	
B1 & B7	SIII-48	24	3.889	3.417
B2, B4 AND B6	SIII-48	24	4.100	3.750
B3 AND B5	SIII-36	20	4.111	3.900

* THE CENTER OF GRAVITY OF STRANDS IS MEASURED FROM THE BOTTOM OF THE BEAM AND IS BASED ON THE GROSS NON-COMPOSITE SECTION

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REV.	DATE	REVISION DESCRIPTION
1	12/9/22	REVISE TABLES

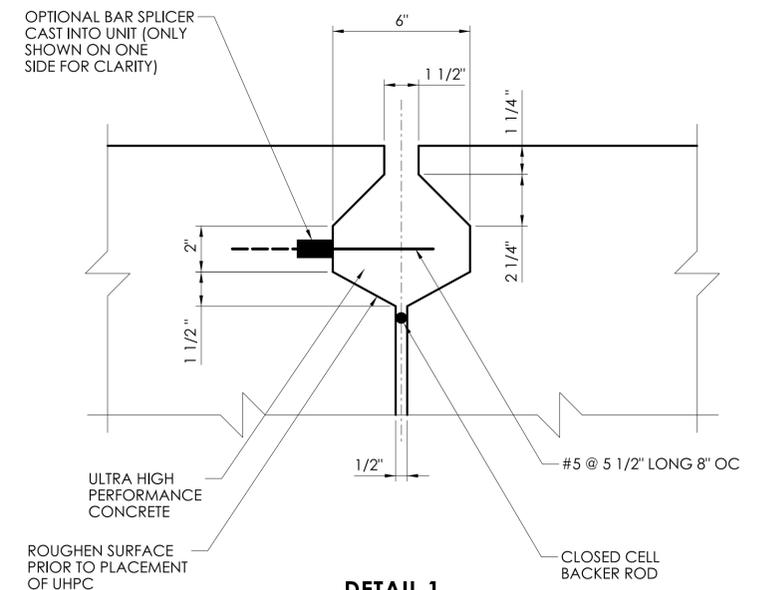
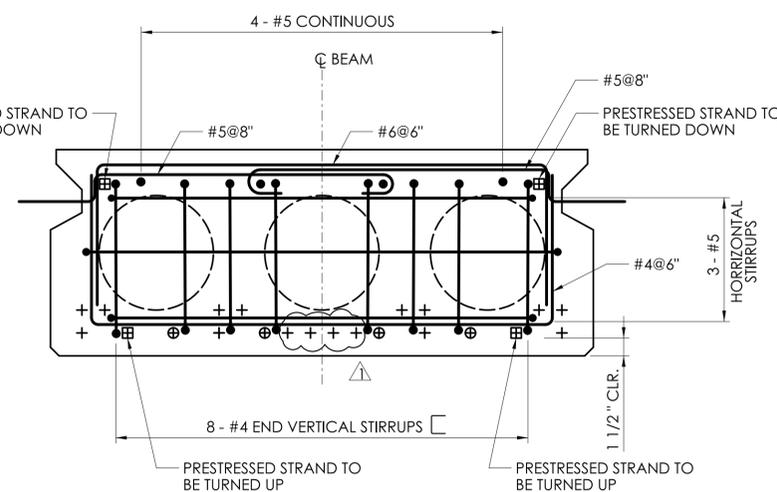
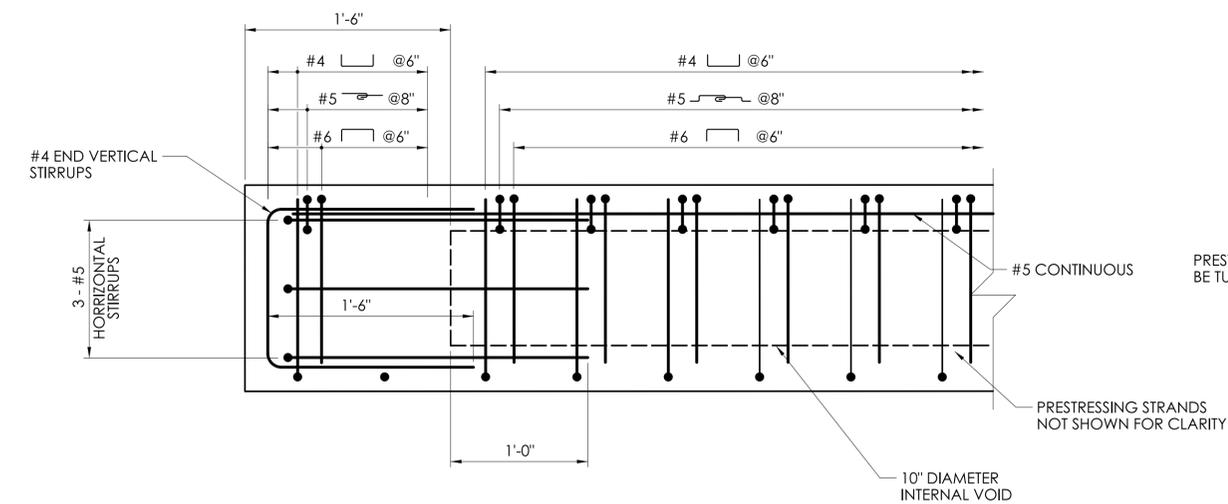
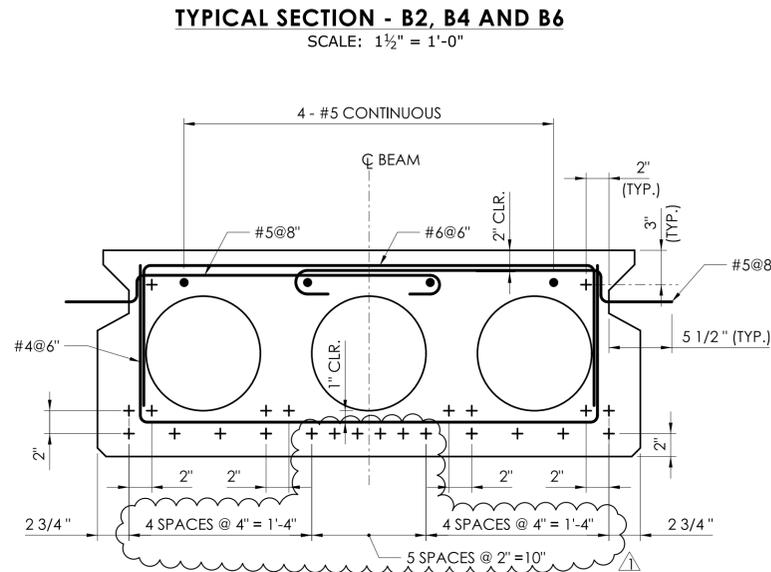


UHPC SHEAR KEY NOTES:

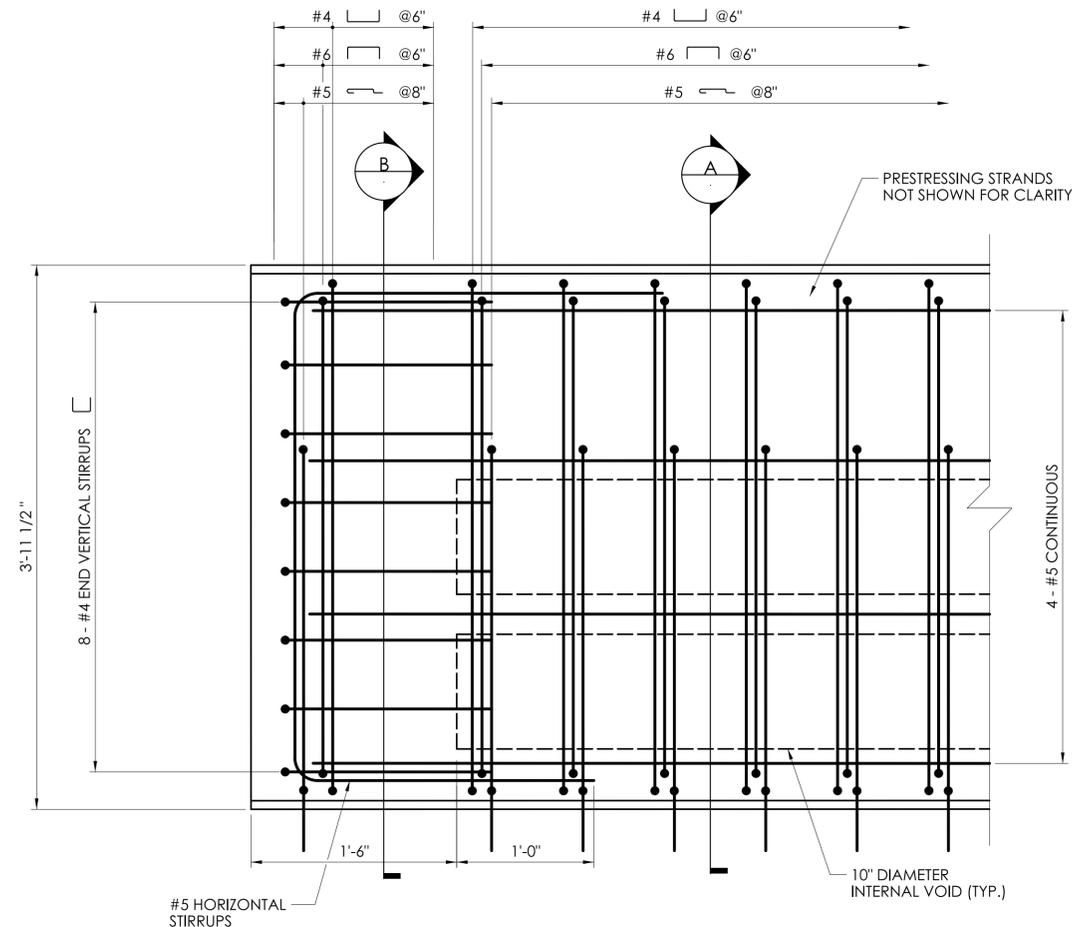
1. SHEAR KEYS TO BE FILLED WITH UHPC SHALL BE ROUGHENED AND CLEANED PRIOR TO BEAM PLACEMENT. TO BE PAID FOR UNDER ITEM 0601054A ULTRA HIGH PERFORMANCE CONCRETE. SEE SPECIAL PROVISIONS.
2. SECURE SPLICE BARS TO BEAM AFTER ROUGHENING CONCRETE BUT PRIOR TO BEAM PLACEMENT IF OPTIONAL BAR SPLICER IS USED.
3. WET KEYWAY SURFACES IMMEDIATELY PRIOR TO UHPC PLACEMENT.
4. AFTER FINAL BEAM PLACEMENT, SHEAR KEYS SHALL BE FILLED WITH ULTRA HIGH PERFORMANCE CONCRETE (UHPC) IN ONE CONTINUOUS POUR PER KEY. UHPC SHALL BE FORCED INTO THE KEYWAY AT THE BLOCKOUT LOCATIONS UTILIZING RESERVOIRS OF UHPC ABOVE EACH BLOCKOUT TO FILL AND SELF CONSOLIDATE THE MATERIAL INSIDE THE KEYWAY VIA HYDROSTATIC PRESSURE.
5. FORMWORK OVER KEYWAY AND AT BEAM ENDS SHALL BE WATER TIGHT TO CONTAIN THE UHPC. DESIGN FORMWORK TO SUPPORT A MINIMUM LINE LOAD OF AT LEAST 31 LB/FT TO RESIST THE HYDROSTATIC LOAD OF THE UHPC.
6. GRIND ANY UHPC OVERFLOW FLUSH AFTER CURING.

LEGEND:

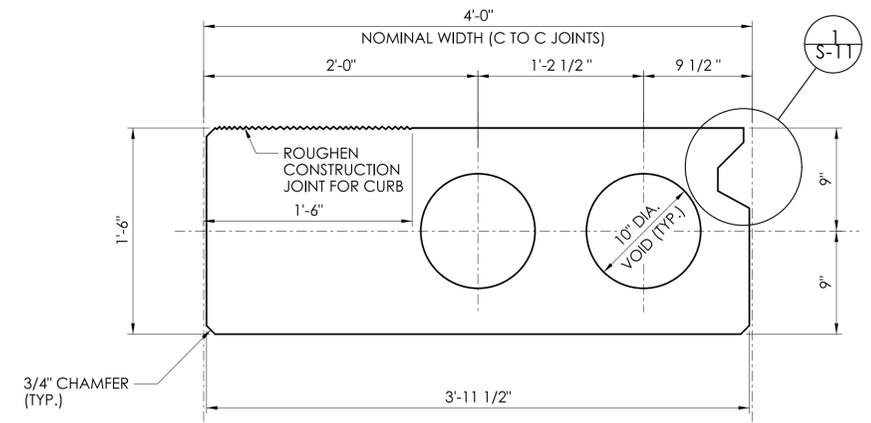
- + DENOTES STRAIGHT BONDED STRAND
- ⊕ DENOTES STRAIGHT DEBONDED STRAND
DEBONDED STRANDS ARE DEBONDED FOR 3'-0" FROM EACH END OF THE PRESTRESSED UNITS.
- ⊞ DENOTES STRAIGHT STRANDS EXTENDED TO THE CLOSURE POUR AND TURNED UP/DOWN



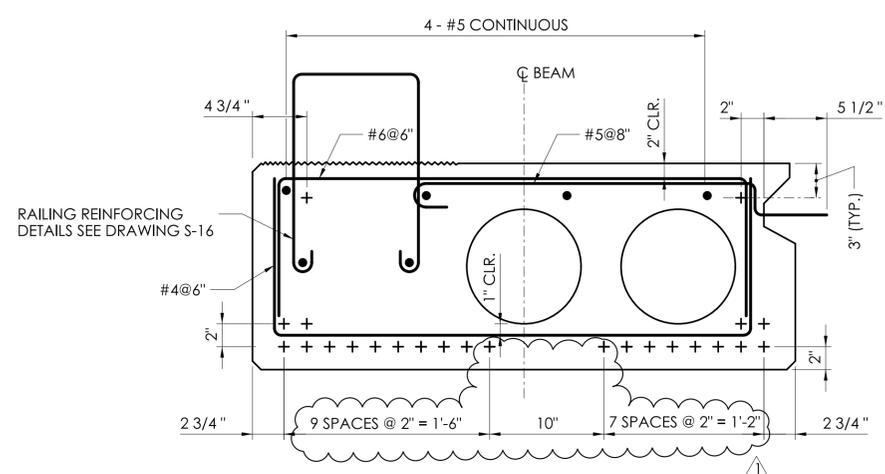
REV.	DATE	ADD STRANDS	REVISION DESCRIPTION
1	12/9/22		



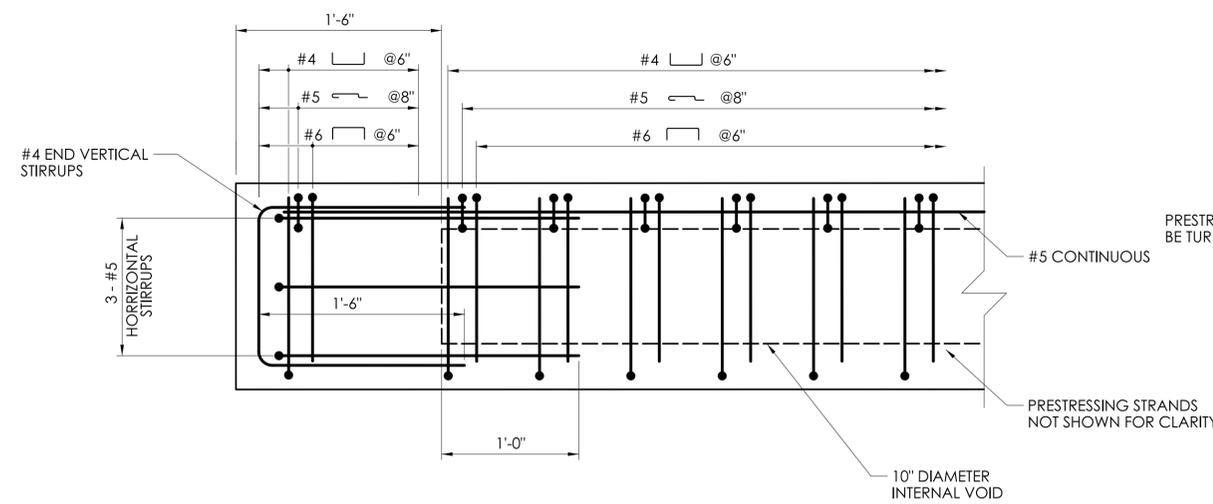
PLAN - B1 AND B7
(B1 SHOWN, B7 OPPOSITE)
SCALE: 1 1/2" = 1'-0"



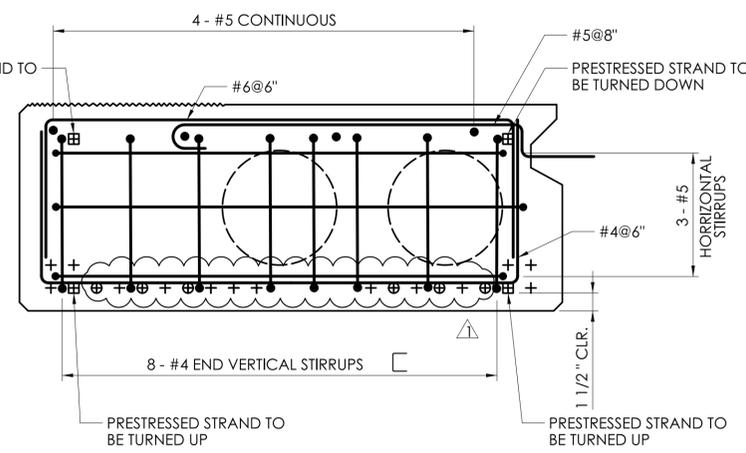
TYPICAL SECTION - B1 AND B7
(B1 SHOWN, B7 OPPOSITE)
SCALE: 1 1/2" = 1'-0"



SECTION A
TYPICAL REINFORCEMENT SECTION AT VOIDS
(B1 SHOWN, B7 OPPOSITE)
SCALE: 1 1/2" = 1'-0"



ELEVATION - B1 AND B7
SCALE: 1 1/2" = 1'-0"



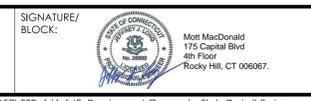
SECTION B
TYPICAL REINFORCEMENT SECTION AT ENDS
(B1 SHOWN, B7 OPPOSITE)
SCALE: 1 1/2" = 1'-0"

- LEGEND:**
- + DENOTES STRAIGHT BONDED STRAND
 - ⊕ DENOTES STRAIGHT DEBONDED STRAND
DEBONDED STRANDS ARE DEBONDED FOR 4'-0"
FROM EACH END OF THE PRESTRESSED UNITS.
 - ⊞ DENOTES STRAIGHT STRANDS EXTENDED TO THE
CLOSURE POUR AND TURNED UP/DOWN

REV.	DATE	REVISION DESCRIPTION
1	12/9/22	REVISE STRANDS

DESIGNER/DRAFTER: C.B. CHECKED BY: D.J.L.

SIGNATURE/BLOCK: Mott MacDonald
175 Capital Blvd
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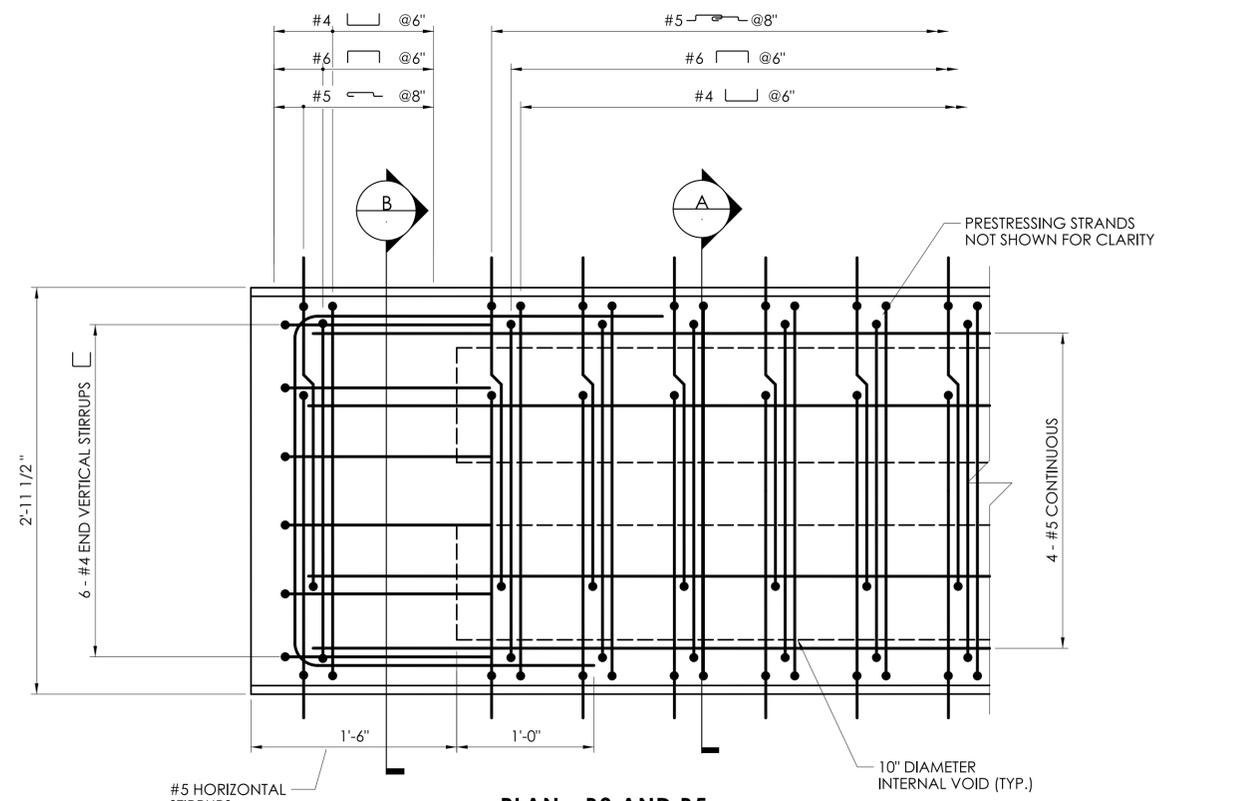
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MOTT MACDONALD
175 CAPITAL BLVD
4TH FLOOR
ROCKY HILL, CT 06067



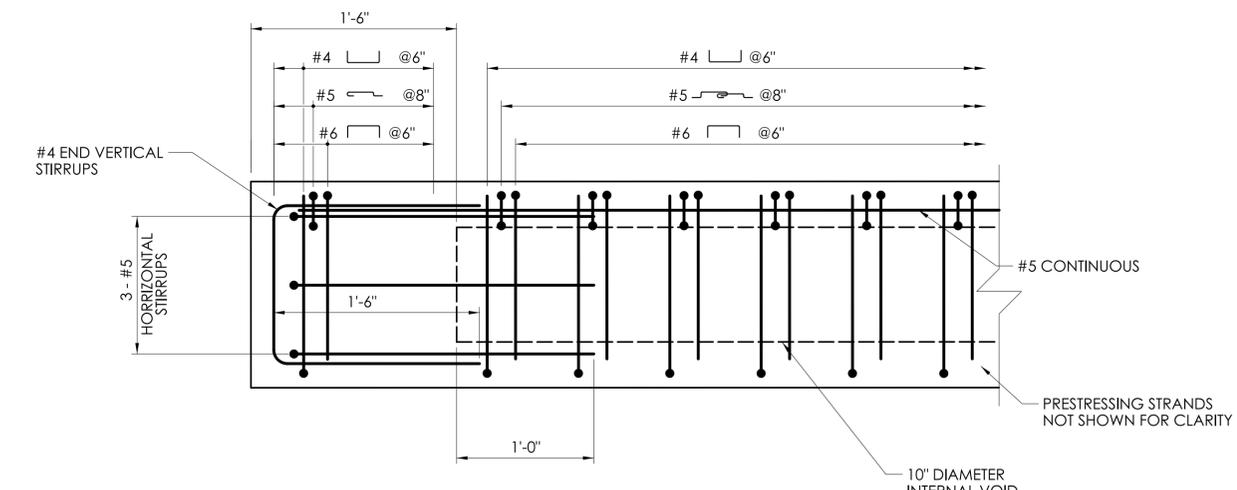
PROJECT NUMBER: 0161-0143
PROJECT DESCRIPTION: REPLACEMENT OF BRIDGE NO. 05501 ARROWHEAD ROAD OVER NORWALK RIVER
TOWN(S): WILTON
DRAWING TITLE: PRESTRESSED CONCRETE DETAILS - 2

DRAWING NO. S-12
SHEET NO. 05.12.A1

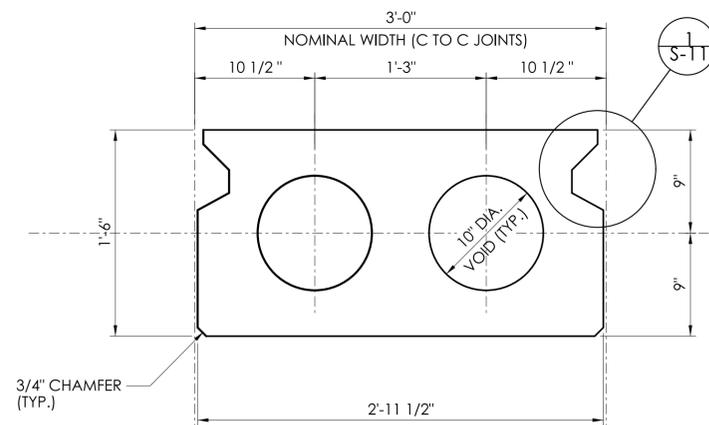
ADDENDUM NO. 1



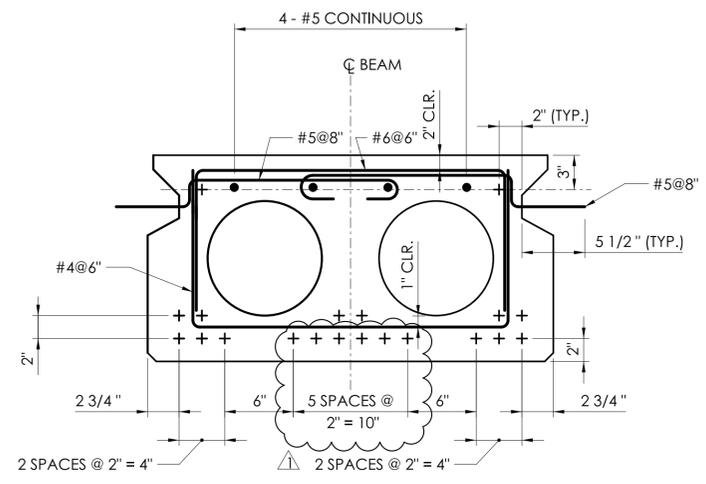
PLAN - B3 AND B5
SCALE: 1 1/2" = 1'-0"



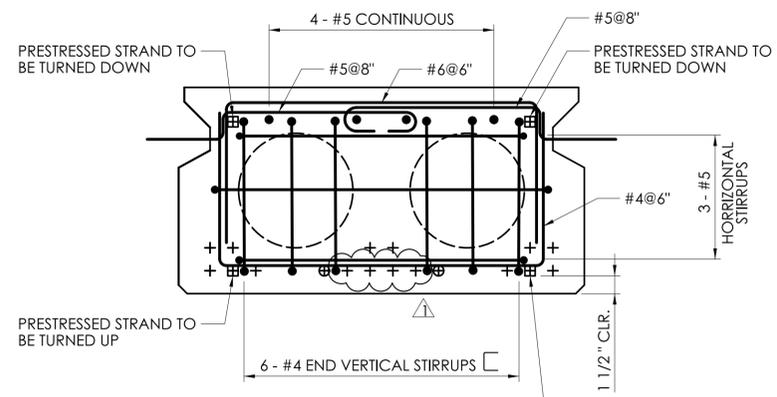
ELEVATION - B3 AND B5
SCALE: 1 1/2" = 1'-0"



TYPICAL SECTION - B3 AND B5
SCALE: 1 1/2" = 1'-0"



SECTION A
TYPICAL REINFORCEMENT SECTION AT VOIDS
SCALE: 1 1/2" = 1'-0"



SECTION B
TYPICAL REINFORCEMENT SECTION AT ENDS
SCALE: 1 1/2" = 1'-0"

- LEGEND:**
- + DENOTES STRAIGHT BONDED STRAND
 - ⊕ DENOTES STRAIGHT DEBONDED STRAND
DEBONDED STRANDS ARE DEBONDED FOR 3'-0" FROM EACH END OF THE PRESTRESSED UNITS.
 - ⊞ DENOTES STRAIGHT STRANDS EXTENDED TO THE CLOSURE POUR AND TURNED UP/DOWN

REV.	DATE	ADD STRANDS	REVISION DESCRIPTION
1	12/9/22		

DESIGNER/DRAFTER: C.B. CHECKED BY: D.J.L.
SCALE AS NOTED

SIGNATURE/BLOCK: Mott MacDonald
175 Capital Blvd
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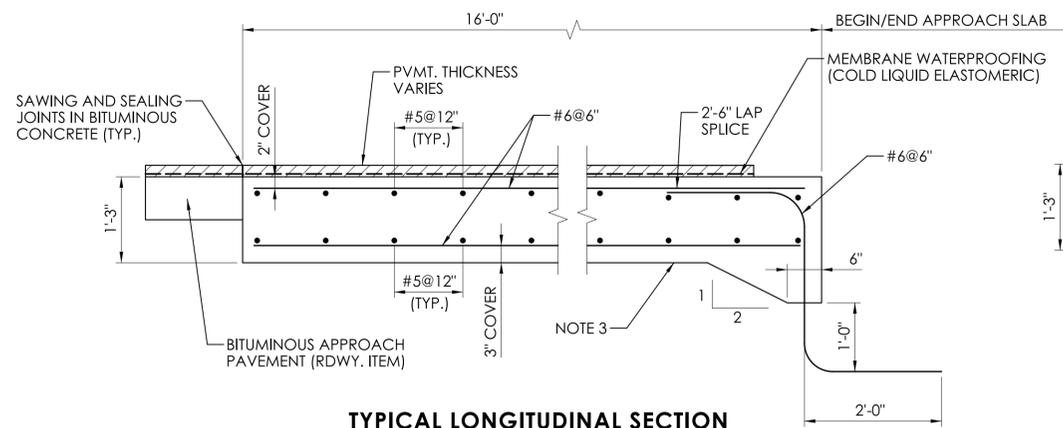
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TOWN OF WILTON

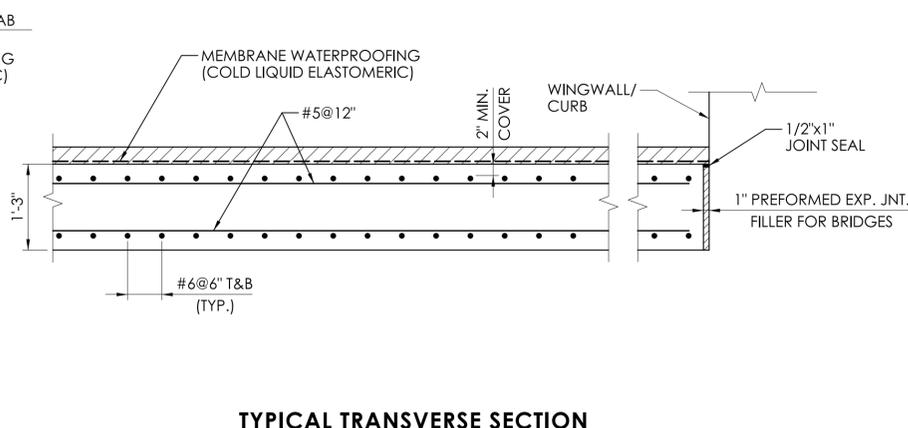
PROJECT NUMBER: 0161-0143
PROJECT DESCRIPTION: REPLACEMENT OF BRIDGE NO. 05501 ARROWHEAD ROAD OVER NORWALK RIVER
TOWN(S): WILTON
DRAWING TITLE: PRESTRESSED CONCRETE DETAILS - 3

DRAWING NO. S-13
SHEET NO. 05.13.A1

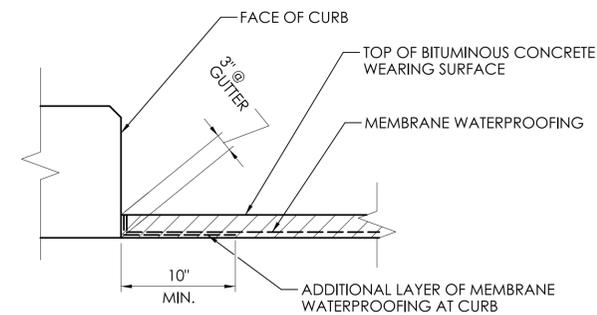
ADDENDUM NO. 1



TYPICAL LONGITUDINAL SECTION



TYPICAL TRANSVERSE SECTION



TREATMENT OF MEMBRANE WATERPROOFING AT GUTTER

ASPHALTIC PLUG EXPANSION JOINT SYSTEM NOTES (CONT.):

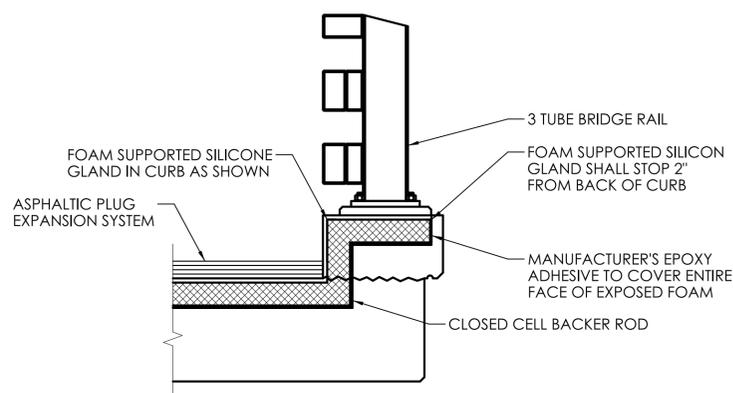
6. INSTALLATION OF MEMBRANE WITHIN THE LIMITS SHOWN TO BE PAID UNDER THE ITEM, "MEMBRANE WATERPROOFING (COLD LIQUID ELASTOMER)".
7. THE FURNISHING AND PLACING OF HMA TO BE INCLUDED FOR PAYMENT UNDER THE ITEM "HMA S0.375".
8. SAW-CUTTING AND REMOVAL OF PAVEMENT FOR JOINT INSTALLATION TO BE INCLUDED FOR PAYMENT UNDER THE ITEM "ASPHALTIC PLUG EXPANSION JOINT SYSTEM".
9. INSTALLATION OF FOAM SUPPORTED SILICONE GLAND TO BE PAID UNDER THE ITEM "PREFORMED JOINT SEAL".
10. ASPHALTIC PLUG EXPANSION JOINT SYSTEMS MAY BE INSTALLED ONLY WITHIN THE TEMPERATURE RANGE SPECIFIED IN THE SPECIAL PROVISION "ASPHALTIC PLUG EXPANSION JOINT SYSTEM". REFERENCE THE RANGE OF THERMAL MOVEMENT FOR THE SELECTED JOINT PRODUCT IN THE TABLE FOR "INSTALLATION RESTRICTIONS" IN THE SPECIAL PROVISION.

APPROACH SLAB NOTES

1. ALL REINFORCING STEEL IN APPROACH SLABS TO BE INCLUDED IN THE ITEM FOR "DEFORMED STEEL BARS-GALVANIZED"
2. SEE DRAWING S-21 FOR PAVEMENT DETAILS AT APPROACH SLAB.

APPROACH SLAB DETAILS

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



ASPHALTIC PLUG EXPANSION JOINT SYSTEM AT CURB

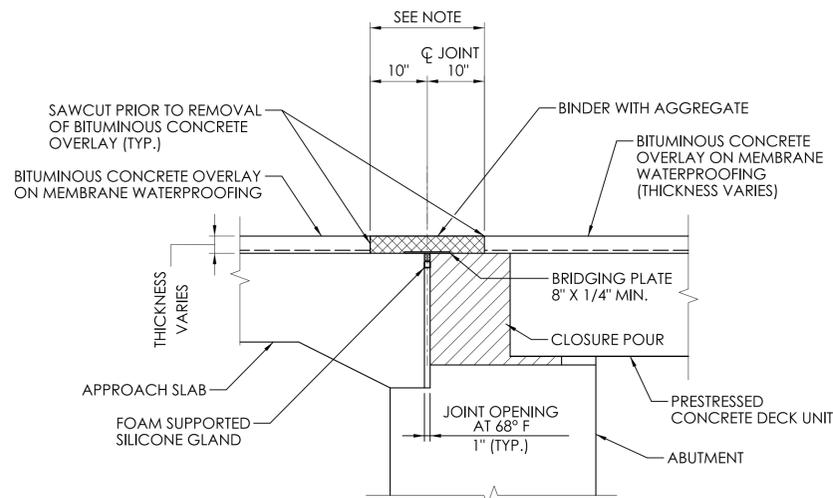
SCALE: 3/4" = 1'-0"

NOTES:

1. THE CLOSED CELL BACKER ROD SHALL BE PLACED A MINIMUM OF 2" FROM THE OUTSIDE FACE OF CURB. INCLUDE IN ITEM FOR ASPHALTIC PLUG EXPANSION JOINT SYSTEM.
2. THE NON-SAGGING SILICONE SEALANT SHALL BE PLACED ON THE BACKER ROD 1/2" THICK. AT THE GUTTER, THE SILICONE SEALANT SHALL BE PLACED FLUSH WITH THE OUTSIDE FACE OF THE CONCRETE.
3. PRIOR TO INSTALLING THE SILICONE SEALANT, CLEAN JOINT SIDES BY SANDBLASTING. DUST SHALL BE REMOVED BY THE METHOD APPROVED BY THE ENGINEER. THE WORK SHALL BE PAID FOR UNDER THE ITEM " ASPHALTIC PLUG EXPANSION JOINT SYSTEM". (SEE SPECIAL PROVISIONS)

SUGGESTED SEQUENCE OF WORK

- STEP 1: INSTALL TEMPORARY BACKER ROD FLUSH WITH THE CLOSURE POUR AND APPROACH SLAB OR BACKWALL.
- STEP 2: INSTALL MEMBRANE WATERPROOFING TO THE TOP OF CLOSURE POUR AND APPROACH SLAB WITHIN THE LIMITS SHOWN.
- STEP 3: PLACE BITUMINOUS CONCRETE OVERLAY AS INDICATED ON THE PLANS.
- STEP 4: SAW-CUT PAVEMENT FULL DEPTH AT 10" EACH SIDE OF CENTERLINE OF JOINT, AND REMOVE ALL PAVEMENT MATERIAL BETWEEN SAW-CUTS. TO BE PAID FOR UNDER THE ITEM "ASPHALTIC PLUG EXPANSION JOINT SYSTEM".
- STEP 5: INSTALL PROPOSED ASPHALTIC PLUG EXPANSION JOINT SYSTEM WITH FOAM SUPPORTED SILICONE GLAND AND BRIDGING PLATE. LOCATING PINS SHALL NOT BE USED TO SECURE THE BRIDGING PLATE.
- STEP 6: INSTALL CRACK SEAL AT CURB LINE ALONG THE LENGTH OF THE BRIDGE, BOTH SIDES. CRACK SEALING SHALL BE INCLUDED FOR PAYMENT UNDER ITEM "JOINT AND CRACK SEALING OF BITUMINOUS CONCRETE PAVEMENT".



ASPHALTIC PLUG EXPANSION JOINT SYSTEM

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

NOTE: REMOVE NEW BITUMINOUS CONCRETE OVERLAY AND MEMBRANE WATERPROOFING. REPLACE WITH ASPHALTIC PLUG EXPANSION JOINT SYSTEM. TO BE PAID FOR UNDER THE ITEM "ASPHALTIC PLUG EXPANSION JOINT SYSTEM." (SEE SPECIAL PROVISION).

EXPECTED THERMAL MOVEMENT BETWEEN 1/8" AND 1/4".

ASPHALTIC PLUG EXPANSION JOINT SYSTEM NOTES:

1. A BRIDGING PLATE SHALL BE USED TO SPAN THE GAP BETWEEN JOINT BETWEEN A DECK END CLOSURE POUR AND A CONCRETE APPROACH SLAB.
2. DISCONTINUE THE INSTALLATION OF THE BRIDGING PLATE WHERE THE APPROACH SLAB IS DISCONTINUED (TYPICALLY IN THE ROADWAY SHOULDERS). SEE "ASPHALTIC PLUG EXPANSION JOINT SYSTEM" SPECIAL PROVISION.
3. NEW STEEL BRIDGING PLATES SHALL BE A MINIMUM OF 1/2" THICK BY 8" WIDE. FOR JOINT OPENINGS WHICH EXCEED 3", A 3/4" THICK BY 12" WIDE PLATE WILL BE REQUIRED.
4. NO BRIDGING PLATE SHALL BE USED AT THE FOLLOWING LOCATIONS:
 - A. JOINT BETWEEN A DECK END CLOSURE POUR AND A CONCRETE APPROACH PAVEMENT
 - B. WHERE A BRIDGE DECK END CLOSURE POUR MEETS A BITUMINOUS APPROACH PAVEMENT
5. TEMPORARY CLOSED CELL BACKER ROD DIAMETER SHALL BE DETERMINED AFTER MEASURING THE JOINT OPENING, THE ROD SHALL BE 25% LARGER THAN THE JOINT OPENING.

BITUMINOUS CONCRETE PLACEMENT AT ASPHALTIC PLUG JOINTS (APJ):

1. THE REQUIREMENTS OF SPECIAL PROVISION SECTION 4.06 SHALL BE MET EXCEPT IN LIEU OF DENSITY TESTING, THE METHODS DESCRIBED BELOW SHALL BE FOLLOWED TO ASSURE PROPER COMPACTION.
2. TOP LIFT MUST BE UNIFORM THICKNESS; INTERMEDIATE LIFTS CAN BE PLACED AT 1 1/4" TO 2 1/2" COMPACTED.
3. REQUIREMENTS FOR PROPER COMPACTION:
 - a. MINIMUM 265° F DELIVERY TEMPERATURE OF MATERIAL. PLACE AND SPREAD MATERIAL BEFORE IT COOLS TO 260° F. MATERIAL BELOW TEMPERATURE REQUIREMENT WILL BE REJECTED.
 - b. COMPACT NON-SURFACE LIFTS WITH VIBRATORY PLATE COMPACTOR MEETING THE FOLLOWING REQUIREMENTS:
 - i. DESIGNED TO COMPACT ASPHALT
 - ii. EQUIPPED WITH A WATER TANK
 - iii. CENTRIFUGAL FORCE 3200 LBS TO 6000 LBS
 - iv. WEIGHS MINIMUM 160 LBS (WITHOUT WATER)
 - v. MINIMUM 4400 VIBRATIONS PER MINUTE
 - c. COMPACT TOP LIFT WITH 3 1/2 TO 4 1/2 TON DOUBLE DRUM ROLLER, DESIGNED TO COMPACT BITUMINOUS CONCRETE.
 - d. PROVIDE NUMBER OF PASSES BASED ON LIFT THICKNESS AS FOLLOWS:

LIFT THICKNESS (INCHES)	NUMBER OF PASSES
1 1/4 TO 1 1/2	8
1 1/2 TO 2	10
2 TO 2 1/2	12
 - e. ADDITIONAL COMPACTING EQUIPMENT MAY BE REQUIRED TO COMPLETE LIFT COMPACTION BEFORE MATERIAL COOLS TO 180° F.
 - f. AT CORNERS OR OTHER AREAS INACCESSIBLE TO PLATE TAMPER, HAND TAMP 20 TIMES MINIMUM BEFORE MATERIAL COOLS TO 180° F.
4. ALTERNATE EQUIPMENT MAY BE REQUESTED AS A SUPPLEMENT TO CONTRACTOR'S QC PLAN. THE EQUIPMENT AND PROCEDURES MUST BE APPROVED BY THE ENGINEER PRIOR TO USE.
5. IF THESE METHODS ARE NOT PERFORMED TO THE SATISFACTION OF THE ENGINEER, DENSITY VERIFICATION MAY BE REQUIRED WHEREIN THE CONTRACTOR SHALL PROVIDE DENSITY TESTING WITH A QC NUCLEAR DENSITY GAUGE OR COLLECT CORE SAMPLES AS SPECIFIED IN SECTION 4.06.

ADDENDUM NO. 1

REV.	DATE	DESCRIPTION
1	12/9/22	ADD STEP FOR CRACK SEAL

DESIGNER/DRAFTER: C.B. CHECKED BY: D.J.L.
SCALE AS NOTED

SIGNATURE/ BLOCK: Mott MacDonald
175 Capital Blvd
4th Floor
Rocky Hill, CT 06067

MOTT MACDONALD
175 CAPITAL BLVD
4TH FLOOR
ROCKY HILL, CT 06067

TOWN OF WILTON

PROJECT NUMBER: 0161-0143
PROJECT DESCRIPTION: REPLACEMENT OF BRIDGE NO. 05051 ARROWHEAD ROAD OVER NORWALK RIVER
TOWN(S): WILTON
DRAWING TITLE: APPROACH SLAB DETAILS

DRAWING NO. S-14
SHEET NO. 05.14.A1



STATE OF CONNECTICUT
DEPARTMENT OF TRANSPORTATION
2800 BERLIN TURNPIKE, P.O. BOX 317546
NEWINGTON, CONNECTICUT 06131-7546



December 8, 2022

The Honorable Lynne A. Vanderslice
First Selectwoman
Town of Wilton
238 Danbury Road
Wilton, Connecticut 06897

Dear Selectwoman Vanderslice:

Subject: Flood Management Certification (FMC)
State Project No. 0161-0143
Replacement of Bridge No. 05501 Arrowhead Road over Norwalk River
Town of Wilton

In accordance with the Memorandum of Understanding (MOU) between the Connecticut Department of Transportation (Department) and the Connecticut Department of Energy and Environmental Protection (DEEP) regarding flood management certifications for municipal projects, the Department has completed the review of the flood management certification prepared and submitted for the Town of Wilton for the subject project. The certification states that the proposed activity is consistent with all applicable standards and criteria established in Section 25-68d(b) of the Connecticut General Statutes and Sections 25-68h-1 through 25-68h-3, inclusive, of the Regulations of Connecticut State Agencies.

The proposed project involves the replacement of Bridge No. 05501, Arrowhead Road over the Norwalk River, in Wilton, Connecticut, as shown on the Environmental Permit Plans revised through October 5, 2022, and as documented in the Hydraulic Design and Floodway/Regulatory Reports, both revised October 2022. The project is located within the Floodway Zone AE of the Norwalk River.

The certification is complete and approved, subject to the following standard conditions:

Standard Conditions:

1. Time of Year Restriction on In-water Construction
 - a. Between September 30th and May 31st the municipality shall not place fill, excavate material, or conduct any other construction activity in any watercourse unless such activity is confined by a cofferdam or other device which isolates such activity from the watercourse, unless the DEEP Inland Fisheries Division has given written authorization otherwise.

- b. The municipality shall not place fill, excavate material, or conduct any other activity in any watercourse stocked with fish by the Commissioner or any other person, or in any tributary to such watercourse, from 12:01 a.m. on the Monday preceding the third Saturday in April through 12 midnight on the Sunday preceding the fourth Saturday in April.
- c. The municipality shall not place fill, excavate material or conduct any other construction activity in or adjacent to any watercourse, which activity may adversely affect anadromous fish, during the time period when anadromous fish are known or reasonably believed to be migrating in the watercourse.

2. Pollution Prevention/Best Management Practices

The municipality shall not cause or allow the authorized activity, including any construction associated therewith, to result in pollution or other environmental damage and shall employ best management practices to prevent such damage. The municipality shall, in addition to employing any other best management practices necessary to prevent such damage, do the following:

a. Controlling Erosion

The municipality shall install and maintain in optimal condition erosion and sedimentation controls to prevent erosion and discharge of material into any waters of the state, including wetlands, as a result of the authorized activity or any construction associated therewith. Such controls shall be installed and maintained in conformance with the *Connecticut Guidelines for Soil Erosion and Sediment Control*, as revised, published by the Connecticut Council on Soil and Water Conservation pursuant to Section 22a-328 of the Connecticut General Statutes.

b. Proper Disposal of Material

All material and solid waste generated during any construction associated with such activity shall be disposed of in accordance with applicable federal, state and local law.

3. Storage of equipment/material within the floodplain should be avoided; but, if absolutely necessary, the municipality will require the contractor to remove equipment and materials from the 100-year floodplain during periods when flood warnings have been issued or are anticipated by a responsible federal, state or local agency. It shall be the contractor's responsibility to be knowledgeable of such warnings when flooding is anticipated.
4. Work shall not be conducted in or adjacent to watercourses and reservoirs used as public drinking water supply sources without coordination with the water supply utility and the Department of Public Health.

5. All temporary structures, cofferdams, and fill shall not impede the movement of flood flows and shall be removed at the completion of their use. The design of such temporary structures, cofferdams and fill shall be based on the DOT Drainage Manual, where applicable. Sheet piling that is cut 1 foot below existing grade shall be considered removed.
6. All fill shall be clean material, free of stumps, rubbish, hazardous, and toxic material.
7. Once work is initiated, it shall proceed rapidly and steadily until completed and stabilized in order to minimize use of temporary structures and to minimize soil erosion.

Please be advised of the following project-specific information:

1. Pursuant to Standard Condition 1.c, coordination with the DEEP Inland Fisheries Division (IFD) concluded that the presence of diadromous fish within the project area necessitates a modification to Standard Condition 1.a. Per direction from the DEEP IFD, Standard Condition 1.a is modified so that any "Unconfined" instream work within the river shall be restricted to the period from July 1 to September 30, inclusive.
2. The installation and removal of temporary cofferdams can occur at any time of the year. Work behind the cofferdams can occur any time of the year.
3. Channel boulders approximately 2 to 4 feet in diameter shall be placed in the river as directed by the fisheries biologist from DEEP. Ten days before the installation of the channel boulder clusters in the river, Bruce Williams of DEEP Fisheries at bruce.williams@ct.gov shall be contacted to oversee the installation of the channel boulder clusters.

A copy of the completed certification forms is attached for your records. No revisions or alterations to the approved plans are allowed without first obtaining written approval from the Department for such alterations.

This letter and certification forms must be attached to any subsequent permit applications for the municipal project that are submitted to the DEEP or the U.S. Army Corps of Engineers.

If there are any questions, please contact Mr. Michael Hogan, Transportation Principal Engineer for the Hydraulics and Drainage Section, at michael.hogan@ct.gov.

Very truly yours,

DocuSigned by:

4A13778C34334C8...

Mark F. Carlino, P. E.
Engineering Administrator
Bureau of Engineering and Construction

The Honorable Lynne A. Vanderslice

-4-

December 8, 2022

Enclosures

cc: Mr. Jeff Caiola, DEEP

**Statewide Flood Management Certification for
Federally and State Funded Municipal Projects**

Attachment A: DOT

A-1: Engineering Certification

Name of Subject Facility and DOT Project Number:

Bridge No. 05501, Project No. 161-143

Name of floodplain and watercourse:

Norwalk River

I hereby certify, in reliance on the Municipal Official Certification, the Town Engineer / Consultant-Professional Certification, the DOT Hydraulics and Drainage Section and the DOT Environmental Planning reviews, that the above referenced project qualifies for the DEP Commissioner's approval pursuant to Section 25-68d of the General Statutes, and that the proposed activity described in this application is consistent with all applicable standards and criteria established in Sections 25-68d(b) of the General Statutes and Sections 25-68h-1 through 25-68h-3, inclusive, of the Regulations of Connecticut State Agencies.

Signature:  4A13778C34334C9...

12/8/2022

Date

Print/Type: Mark F. Carlino
Transportation Engineering Administrator
Bureau of Engineering and Construction

**Statewide Flood Management Certification for
Federally and State Funded Municipal Projects**

Attachment A: DOT

DOT Project No. 0161-0143

A-2: Hydraulics and Drainage Section Review

Based on my review and reasonable investigation, including my inquiry of those individuals responsible for obtaining the information, the proposed activity described in this application is consistent with all applicable standards and criteria established in Sections 25-68d(b) of the General Statutes and Sections 25-68h-1 through 25-68h-3, inclusive, of the Regulations of Connecticut State Agencies.

Signature: Michael E. Hogan Digitally signed by Michael E. Hogan, P.E.
Date: 2022.12.01 14:26:12-05'00' _____ Date

Print/Type: Michael E. Hogan
Transportation Principal Engineer
Hydraulics and Drainage Section

A-3: Environmental Planning Review

Based on my review and reasonable investigation, including my inquiry of those individuals responsible for obtaining the information, the proposed activity described in this application is consistent with all applicable standards found in the 2004 Connecticut Stormwater Manual, 2002 Erosion and Sedimentation Control Guidelines (as amended) and that there has been proper coordination with the Inland Fisheries Division and the Natural Diversity Database.

Signature: Andrew H Davis Digitally signed by Andrew H Davis
DN: C=US, E=andrew.h.davis@ct.gov, O=Connecticut
Department of Transportation, OU=Natural Resources
Planning, CN=Andrew H Davis
Date: 2022.11.30 11:31:58-05'00' _____ Date

Print/Type: Andrew H. Davis
Transportation Supervising Planner
Office of Environmental Planning

**Statewide Flood Management Certification for
Federally and State Funded Municipal Projects**

Attachment B: Municipality

B-1: Municipal Official Certification

Name of Applicant / Municipality: **Town of Wilton**

DOT Project No.: **161-143**

Description of Proposed Project: **Replacement of Bridge No. 05501**

1. The recipient of federal and/or state funding will be:

Name: **Town of Wilton**

Mailing Address: **238 Danbury Rd.**

City/Town: **Wilton**

State: **CT**

Zip Code: **06897**

Phone: **203 563 0153** ext.

Fax: **203 563 0269**

Based on my review and reasonable investigation, including my inquiry of those individuals responsible for preparing the information, the proposed activity described in this application is consistent with all applicable standards and criteria established in Sections 25-68d(b) of the General Statutes and Sections 25-68h-1 through 25-68h-3, inclusive, of the Regulations of Connecticut State Agencies.

I understand that a false statement made in the submitted information may, pursuant to Section 22a-6 of the General Statutes, be punishable as a criminal offense under Section 53a-157b of the General Statutes, and may also be punishable under Section 22a-438 of the General Statutes.

Signature: 

9/9/22
Date

Print/Type: LYNNE A. VANDERSLICE
Chief Elected Official
First Selectman

**Statewide Flood Management Certification for
Federally and State Funded Municipal Projects**

Attachment B: Municipality

B-2: Town Engineer / Consultant - Professional Certification

DOT Project No.: 0161-0143

Description of Proposed Project: Replacement of Bridge No. 05501

Plan Dated and Revised Through: 10/05/2022

Hydrologic and Hydraulic Study Dated: 10/07/2022

I hereby certify that the prepared information and the proposed activity described in this application is consistent with all applicable standards and criteria established in Sections 25-68d(b) of the General Statutes and Sections 25-68h-1 through 25-68h-3, inclusive, of the Regulations of Connecticut State Agencies.

I understand that a false statement made in the submitted information may, pursuant to Section 22a-6 of the General Statutes, be punishable as a criminal offense under Section 53a-157b of the General Statutes, and may also be punishable under Section 22a-438 of the General Statutes.

Signature: _____



10/12/22

Date

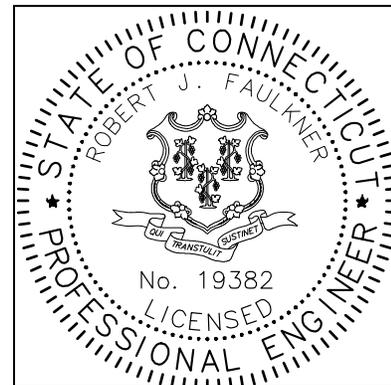
Print/Type: _____

Robert Faulkner

Professional Engineer

P.E. Number: _____

19382



Affix P.E. Stamp Here



Flood Management Certification Program for Municipal Projects Funded¹ by the Department of Transportation

Projects eligible for this certification program, as identified in the Memorandum of Understanding (MOU) between the Departments of Transportation and Environmental Protection (03/18/2009), shall be reviewed by the Department of Transportation for consistency with Section 25-68d (b) of the Connecticut General Statutes² and Sections 25-68h-1 through 25-68h-3 of the Regulations of Connecticut State Agencies (RCSA)³ and approval shall be in accordance with the MOU. **This program shall not apply to projects that qualify for the Department of Transportation Flood Management General Certification Program nor shall it be construed as a substitute for any other flood management or permit approval process that may be required by the municipality.**

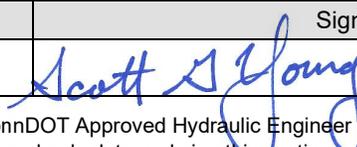
1. Project Identification

ConnDOT Project No(s).	(PE) 161-143	(Construction)	City/Town(s) Wilton
Project Name	Replacement of Bridge No. 05501		

2. Funding Source

Check the funding source(s) for the subject project from the eligible list below:	
<input type="checkbox"/> State Local Bridge Program: DOT Br. No(s).	<input type="checkbox"/> STP – Urban Program
<input checked="" type="checkbox"/> Federal Local Bridge Program: DOT Br. No(s). 05501	<input type="checkbox"/> STP – Rural Minor / Major Collector Program
<input type="checkbox"/> Small Town Economic Assistance Program	<input type="checkbox"/> Local Roads Accident Reduction Program
<input type="checkbox"/> Transportation Enhancement Program	<input type="checkbox"/> Federal Earmark Project
	<input type="checkbox"/> CT Special Act Grant
	<input type="checkbox"/> Safe Routes to School Program

3. Quality Assurance/Quality Control

<p>The intent of this document is to assist the applicant as well as the reviewer with the regulatory requirements, process, scope and the completeness of the documentation for the flood management certification of a project. Failure to complete this document in its entirety and/or to provide the information indicated therein will result in rejection of the flood management submission and a possible delay in the project.</p> <p>Enter contact information and signature of the person responsible for preparing this document and the completeness of the submission below:</p>			
Name		Company Name	
Scott Young		CHA Companies, Inc.	
Mailing Address	City/Town	State	Zip Code
400 Capital Boulevard, Suite 301	Rocky Hill	CT	06067
Telephone No.	Fax No.	Email address	
860-290-4100 ext. 2103	860-290-4114	syong@chacompanies.com	
Date Prepared		Signature	
10/12/2022			
<input checked="" type="checkbox"/> Check this box if this document has been prepared by the ConnDOT Approved Hydraulic Engineer who shall be responsible for the submission content. The Approved Hydraulic Engineer shall need only date and sign this section, provided the other contact information is the same as in Section 7, Hydraulic Engineer Approval.			

¹ Federal or state funding passed to municipalities by ConnDOT

² http://cga.ct.gov/lco/Statute_Web_Site_LCO.htm

³ <http://www.ct.gov/dep/cwp/view.asp?a=2704&q=323518>

4. Other Permits/Authorizations/Certifications

This section should be completed in conjunction with Section 8, <i>Flooding Source Identification & Floodplain Determination</i> , Section 9, <i>Floodplain Involvement</i> , and Section 10, <i>Environmental Considerations</i> . Check for other permits/authorizations/certifications required for the subject project:			
ConnDOT Flood Management General Certification – The general certification applies to certain minor activities in a regulatory floodplain and is separate from the Flood Management Certification Program for Municipal Projects. The application form and descriptions of approved activities for the general certification are available on the Hydraulics and Drainage (H & D) website (http://www.ct.gov/dot/cwp/view.asp?a=2303&q=300868)			
<input checked="" type="checkbox"/> The descriptions of approved activities of the general certification have been reviewed. The subject project does not qualify for the Flood Management General Certification.			
DEP Inland Water Resources Div. (IWRD):		<input checked="" type="checkbox"/> NO IWRD PERMITS REQUIRED	
http://www.ct.gov/dep/cwp/view.asp?a=2709&q=324222&depNav_GID=1643			
Permit Type	Date Approved	Permit Type	Date Approved
<input type="checkbox"/> Inland Wetlands & Watercourses		<input type="checkbox"/> Dam Construction	
<input type="checkbox"/> Stream Channel Encroachment Line*		<input type="checkbox"/> 401 Water Quality Certification	
<input type="checkbox"/> Water Diversion		<input type="checkbox"/> General Permit - <i>Indicate type below</i>	
*A listing of SCEL regulated areas is provided at the H & D website @ http://www.ct.gov/dot/cwp/view.asp?a=2303&q=300868		Type:	
<input type="checkbox"/> Any project that requires an <i>Inland Wetlands & Watercourses</i>, <i>Stream Channel Encroachment Line</i> or <i>Water Diversion</i> permit from the DEP is not eligible for this program. The project must be submitted to the DEP in accordance with the MOU.			
DEP (Other Permits):			Date Approved
<input type="checkbox"/> Aquifer Protection Area (http://www.ct.gov/dep/cwp/view.asp?a=2709&q=324222&depNav_GID=1643)			
<input type="checkbox"/> Stormwater and Dewatering Wastewaters from Construction Activities (a.k.a. Stormwater Discharge) http://www.ct.gov/dep/cwp/view.asp?a=2709&q=324212&depNav_GID=1643#StormwaterConstructionGP			
DEP Office of Long Island Sound Programs (OLISP):		<input checked="" type="checkbox"/> NO OLISP PERMITS REQUIRED	
http://www.ct.gov/dep/cwp/view.asp?a=2709&q=324222&depNav_GID=1643			
Permit Type	Date Approved	Permit Type	Date Approved
<input type="checkbox"/> Structures, Dredging and Fill & Tidal Wetlands		<input type="checkbox"/> Certificate of Permission	
<input type="checkbox"/> OLISP General Permit – <i>Indicate type</i>	Type:		
U.S. Army Corps of Engineers (Corps):		<input type="checkbox"/> NO CORPS PERMIT REQUIRED	
http://www.nae.usace.army.mil/reg/index.htm			
Permit Type			Date Approved
<input checked="" type="checkbox"/> Programmatic General Permit (PGP)	<input checked="" type="checkbox"/> Category 1 SV	<input type="checkbox"/> Category 2-PCN	TBD
<input type="checkbox"/> Individual			
Municipal Permits:			
Permit Type	Date Approved	Permit Type	Date Approved
Town of Wilton Inland Wetland and Watercourses Permit	TBD		

6. Significant Impacts

<p>Any project or activity considered a significant impact as defined under Section 25-68h-1 of the Flood Management Regulations for State Agencies is not eligible for this program. Complete this section to determine if the project includes a significant activity as defined in the regulations.</p>		
Yes	No	Does the project include any activity that would create/cause:
<input type="checkbox"/>	<input checked="" type="checkbox"/>	1. A five percent increase in peak flow rates at any downstream point
<input type="checkbox"/>	<input checked="" type="checkbox"/>	2. A twenty percent increase in flow velocities or a change that allows a stable condition to become unstable
<input type="checkbox"/>	<input checked="" type="checkbox"/>	3. An unacceptable cumulative impact
<input type="checkbox"/>	<input checked="" type="checkbox"/>	4. Flooding on developed property not currently subject to flooding
<input type="checkbox"/>	<input checked="" type="checkbox"/>	5. A downstream dam to become unsafe
<p><input type="checkbox"/> If the answer is yes to one or more of the above, the project includes a significant activity as defined in the regulations and is not eligible for this program. The project shall be submitted to the DEP in accordance with the MOU.</p>		

7. Hydraulic Engineer Approval

<p>In order to be eligible for this program, the engineer responsible for preparing the hydraulic analysis and design and the flood management certification for the project must be pre-approved by the Department in accordance with Section 404.01 of the Department's Consultant Administration And Project Development Manual and Section 1.2.4 of the Drainage Manual. Enter the information for the approved Hydraulic Engineer below:</p>			
Name	CT PE Number	Company Name	
Scott Young	#19357	CHA Companies, Inc.	
Mailing Address	City/Town	State	Zip Code
400 Capital Boulevard, Suite 301	Rocky Hill	CT	06067
Telephone No.	Fax No.	Email address	
860-290-4100 ext. 2103	860-290-4114	syong@chacompanies.com	
Approval Request Date		Date Approved	
10/14/2015		10/28/2015	

8. Flooding Source Identification & Floodplain Determination

State Flood Management Certification (FMC) is required for projects proposing activities within mapped, 1-percent annual chance (100-Year) floodplains, designated as Zone A, AE, or A-numbered and V or VE (coastal floodplains) FEMA Flood Hazard Zones where the drainage area of the flooding source is greater than or equal to one square mile.

Note: FMC is not required for proposed activities in:

- *mapped* floodplains where the drainage area of the flooding source is *less* than one square mile, or
- *unmapped* floodplains with drainage areas greater than or equal to one square mile *unless* changes in drainage patterns are proposed.

The floodplain designation and drainage area at the project site(s) shall be verified by completing the following section:

Flooding Source	Site 1	Site 2	Site 3
Site Description (ex. Br. No., Sta., etc.)	Bridge No. 05501		
Name of Stream or Waterbody	Norwalk River		
Drainage Area @ Site	29 sq. mi.		
<input checked="" type="checkbox"/> Copies of the drainage area delineation(s) must be attached and included in the preliminary hydrologic and hydraulic design reports.			
FEMA Flood Insurance Study (FIS) Data. Downloads available at FEMA Map Service Center: http://msc.fema.gov/webapp/wcs/stores/servlet/StoreCatalogDisplay?storeId=10001&catalogId=10001&langId=-1&userType=G			
Flood Insurance Rate & Floodway Maps	Site 1	Site 2	Site 3
Map Panel No(s)	09001C0391F		
Effective Date(s)	06/18/2010		
Flood Hazard Zone(s) [Indicate "None", if no zone]	AE		
Regulatory Floodway (Yes/No)	Yes		
<input checked="" type="checkbox"/> Copies of FEMA Flood Insurance Rate Maps (FIRM) and Floodway & Flood Hazard Boundary Maps (<i>if separate maps were published</i>) with bridge locations and/or project limits annotated must be attached to this form and included in the preliminary hydraulic design and the floodplain/floodway analysis reports.			

9. Floodplain Involvement

Type of Floodplain Involvement (Check all that apply)		
Site 1	Site 2	Site 3
<input checked="" type="checkbox"/> Bridge/Culvert Replacement	<input type="checkbox"/> Bridge/Culvert Replacement	<input type="checkbox"/> Bridge/Culvert Replacement
<input type="checkbox"/> Bridge/Culvert Rehabilitation or Modification	<input type="checkbox"/> Bridge/Culvert Rehabilitation or Modification	<input type="checkbox"/> Bridge/Culvert Rehabilitation or Modification
<input checked="" type="checkbox"/> Fill <input checked="" type="checkbox"/> Cut in floodplain	<input type="checkbox"/> Fill <input type="checkbox"/> Cut in floodplain	<input type="checkbox"/> Fill <input type="checkbox"/> Cut in floodplain
<input checked="" type="checkbox"/> Fill <input checked="" type="checkbox"/> Cut in floodway	<input type="checkbox"/> Fill <input type="checkbox"/> Cut in floodway	<input type="checkbox"/> Fill <input type="checkbox"/> Cut in floodway
<input type="checkbox"/> Stream Alteration	<input type="checkbox"/> Stream Alteration	<input type="checkbox"/> Stream Alteration
<input type="checkbox"/> New or Substantially Improved Structure (i.e., Building/Facility)	<input type="checkbox"/> New or Substantially Improved Structure (i.e., Building/Facility)	<input type="checkbox"/> New or Substantially Improved Structure (i.e., Building/Facility)
<input type="checkbox"/> Critical Activity as defined in CGS Sec. 25-68b (4)	<input type="checkbox"/> Critical Activity as defined in CGS Sec. 25-68b (4)	<input type="checkbox"/> Critical Activity as defined in CGS Sec. 25-68b (4)

9. Floodplain Involvement (continued)

Regulatory floodplain/floodway analyses – Based on the type and extent of floodplain involvement, does the project require detailed hydraulic analyses in accordance with the DEP “Hydraulic Analysis Guidance Document” available at http://www.ct.gov/dep/cwp/view.asp?a=2709&q=324222&depNav_GID=1643					Yes/No
					Yes
If no, explain:					
Has the stream been studied in detail by the FEMA FIS? (Yes/No)					Yes
If yes, the back-up hydraulic analysis data used in the FIS must be obtained from FEMA using the FIS Data Request Form (http://www.fema.gov/library/viewRecord.do?id=2223), unless the town/city has a copy of the data that matches the effective study. Enter the FEMA data request and receipt information in the space provided:					
Date Requested	8/9/2019	Data Available (Yes/No)?	Yes	Date Received	10/15/2019
Yes A copy of the archive hydraulic data obtained from FEMA or the town/city must be included in the preliminary floodplain/floodway analysis report. <input checked="" type="checkbox"/> All copies of correspondence with FEMA, in particular, if FEMA determines that the hydraulic data is unavailable, must be included in the preliminary floodplain/floodway analysis report.					
Critical Activity - Does the proposed project involve the treatment, storage and disposal of hazardous waste or the siting of hospitals, housing for the elderly, schools or residences, in the 0.2 per cent (500 year) floodplain?					Yes/No
					No
<input type="checkbox"/> If yes, the base flood for the critical activity shall have a recurrence interval equal to the 500 year flood event.					
Nonintensive Floodplain Uses - Will the proposed project promote development in floodplains or will utilities servicing the project be located so as to enable floodplain development?					Yes/No
					No
Explain (<i>required if yes or no</i>):					
National Flood Insurance Program (NFIP) – Does the proposed project meet the NFIP minimum standards established in 44 CFR, Chapter 1, Subchapter B, Part 60.3, floodplain management criteria for flood-prone areas?					Yes/No
					Yes
Municipal Regulations - Has the municipality in which the proposed project is to be located adopted floodplain regulations containing requirements that are more restrictive than the NFIP floodplain management criteria for flood-prone areas?					Yes/No
					Yes
The Zoning Regulations of the Town of Wilton, Section 29-9.F, Items k and l, require (k) equal conveyance unless applicant provides hydrologic and hydraulic analyses demonstrating no increase (0.00 ft) in base flood elevation as a result of encroachments and (l) compensatory storage, i.e., the water holding capacity of the floodplain shall not be reduced; any reduction caused by filling, etc. shall be compensated for by deepening and/or widening of the floodplain.					
Does the proposed project comply with the more restrictive standards of the municipality (Yes/No)?					Yes

9. Floodplain Involvement (continued)

<p>Regulatory Floodplain with No Floodway – The NFIP requires that until a regulatory floodway is designated, that no new construction, substantial improvements, or other development (including fill) shall be permitted within Zones A1-30 and AE unless it is demonstrated that the cumulative effect of the proposed development, when combined with all other existing and anticipated development, will not increase the water surface elevation of the base flood more than one foot at any point. (If no regulatory floodway has been adopted, project impacts may be evaluated by considering an equivalent conveyance loss on the opposite side of the river from the proposed project.)</p>					
<p>Is the proposed project consistent with this requirement?</p>	<input type="checkbox"/> Yes	<input type="checkbox"/> No	<input checked="" type="checkbox"/> Not applicable. The site has a regulatory floodway.		
<p>Floodway Encroachments - Does the proposed project include encroachments, including fill, new construction, substantial improvements, or other development within a NFIP adopted regulatory floodway?</p>			<table border="1" style="width:100%; border-collapse: collapse;"> <tr> <td style="text-align: center;">Yes/No</td> </tr> <tr> <td style="text-align: center;">Yes</td> </tr> </table>	Yes/No	Yes
Yes/No					
Yes					
<p>If yes, will the proposed encroachment into the floodway result in any increase in flood levels during either the 100 year or 10 year discharges?</p>					
<p>100-year:</p>	<input checked="" type="checkbox"/> No Increase	<input type="checkbox"/> There is an increase in 100-yr flood level of (1/100ths of a foot):			
		<p style="text-align: center;">Is the increase contained within city/town property (Yes/No)?</p>			
		<p style="text-align: center;">Has approval of such increase been received in accordance with 44 CFR, Chapter 1, Subchapter B, Part 65.12 (Yes/No)?</p>			
<p>RCSA Section 25-68h-2(c)(5) and Section 60.3(d)(3) of NFIP regulations prohibit any activity within a regulatory floodway which would result in any increase in the base flood water surface elevation. In order for any proposed project which does not meet these standards to be approved, a map revision is required from FEMA. Some increase in the floodway elevations within the roadway right-of-way may be acceptable without FEMA's prior approval, however, an exemption to the flood management regulations would be required and the project would need to be submitted to the DEP in accordance with the MOU.</p>					
<p>10-year:</p>	<input checked="" type="checkbox"/> No Increase	<input type="checkbox"/> There is an increase in 10-yr flood level of (1/100ths of a foot):			
		<p style="text-align: center;">Is the increase contained within city/town property (Yes/No)?</p>			
<p>RCSA Section 25-68h-2(c)(5) prohibits any activity within a regulatory floodway which would result in an increase in the elevation of the 10-year water surface. An increase within the right of way or one with no adverse impact may be approved, however, an exemption to the flood management regulations would be required and the project would need to be submitted to the DEP in accordance with the MOU.</p>					
<p>Flooding - Will the proposed project pose any hazard to human life, health or property in the event of a base flood?</p>			<table border="1" style="width:100%; border-collapse: collapse;"> <tr> <td style="text-align: center;">Yes/No</td> </tr> <tr> <td style="text-align: center;">No</td> </tr> </table>	Yes/No	No
Yes/No					
No					
<p>Explain:</p> <p style="margin-top: 20px;">There is no increase of the water surface elevation of the base flood as a result of the proposed project.</p>					

9. Floodplain Involvement (continued)

Flood Elevations - Will the proposed project cause an increase in flood elevation during the base flood discharge?	Yes/No
	No
If yes, the increase in flood elevation in 1/100ths of a foot is:	
Flood Velocities - Will the proposed project cause an increase in flow velocity during the base flood discharge?	Yes/No
	No
If yes, the increase in flow velocity in feet per second is:	
Will such increase in velocity or flood elevation cause channel erosion or pose any hazard to human life, health or property?	Yes/No
	N/A
Explain:	
Flood Storage - Will the proposed project affect the flood storage capacity or flood control value of the floodplain?	Yes/No
	No
Explain:	
Degrading or Aggrading Stream Beds - Is the streambed currently degrading or aggrading?	
<input type="checkbox"/> Degrading	<input type="checkbox"/> Aggrading
<input checked="" type="checkbox"/> Neither	
Has the project design addressed degrading or aggrading streambed conditions (Yes/No)?	N/A
Ice Jams - Is the watercourse prone to ice jams or floods due to ice (Yes/No)?	
Has the project design considered ice jams or floods due to ice (Yes/No)?	No
Storage of Materials & Equipment – Storage of materials that could be injurious to human health or the environment in the event of flooding is prohibited below the elevation of the 500 year flood. Other material or equipment may be stored below the 500 year flood elevation provided that such material or equipment is not subject to major damage by floods, and provided that such material or equipment is firmly anchored, restrained or enclosed to prevent it from floating away or that such material or equipment can be removed prior to flooding.	
Will the construction or use of the proposed project involve the storage of materials below the 500 year flood elevation that are buoyant, hazardous, flammable, explosive, soluble, expansive or radioactive, or the storage of any other materials which could be injurious to human, animal or plant life in the event of a flood?	Yes/No
	Yes
If yes, describe the materials and how such materials will be protected from flood damage, secured or removed from the floodplain to prevent pollution and hazards to life and property.	
Lumber used for form work of new bridge will be below the 500- year flood elevation. This material is buoyant but will be removed upon the forecast of a major flooding event to prevent injuries to humans, animals, or plant life.	

9. Floodplain Involvement (continued)

Floodwater Loads - Will structures, facilities and stored materials be anchored or otherwise designed to prevent floatation, collapse, or lateral movement resulting from hydrodynamic and hydrostatic loads, including the effects of buoyancy?		Yes/No
		N/A
Coastal Areas - Flood hazard potential in coastal areas shall be evaluated considering surface profiles of the combined occurrence of tides, storm surges, and peak runoff. The starting water surface elevation for the base flood in watersheds with time of concentrations of over 6 hours shall be the 10 year frequency tidal surge level.		
If the proposed project is in a coastal area, have the hydraulic analyses incorporated these criteria?		
<input type="checkbox"/> Yes	<input type="checkbox"/> No	<input checked="" type="checkbox"/> Not in Coastal Area

10. Environmental Considerations

Fish Passage & Habitat – The design of bridges, culverts and stream channel alterations along watercourses must be reviewed by and receive concurrence from the Department of Environmental Protection Fisheries Division. Enter the Fisheries review and concurrence information below:		
Fisheries Review Request Date	Fisheries Comments Date	Fisheries Concurrence Date
9/17/2019	11/12/2019	6/9/2022
<input checked="" type="checkbox"/> Copies of all correspondence with the DEP Fisheries must be attached to this form and/or included in the preliminary hydraulic design and the floodplain/floodway analysis reports		
Endangered, Threatened Or Special Concern Species – Is the project site located within an area identified as a habitat for endangered, threatened or special concern species as identified on the "State and Federal Listed Species and Natural Communities Map"? http://www.ct.gov/dep/cwp/view.asp?a=2698&q=322898&depNav_GID=1707	Yes/No	Date of Map
	No	June 2022
If yes, complete and submit a <i>Connecticut Natural Diversity Data Base (CT NDDDB) Review Request Form</i> (DEP-APP-007) to the DEP Bureau Of Natural Resources, Wildlife Division. http://www.ct.gov/dep/cwp/view.asp?a=2709&q=324218&depNav_GID=1643#NDDDB		Date Requested
Correspondence received (Yes/No)?		Date Reviewed
Concerns:		
Has a field survey been conducted to determine the presence of these species? If yes, provide biologist's name & address.	Yes/No	Survey Date
Name	Address	
<input type="checkbox"/> Copies of any correspondence provided to or received from the NDDDB, including copies of the completed CT NDDB Review Request Form, any field surveys, and any other information which may lead you to believe that endangered or threatened species may or may not be located in the area of the project, must be attached to this form.		
Aquifer – Is the site located within an aquifer protection area as defined in Section 22a-354a through 354bb of the General Statutes? If yes, coordination with the water company is required.		Yes/No
		No
Name of Water Company		
Public Water Supply – Is the project located within a public water supply watershed or a well-head protection area?	Yes/No	<input type="checkbox"/> Reservoir
	No	<input type="checkbox"/> Well-head
Name of Reservoir or Well-head	Name of Water Company	

10. Environmental Considerations (continued)

If project is located within public water supply watershed or aquifer protection area: <input type="checkbox"/> The design of storm drainage systems shall be coordinated with the Department of Public Health (DPH) and the water authority. <input type="checkbox"/> Copies of any correspondence/meeting minutes with the DPH and the water company must be attached to this form. <input type="checkbox"/> A "Notice to Contractor" shall be prepared with input from the Office of Environmental Planning that shall be included in the contract documents.	
Stormwater Quality – Does the project include new installation or the modification of storm drainage systems?	Yes/No
	Yes
<input checked="" type="checkbox"/> If yes, the drainage design and stormwater treatment practices shall be in accordance with the ConnDOT <i>Drainage Manual</i> (http://www.ct.gov/dot/cwp/view.asp?a=3200&q=260116&dotPNavCtr= #40139), the <i>Design Measures for Stormwater Permits Phase II</i> (http://www.ct.gov/dot/cwp/view.asp?a=2303&q=300868) guidelines and the DEP <i>2004 Connecticut Stormwater Quality Manual</i> (http://www.ct.gov/dep/cwp/view.asp?a=2721&q=325704&depNav_GID=1654).	
Erosion and Sediment Control (E & S) – E & S plans shall be consistent with the <i>2002 Connecticut Guidelines for Soil Erosion and Sediment Control</i> (http://www.ct.gov/dep/cwp/view.asp?a=2720&q=325660&depNav_GID=1654), the current version of ConnDOT's "On Site Mitigation for Construction Activities" and the <i>Standard Specifications Form 816, Section 1.10, Environmental Compliance</i> (http://www.ct.gov/dot/cwp/view.asp?a=3609&q=430362).	
<input checked="" type="checkbox"/> E & S plans shall be developed in final design in accordance with the required documents.	
Estimate total acres of site disturbance for project:	The General Permit for Stormwater Discharge shall be:
<input checked="" type="checkbox"/> less than 1 acre <input type="checkbox"/> greater than or equal to 1 acre but less than 5-acres <input type="checkbox"/> greater than 5 acres	<input checked="" type="checkbox"/> Not Required <input type="checkbox"/> Reviewed & Approved by City/Town <input type="checkbox"/> Registered with the DEP
General Permit for Stormwater and Dewatering Wastewaters from Construction Activities (Stormwater Discharge): http://www.ct.gov/dep/cwp/view.asp?a=2709&q=324212&depNav_GID=1643#StormwaterConstructionGP	

10. Environmental Considerations (continued)

U.S. Army Corps of Engineers (Corps) Programmatic General Permit (PGP) – The Corps regulates any work in U.S. waters or wetlands. The New England District of the Corps has issued a PGP to expedite review of minimal impact projects in coastal and inland waters and wetlands within the State of Connecticut. Although the PGP is not directly related to the FMC, the requirements for bridges or culverts under the PGP may affect the design of these structures which may in turn affect the documentation for the FMC. Therefore, an early understanding of the PGP requirements is necessary to ensure that the project is eligible for the streamlined Corps permit and/or to avoid any unnecessary design changes that may affect the FMC approval and the project schedule. A copy of the CT PGP is available at <http://www.nae.usace.army.mil/reg/ctpgp.pdf>

Indicate the area of impact to inland or tidal wetlands from the project (0 = No Impact)						<input checked="" type="checkbox"/> Inland	
						<input type="checkbox"/> Tidal	
Permanent (Acres)		Temporary (Acres)		Total Impact (Acres)			
370 S.F. (0.009 AC.)		1,280 S.F. (0.029 AC.)		1,650 S.F (0.038 AC.)			
Does the project result in fill in the regulatory floodway (Yes/No)?						Yes	
Does the project include a bridge or culvert waterway crossing (Yes/No)?						Yes	
Is the drainage area to the bridge/culvert greater than or equal to one square mile (Yes/No)?						Yes	
<input checked="" type="checkbox"/> Bridge or Open-Bottom Structure				<input type="checkbox"/> Culvert or Artificial-Bottom Structure			
<input checked="" type="checkbox"/> Crossing spans at least 1.2 times the watercourse bank full width <input checked="" type="checkbox"/> Structure has an openness ratio equal to or greater than 0.25 meters <input checked="" type="checkbox"/> Structure allows for continuous flow and does not result in a change of the normal surface elevation of the upstream waters, waterway or wetland <input checked="" type="checkbox"/> Structure incorporates a riparian bank on at least one side for wildlife passage <i>Open bottom arches, bridge spans or embedded culverts are generally preferred over traditional culverts and are required for Category 1/non-reporting projects. However, site constraints may make use of an open bottom arch, bridge span or embedded culverts impractical, and in these cases documentation must be provided.</i>				<input type="checkbox"/> Structure has an openness ratio equal to or greater than 0.25 meters <input type="checkbox"/> Culvert gradient is less than or equal to the streambed gradient upstream and downstream of the culvert <input type="checkbox"/> Invert is set at least 1 foot below streambed elevation; (for double box crossings, at least one box is set 1 foot below, for culverts where one foot is not practicable, 25% of the pipe must be depressed) <input type="checkbox"/> Structure allows for continuous flow and does not result in a change of the normal surface elevation of the upstream waters, waterway or wetland <input type="checkbox"/> Structure does not impede the passage of fish			
Waterway Crossing Data – Enter the bridge/culvert crossing data below:							
Location	Site 1		Site 2		Site 3		
Bridge/Culvert Type	Clear Span Bridge						
Span/Size	48 ft	m	ft	m	ft	m	
Channel Bankfull Width	38 ft	m	ft	m	ft	m	
Culvert embedment depth	ft	m	ft	m	ft	m	
Cross Sectional Area (excludes embedded area)	367ft ²	m ²	ft ²	m ²	ft ²	m ²	
Bridge/Culvert Length (in direction of flow)	26.5 ft	m	ft	m	ft	m	
Openness Ratio (m ² /m)	4.25m		m		m		
Check the type of permit required for the project:							
<input checked="" type="checkbox"/> Project is Category 1 SV eligible. Documentation will be processed through Office of Environmental Planning.							
<input type="checkbox"/> Project is Category 2 eligible and must be presented at Project Manager's Meeting. Corps application Form ENG 4345 and CT PGP addendum (both available at http://www.nae.usace.army.mil/reg/index.htm) must be prepared. If any of the above criteria cannot be met, a justification for the reasons must be included in the permit submission.							
<input type="checkbox"/> Project is not eligible for PGP. An individual permit must be submitted to the Corps.							

11. Stormwater Management

Stormwater Runoff – The proposed project will (check all that apply):		
<input type="checkbox"/> Increase the area of impervious surfaces	<input checked="" type="checkbox"/> Alter existing drainage patterns	
<input type="checkbox"/> Increase runoff coefficients	<input type="checkbox"/> Alter time of concentrations	
<input type="checkbox"/> Change the timing of runoff in relation to adjacent watersheds		
Will the proposed project impact downstream areas by increasing peak flow rates, the timing of runoff, or the volume of runoff?	Yes/No	
	No	
If yes, describe the downstream impacts for the 2, 10 and 100 year frequency discharges:		
The pre and post development peak flow rates at the downstream design point are as follows:		
Return Frequency (Year)	Peak Discharges (CFS)	
	Pre-Development	Post-Development
2		
10	No change in peak flow rates	
100		
The above peak discharges were computed utilizing the a storm duration of:		Hour
This duration storm was selected because:		
Describe the location of the design point and why this location was chosen:		
Stormwater Detention Facilities – Does the proposed project include the construction of any stormwater detention facilities?		Yes/No
		No
<input type="checkbox"/> If yes, complete the <i>Stormwater Detention Facilities</i> worksheet and attach		
Storm Drainage Systems – Does the proposed project include the construction of subsurface storm drainage systems?		Yes/No
		Yes
<input checked="" type="checkbox"/> If yes, complete the <i>Storm Drainage Systems</i> worksheet and attach		

12. Hydrologic Report(s)

<input checked="" type="checkbox"/> Perform hydrologic analysis in accordance with the methods identified in the current ConnDOT Drainage Manual and Consulting Engineers General Memorandum 07-06, "StreamStats" (http://www.ct.gov/dot/cwp/view.asp?a=2303&q=421916).
<input checked="" type="checkbox"/> Prepare narrative describing the watershed; design storm frequency; FEMA, SCEL, USGS stream gage, <i>StreamStats</i> or other study discharge information, if available; the hydrologic methodologies used in the analysis; results of the hydrologic analysis and final recommendations for the 2, 10, 25, 50, 100 and 500-year storm frequencies.
<input checked="" type="checkbox"/> Include <u>all</u> other documentation as outlined in Chapter 6, Appendix D of the Drainage manual.
<input checked="" type="checkbox"/> Submit a draft Hydrologic Report to ConnDOT for review and approval. The persons preparing and checking the report shall sign and date the report. The report shall be signed and dated by the Department approved hydraulic engineer and include a professional engineer seal, signature and date.
<input checked="" type="checkbox"/> Incorporate comments into report, repackage and resubmit Final Report with signatures. Provide responses to previous comments.

13. Hydraulic Report(s)

Depending on whether the flooding source identified in Section 4, "Flooding Source Identification & Floodplain Determination", has been studied in detail by FEMA, one or both of the following documents shall be required:

A. Preliminary Hydraulic Analysis Report – This report and hydraulic analyses contained therein, shall document the hydraulic design for the project and its conformance to the standards and design criteria outlined in the ConnDOT Drainage Manual 2000, as revised. The manual and revisions can be found on the internet at <http://www.ct.gov/dot/cwp/view.asp?a=1385&Q=260116>. For projects potentially affecting a regulatory floodplain that was determined by approximate methods (FEMA Zone A), this report and hydraulic analyses contained therein, shall document that the proposed project is in conformance with the applicable flood management standards and criteria prescribed in Sections 25-68b through 25-68h of the Connecticut General Statutes (CGS), Sections 25-68h-1 through 25-68h-3 of the Regulations of Connecticut State Agencies, and Section 13a-94 of the CGS.

The report and hydraulic analyses shall be prepared in accordance with the latest version of the DEP "Hydraulic Analysis Guidance Document" and the ConnDOT Drainage Manual. The hydraulic analyses shall be performed using the latest version of the ACOE HEC-RAS computer program unless another program has been specified or approved by the Department.

Cross sections for the hydraulic models shall be developed from field survey and where appropriate, supplemented with cross sections from previous analyses, LIDAR data or other available contour mapping.

Peak discharges from the approved Final Hydrologic Report shall be used. Unless otherwise noted, the 2, 10, 25, 50, 100, and 500-year storm events shall be analyzed for riverine conditions. For tidal structures a combination of tidal storm surge and riverine flooding needs to be analyzed.

Required – **Complete Section 13A** Not Required (*indicate reason*)

Reason:

B. Preliminary Floodplain/Floodway Analysis Report – This report is only required for floodplain/floodway involvement in watercourses that have been studied in detail by FEMA. The report is not required for watercourses with FEMA Flood Hazard Zone "A", "B", or "X" ("C" in older studies) designations or when no zone designation is shown on the FEMA mapping. For projects potentially affecting a regulatory floodplain and floodway, this report and hydraulic analyses contained therein, shall document that the proposed project is in conformance with the applicable flood management standards and criteria prescribed in Sections 25-68b through 25-68h of the Connecticut General Statutes (CGS), Sections 25-68h-1 through 25-68h-3 of the Regulations of Connecticut State Agencies, and Section 13a-94 of the CGS.

The report and hydraulic analyses shall be prepared in accordance with the latest version of the DEP "Hydraulic Analysis Guidance Document" (<http://dep.state.ct.us/pao/download.htm#IWRD>) and the ConnDOT Drainage Manual. The hydraulic analyses shall be performed using the latest version of the ACOE HEC-RAS computer program unless another program has been specified or approved by the Department.

Cross sections for the hydraulic models shall be the same as those used for the published FEMA FIS. The original FEMA FIS hydrologic and hydraulic analysis data is requested as noted in Section 4 of this form. When the FEMA data is unavailable, the DEP guidance document shall be followed. The FIS cross sections may be supplemented, replaced or additional cross sections from field survey information may be inserted into the hydraulic model in order to define the project site as outlined in the DEP guidance document. In cases where discrepancies between the FIS cross sections and the current survey information are unacceptable, or obvious input errors are noted, data from the current survey shall be used.

Peak discharges from the published FEMA FIS shall be used. Unless otherwise noted, the 10, 50, 100, and 500-year peak discharges shall be analyzed for the floodplain (unencroached condition) analysis. The 10 and 100 peak discharges shall be analyzed in the floodway (encroached condition) analysis. When only a portion of the stream reach is being studied by the project, the hydraulic models shall start and end at "lettered" FEMA cross sections.

Required – **Complete Section 13B** Not Required (*indicate reason*)

Reason:

13A. Preliminary Hydraulic Analysis Report

The following hydraulic models shall be developed:

- Existing conditions model* – This model shall be developed to reflect the current, pre-project conditions.
- Natural conditions model* – This model is required for all structure replacements and is typically developed by removing existing structure data from the existing conditions model. Only the 100-year peak discharge needs to be analyzed in the natural conditions model.
- Proposed conditions model* – This model is developed by imposing the proposed structure and any other proposed modifications onto the existing conditions model. Proposed modifications may include, among other things, floodplain encroachments resulting from the proposed highway and bridge design and any stream channel relocations/restorations. The preliminary hydraulic design and proposed model shall also address any fisheries and aquatic habitat concerns identified by the DEP Fisheries review. The hydraulic models shall be compared to verify that there are no increases in elevations from existing to proposed conditions and that the proposed conditions model does not increase the water surface elevation by more than one foot over the natural conditions for the 100-year storm event. The proposed conditions model results shall be used to verify that the design of culverts and bridges satisfy the design criteria outlined in Tables 8-4 and 9-2 of the Drainage Manual. In certain cases where these and other design criteria can not be satisfied due to site conditions or other constraints, the report must document the reasons, potential impacts and provide recommendations.
- Temporary conditions model* – In combination with the anticipated construction methodology and/or stage construction plans, conceptual water handling and flood contingency plans shall be developed. The temporary conditions model shall reflect any obstructions and reduced channel capacities caused by temporary hydraulic facilities that are used to temporarily divert stream flow or isolate work areas from the stream flow as shown in the water handling plan. All stages of construction shall be analyzed using a temporary design flow as determined by the methodology in Chapter 6, Appendix F, "Hydrology for Temporary Facilities", of the Drainage Manual. In some cases, an analysis of the worst-case scenario only, may be acceptable to document that the temporary condition will not cause or exacerbate flooding of the roadway or private property or result in excessive erosion and sedimentation. As a part of the development of a flood contingency plan for the project, storms greater than the temporary design storm shall also be evaluated and, if necessary, the water handling/stage construction plans shall be modified to avoid excessive flooding or erosion during construction.
 - All hydraulic models for a specific site shall be created and maintained in the same HEC-RAS project (.prj) file using different geometry, flow data and plan files where needed. The HEC-RAS program has been specifically designed to facilitate review of different conditions and scenarios in this fashion.*
- Channel Design – Conceptual plans and calculations shall be included in the report for any channel design, stream relocation/restoration, revetment design, scour countermeasures, fisheries enhancements or other similar work proposed for the project.
- Prepare Report – The report shall include all information required to clearly document the site specific hydraulic analysis and design. At a **minimum**, the report shall include the following material:
 - Location Maps (annotated TRU, USGS Quad, FEMA and aerial maps)
 - Hydraulic Data Sheets (DM, Chapter 9, Appendix A) for each proposed structure based on ConnDOT design discharge.
 - Hydraulic Cross-Section Location Map(s) with topography and contours showing existing and proposed cross section locations. The map(s) shall be developed from the base mapping for the project.
 - Water Surface Profile Plots
 - Existing, Natural & Proposed at 100-year design discharge
 - Existing & Proposed at 10-year design discharge
 - Proposed at 100-year design discharge
 - Comparison Tables
 - Existing vs. Proposed & Proposed vs. Natural 100-year Water Surface Elevation
 - Existing vs. Proposed 10-year Water Surface Elevation
 - Existing vs. Proposed 100-year Average Channel Velocity
 - Existing vs. Proposed 10-year Average Channel Velocity

13A. Preliminary Hydraulic Analysis Report (continued)

- Narrative describing the project; hydrology; hydraulic design criteria, analysis methodology and results; natural, existing and proposed conditions; model boundary conditions; hydraulic structures; channel design, stream relocations and restorations; fish passage; any unusual aspects of the hydraulic analysis, results and design; conclusions and recommendations. For structure replacements that decrease backwater from existing conditions, the narrative shall address qualitatively potential downstream effects due to loss of upstream flood storage volume. If it appears that downstream effects may be detrimental, then additional analyses may be required to verify the effects or the design may need to be modified accordingly. The narrative shall be comprehensive and clear enough to expedite the review process by guiding the reviewers' through the project, the hydraulic analysis and design. The document shall also serve as a record so that the design methodology and intent may be understood should the document be referenced many years in the future. Stage construction, water handling, temporary hydraulic facilities and flood contingency shall be described in a separate narrative included in an appendix to the report.
- Appendices
 - Site photographs
 - Data Collection & Field review Forms
 - HEC-RAS hydraulic model input and output data – Full printout for proposed condition only; HEC-RAS Profile Output Tables – Standard Table 1 including the 2, 10, 25, 50, 100, and 500-year storm events for existing and proposed conditions and 100-year for the natural condition.
 - Hydraulic calculations – Include all miscellaneous hydraulic calculations used for the design of the project.
 - Channel Design – Include all calculations, plates or plans for channel design.
 - Cross section plots – Proposed condition superimposed on existing condition with 10- and 100-year water surfaces and the proposed condition alone with 10- and 100-year water surfaces.
 - Water Handling And Temporary Hydraulic Facility Design – Narrative describing stage construction, water handling, temporary hydraulic facilities, flood contingency and the development and results of the temporary conditions model; Hydrology for Temporary Facilities (worksheet); HEC-RAS Profile Output Table – Standard Table 1; water surface profile plot; cross section plots showing temporary conditions; plates or plans showing construction staging, water handling and the temporary hydraulic facilities.
- Correspondence – Include any correspondence related to the hydraulic design such as a copy of the DEP Fisheries comments and recommendations.
- CD – The report shall include a computer CD containing all files used in the hydraulic analysis including HEC-RAS input files and any spreadsheets developed for the project. The CD shall be labeled with the project information and include a clear index of the files contained therein. Any interim calculation or extraneous files used during the design process shall not be copied onto CD. **(Note: Provided in digital form, not on a CD.)**
- Other – Include any other site or project specific information required to document the hydraulic analysis and design.
- Submit Preliminary Hydraulic Analysis Report to ConnDOT for review prior to or concurrent with the Preliminary Design submission. The persons preparing and checking the report shall sign and date the report. The report shall include the signature of the Department approved hydraulic engineer, date and a professional engineer seal, signature and date.

13B. Preliminary Floodplain/Floodway Analysis Report

- Prior to developing the hydraulic models, the 100-year floodplain limits, floodway and FEMA cross section locations shall be plotted on a plan developed from the base mapping for the project. The proposed conditions shall be superimposed on the plan so that proposed encroachments into the floodplain/floodway can be identified, be eliminated by redesign or be included in the hydraulic models for the project.

The following hydraulic models shall be developed:

- Calibrated model* - Recreate the FEMA model "as-is" with the original FEMA data for the 10, 50, 100 and 500-year storm events using the published FEMA flows. Compare the results of this model with FEMA's published values. In the report narrative, discuss any differences between the calibrated model results and the published FEMA data including any apparent errors or discrepancies in the original data.
- Existing conditions model* – Modify the calibrated or "as-is" model to reflect the current conditions, keeping in mind that if additional cross sections are required for the proposed conditions model, matching cross sections must be included in the existing conditions model. Also, cross sections at the right of way limits are recommended as they may be needed should the proposed condition show minor increases in water surface elevation near the roadway crossing. However, prior to developing this model, the FEMA cross sections within the study reach of the proposal should be compared to current survey information at the location of the FEMA cross sections in order to determine their accuracy. In situations where any discrepancies found between the FEMA data and the current survey information are relatively minor (generally matching to within 0.5' is acceptable), the FEMA data should be used. In cases where the discrepancies between the FEMA cross sections and the current survey information are unacceptable, or obvious input errors are noted, data from the actual site conditions should be utilized. The report shall discuss any differences.
- Existing conditions encroached model* – When a FEMA floodway is present the existing conditions model will be run with encroachments using Method 1 for the 10 and 100-year storm events. The distance between the encroachment stations shall be consistent with the published (FIS "FLOODWAY DATA" table) floodway widths and the floodway widths scaled from the FEMA mapping.
- Proposed conditions model* – Similar to the hydraulic analysis report, this model is developed by imposing the proposed structure and any other proposed modifications onto the existing conditions model. Increases in water surface elevation in the proposed conditions model compared to the existing conditions model shall be eliminated by redesign, where possible. Unavoidable increases and potential impacts must be thoroughly discussed in the report narrative. Adverse impacts will not be approved. If the proposed conditions model differs from the published information by more than 0.5-feet, a notification letter and backup data shall be sent to FEMA and the town per the DEP guidelines. The existing and proposed conditions model shall show convergence of the water surface elevation upstream and downstream of the project. If the water surface elevation is lowered in the proposed condition, convergence within 0.5-feet is acceptable.
- Proposed conditions encroached model* - When a FEMA floodway is present the proposed conditions model will be run with encroachments using Method 1 for the 10 and 100-year storm events. The encroachment stations must be the same as in the existing conditions encroached model. No increase in water surface elevation (0.00') in the proposed encroached conditions model compared to the existing encroached conditions model is allowed. If an increase occurs, the hydraulic models shall be carefully reviewed and/or the project design shall be modified to eliminate the increase. An increase in water surface elevation that converges to the existing condition at or within the State or Town (for municipal projects) right of way may be permissible if there is no adverse impact shown. Cross sections must be located at the right of way limits to demonstrate convergence. Other unavoidable increases in water surface elevation or modifications to the regulatory floodway will not be permitted without prior approval of a conditional letter of map revision (CLOMR) from FEMA.
- All hydraulic models for a specific site shall be created and maintained in the same HEC-RAS project (.prj) file using different geometry, flow data and plan files where needed. The HEC-RAS program has been specifically designed to facilitate review of different conditions and scenarios in this fashion.*
- Prepare Report – The report shall include all information required to clearly document the site specific hydraulic analysis and design. At a minimum, the report shall include the following material:
 - Location Maps (annotated TRU, USGS Quad, FEMA and aerial maps)
 - Hydraulic Data Sheets (DM, Chapter 9, Appendix A) for each proposed structure based on FEMA discharge.
 - Plan showing floodplain/floodway involvement.
 - Hydraulic Cross-Section Location Map(s) with topography and contours showing FEMA cross section locations and any additional existing and proposed cross section locations. The map(s) shall be developed from the base mapping for the project or other mapping that has been approved for use by the Department.

13B. Preliminary Floodplain/Floodway Analysis Report (continued)

- Water Surface Profile Plots
 - Existing & Proposed conditions at 100-year design discharge
 - Existing encroached & Proposed encroached conditions at 100-year design discharge
 - Existing & Proposed conditions at 10-year design discharge
 - Existing encroached & Proposed encroached conditions at 10-year design discharge
 - Proposed conditions and Proposed encroached conditions at 100-year design discharge
- Comparison Tables
 - FEMA FIS model vs. Calibrated model & Calibrated model vs. Existing conditions model 100-year Water Surface Elevation
 - Existing conditions & Existing encroached conditions vs. Proposed conditions & Proposed encroached conditions 100-year Water Surface Elevation
 - Existing conditions & Existing encroached conditions vs. Proposed conditions & Proposed encroached conditions 10-year Water Surface Elevation
 - Existing vs. Proposed conditions 100-year Average Channel Velocity
 - Existing vs. Proposed conditions 10-year Average Channel Velocity
- Narrative describing the project; location(s) and description of floodplain/floodway involvement; FEMA FIS data, FEMA cross sections, accuracy and use of additional cross sections to define site; FEMA and project hydrology; hydraulic design criteria; hydraulic structures; channel design, stream relocations and restorations; fish passage; FEMA and project analysis methodology and results; FEMA calibrated model, existing and proposed unencroached and encroached conditions models; model boundary conditions; any unusual aspects of the hydraulic analysis, results and design; conclusions and recommendations. The narrative shall be comprehensive and clear enough to expedite the review process by guiding the reviewers' through the project, hydraulic analysis and design. The narrative shall cross reference any pertinent information contained in the separately bound Hydrologic, Hydraulic Analysis, and Drainage reports prepared for the project.
- Appendices
 - FEMA FIS data – FIS cover page, summary of discharges, floodway data table, flood profiles, copy of FIS hydrologic and hydraulic analyses obtained from FEMA.
 - HEC-RAS hydraulic model input and output data – Full printout for proposed conditions and proposed encroached conditions only; HEC-RAS Profile Output Tables – Standard Table 1 for (1) the 10, 50, 100, and 500-year storm events for existing and proposed conditions, (2) 100-year existing, existing encroached, proposed and proposed encroached conditions and (3) 10-year existing, existing encroached, proposed and proposed encroached conditions.
 - Cross section plots – Proposed conditions & proposed encroached conditions superimposed on existing conditions & existing encroached conditions with 10- and 100-year water surfaces shown separately.
- CD – The report shall include a computer CD containing all files used in the hydraulic analysis including HEC-RAS input files and any spreadsheets developed for the project. The CD shall be labeled with the project information and include a clear index of the files contained therein. Any interim calculation or extraneous files used during the design process shall not be copied onto CD. **(Note: Provided in digital form, not on a CD.)**
- Other – Include any other site or project specific information required to document the hydraulic analysis and design.
- Submit to ConnDOT for review prior to or concurrent with the Preliminary Design submission. The persons preparing and checking the report shall sign and date the report. The report shall include the signature of the Department approved hydraulic engineer, date and a professional engineer seal, signature and date.

Culverts and Bridges

Complete this section <i>only</i> if the proposed project includes the repair, modification, replacement or new construction of a culvert or bridge. Use a separate worksheet for each culvert/bridge on the project.			
Bridge No.	Roadway	Station/Location	Stream Name
05501	Arrowhead Road		Norwalk River
All culverts and bridges are designed in accordance with methods and procedures defined in the DOT Drainage Manual as revised, DOT 816 as revised and the CT 2004 Stormwater Quality Manual as revised.			
Utilizing the DOT Drainage Manual classifications listed below, the culvert or bridge is classified as a:			
<input type="checkbox"/> <i>Minor Structure</i> - Minor structures have a drainage area of less than one square mile in which there is no established watercourse. They shall be designed to pass the 25 year frequency discharge.			
<input type="checkbox"/> <i>Small Structure</i> - Small structures have a drainage area of less than one square mile in which there is an established watercourse. They shall be designed to pass the 50 year frequency discharge.			
<input type="checkbox"/> <i>Intermediate Structure</i> - Intermediate structures have a drainage area greater than one square mile and less than 10 square miles. They shall be designed to pass the 100 year frequency discharge with reasonable underclearance.			
<input checked="" type="checkbox"/> <i>Large Structure</i> - Large structures have a drainage area greater than 10 square miles and less than 1000 square miles. They shall be designed to pass the 100 year frequency discharge with an underclearance not less than two feet.			
<input type="checkbox"/> <i>Monumental Structure</i> - Monumental structures <i>have</i> a drainage area greater than 1000 square miles. They shall be designed to meet the requirements of the Connecticut Department of Environmental Protection, U.S. Army Corps of Engineers, and the U.S. Coast Guard.			
<input type="checkbox"/> <i>Tidal Structure</i> - Tidal structures are subject to tidal action and shall be classified as minor, small, intermediate, etc. depending on their drainage area. These structures shall be designed in accordance with the previously listed <i>classifications</i> . However if the highway is subject to frequent tidal flooding, the design storm may be made consistent with the frequency of flooding by tidal action. The proposed culvert or bridge is classified as:			
<input type="checkbox"/> Minor <input type="checkbox"/> Small <input type="checkbox"/> Intermediate <input type="checkbox"/> Large <input type="checkbox"/> Monumental			
Note: Underclearance requirements are most applicable to bridge superstructures that are subject to buoyancy and damage from debris impact and are not applicable to culverts (enclosed conduits).			
Culverts and bridges will be designed for flood frequencies and underclearances stipulated in the DOT Drainage Manual as listed above, except that on local roads and driveways with low traffic volumes and where alternate routes are available, lower design criteria are acceptable when:			
<input checked="" type="checkbox"/> Flood discharges may be allowed to cross over roads that are at or close to the floodplain grade.			
<input checked="" type="checkbox"/> Water surface elevations are not increased by more than one foot, and will not cause damage to upstream properties.			
<input checked="" type="checkbox"/> Provisions are made to barricade the road when overtopped.			
<input checked="" type="checkbox"/> The road or driveway is posted as being subject to flooding.			
Has the structure been designed in accordance with the criteria established in the DOT Drainage Manual?			Yes/No
			No
If no, have the preceding conditions been incorporated with the lower design criteria (Yes/No)?			Yes
The culvert or bridge has been designed for:		Design Frequency (Year)	Underclearance (feet)
		100	-1.9

Describe the lower design standards and the reasons for not complying with the DOT Drainage Manual

A waiver was requested for the design criteria for a minimum 2-foot underclearance for large structures and a minimum 1-foot freeboard. The proposed replacement Bridge No. 05501 does not meet the underclearance or freeboard criteria. It is not feasible for the project to meet the design criteria, because the existing roadway is near the 100-year base flood elevation. Due to the bridge and surrounding infrastructure, including driveways, being near or below the 100-year base flood elevation, it is impractical to raise the roadway to achieve the underclearance and freeboard criteria due to significant additional work and costs beyond the scope of this project. In addition, the weir flow that occurs over the roadway during base flood maintains the compliance with NFIP and CT DEEP FM Program by matching or lowering the 100-year base flood elevation.

Culverts and Bridges (continued)

<p>Design Discharge – If the subject site is located in a FEMA floodway or a <i>numbered</i> “A” zone, the discharge for analyzing the acceptability of a project at that site must be the same discharge used by FEMA in establishing the floodway or <i>numbered</i> “A” zone designation for the site. If the subject site is located in an <i>unnumbered</i> “A” zone or is not located in a FEMA flood zone, such that no detailed study is available, hydrologic analysis must be performed to establish an appropriate design discharge for evaluating the acceptability of the project at that site. If a design discharge is recommended other than the discharge used by FEMA, the designer must still evaluate the project using the FEMA design discharge and provide a detailed justification as to why another discharge was selected.</p>			
100-Year FEMA Discharge (cfs)	7,455	100-Year Design Discharge (cfs)	4,850
<p>Natural Condition – Bridges and culverts should be designed so that the proposed water surface profile does not exceed the natural profile by more than one foot for the 100-year floodplain analysis. This applies to the replacement of existing bridges and culverts as well as the construction of new structures.</p>			
Will the proposed culvert or bridge meet this standard?	Yes/No	Maximum Increase Proposed vs Natural (feet) Is?	
	Yes	0.2	
<p>If no, provide justification below: N/A</p>			
<p>Headwater – Will the proposed culvert or bridge be designed so that flooding during the design discharge does not endanger the roadway or cause damage to upstream developed property?</p>			Yes/No
			No
<p><i>Freeboard</i> is defined as the vertical distance between the design water surface and the upstream control such as the low point of the roadway edge, sill of a building or other controlling element. Indicate the amount of freeboard (in feet) provided in the proposed culvert or bridge design:</p>			-1.6
<p>Indicate the hydraulic design control(s) for the proposed culvert or bridge below:</p> <p><input checked="" type="checkbox"/> The elevation of roadway edge at roadway low point <input type="checkbox"/> The sill elevation of building or other structure</p> <p><input type="checkbox"/> A water surface elevation equal or less than the FEMA regulatory elevation <input type="checkbox"/> One foot over natural condition requirement</p> <p><input type="checkbox"/> A water surface elevation non-damaging or not encroaching onto private property <input type="checkbox"/> A ratio of the headwater/culvert depth (HW/D) less than 1.5</p> <p><input type="checkbox"/> A water surface elevation below a divide where the flow would be diverted from the area tributary to the culvert <input type="checkbox"/> Maintain existing water surface elevation and flood storage due to downstream flooding concerns</p> <p><input type="checkbox"/> Other:</p>			
<p>Downstream Peak Flows – Will the proposed culvert or bridge increase downstream peak flows by decreasing existing headwater depths during flooding events?</p>			Yes/No
			No
<p>If yes, describe the selected design criteria and the impacts to downstream properties: N/A</p>			

Culverts and Bridges (continued)

Alignment – If the proposed bridge or culvert is new construction, has the structure been aligned to minimize the relocation of the watercourse? <input checked="" type="checkbox"/> No new alignment	Yes/No
	N/A
Fish Passage – Does the culvert design allow for the passage of fish?	Yes/No
	N/A
Has the rigid floors at new or replaced bridges and culverts been depressed a minimum of one foot below the normal streambed with one foot native streambed material on top? <input checked="" type="checkbox"/> No rigid structural floor	Yes/No
	N/A
If no, has written approval been obtained from DEP Fisheries (Yes/No)?	N/A
Describe the specific design provisions for fish passage: N/A	
Parapet Walls – Does the design utilize solid parapet walls in the sag part of a vertical curve?	Yes/No
	No
If yes, has the use of such walls been deemed hydraulically acceptable by the DOT Hydraulics and Drainage?	Yes/No
	N/A
Multiple Openings – The use of a single large culvert or bridge opening is preferred over the use of multiple small openings. Has the design minimized the use of multiple small openings? If no, explain: N/A	Yes/No
	Yes
Debris Blockage – Is the culvert or bridge prone to blockage by debris?	Yes/No
	No
If yes, has the project design incorporated measures to minimize the potential for debris blockage?	Yes/No
	N/A
(Empty row)	
(Empty row)	

Temporary Hydraulic Facilities

This section must be completed if the project requires a temporary hydraulic facility for water handling, temporary stream diversion and stage construction. Temporary hydraulic facilities include, among other things, all channels, culverts, bridges or channel constrictions such as cofferdams which are required for haul roads, channel relocations, culvert installations, bridge construction, temporary roads, or detours. They are to be designed with the same care which is used for the primary facility.

Has such facility been designed in accordance with Chapter 6, Appendix F, "Temporary Hydraulic Facilities," of the DOT Drainage Manual? Yes No If yes, the design flood frequency is the: **2** year flood.

Describe the temporary facilities:

Temporary cofferdams, consisting of sheet piling or other approved system, will safely convey water flows through the construction area and shall be able to support construction activity and excavation. A minimum 22' span between cofferdams shall be maintained throughout construction, and the top of cofferdam elevation shall be approx. el. 137.9'. A pump discharge basin/ silt bag shall be established outside of the wetland limits and within the ROW if possible. Any "unconfined" instream work within the brook shall be restricted to the period from July 1 to September 30, inclusive.

Storm Drainage Systems

Complete this section *only* if the proposed project includes the construction of subsurface storm drainage systems.

- a. *DOT Standards* - Is the proposed storm drainage system designed in accordance with the Connecticut Department of Transportation's (DOT) Drainage Manual? Yes No

If no, describe the lower design standards and the reasons for not complying with the Drainage Manual:

- b. *Design Storm* - Is the storm drainage system designed for a ten year frequency storm without closing the use of the facility? Yes No

- c. *Future Development* - Has the design of the system considered future development of adjacent properties?

Yes No

- d. *Outlet Protection* - Have the outlets from the system been designed to minimize the potential for downstream erosion?

Yes No

- e. *Overland Flow* - Has the use of curbing been minimized to encourage overland dispersed flow through stable vegetated areas? Yes No

- f. *Vegetated Filter Strips* - Has the design incorporated the use of vegetated filter strips or grass swales to improve the quality of water outletting from the storm drainage system? Yes No

- g. *Stormwater Treatment* - Describe features of the stormwater collection system intended to improve the quality of stormwater runoff prior to its discharge to surface waters.

The drainage system has included 4 single grate catch basins; two catch basins east and west of Bridge 05501. These catch basins are on a sag vertical curve, collecting water along Arrowhead Road. At each basin a sediment control system will be installed. 20 linear feet of granite stone curbing is proposed at all four corners of the bridge approach as well to minimize erosion effects.

- h. *E & S Control Plan* - Has the design and installation of the storm drainage system been coordinated with the soil erosion and sediment control plan prepared in accordance with the 2002 Connecticut Guidelines for Soil Erosion and Sediment Control?

Yes No

Explain:- The project conforms to the soil and sediment control protocol as documented in the 2002 CT Guidelines for Soil Erosion and Sediment Control. Throughout the course of the project, proper sedimentation control systems will be utilized. At the completion of the project, disturbed areas will be seeded and will be restored with tree plantings to prevent erosion.

Alterations of Watercourses

Complete this section *only* if the proposed project includes the construction or alteration to a natural perennial watercourse or man-made channel

- a. *Topography Change* - Is the watercourse or channel located within a regulatory floodway or Zone A1-30 or AE as designated by the NFIP? Yes No
- b. *Hydraulic Capacity* - Does the channel have a minimum flow capacity of a flood equal to at least the 25 year frequency flood? Yes No

The channel capacity is designed for the: year flood.

Does the channel have an inner channel with a capacity of a 2 year frequency flood? Yes No

- c. *Aquatic Habitat* - Channel alterations should be designed to create aquatic habitats suitable for fisheries, including suitable habitat for maintaining fish populations and to enable fish passage, and to maintain or improve water quality, aesthetics, and recreation.

Has the applicant had any pre-application meetings or correspondence with DEP Fisheries?

Yes No

Check each of the following criteria that have been incorporated into the project design:

- 1. artificial channel linings have been avoided;
- 2. the channel will encourage ecological productivity and diversity;
- 3. the channel and its banks will be compatible with their surroundings;
- 4. the channel will vary in its width, depth, invert elevations, and side slopes to provide diverse aquatic habitat;
- 5. straightening existing channels and thereby decreasing their length has been avoided;
- 6. the channel will not create barriers to upstream and downstream fish passage;
- 7. the channel will contain pools and riffles and a low flow channel to concentrate seasonal low water flows;
- 8. the channel will contain flow deflectors, boulders and low check dams to enhance aquatic habitat;
- 9. stream bank vegetation will be preserved where feasible and disturbed stream bank areas will be replanted with suitable vegetation;
- 10. clean natural stream bed materials of a suitable size will be incorporated in the new channel; and
- 11. construction of the proposed project will be scheduled to minimize conflicts with spawning, stocking, and recreational fishing seasons.

Describe how the above aquatic habitat design criteria have been incorporated into the project design:

Stormwater Detention Facilities

Complete this section *only* if the proposed project includes the construction of any stormwater detention facilities.

Has the DEP determined whether a dam construction permit is required? Yes No

The pre and post development peak flow rates at the downstream design point are as follows:

Return Frequency (Year)	Peak Discharges (CFS)		
	Pre-Development	Post-Development (without detention)	Post-Development (with detention)
2			
10			
100			

The above peak discharges were computed utilizing the: _____ hour duration storm. This duration storm was selected because:

Describe the location of the design point and why this location was chosen:

If the proposed project increases peak flow rates for the 2, 10 or 100 year frequency discharges, describe the impacts to downstream areas:

Will the detention facility aggravate erosion along the downstream channel? Yes No

In certain situations, detention of stormwater aggravates downstream flooding. This occurs when the discharge from a subwatershed is delayed by a detention facility so that it adds to the peak discharge from another subwatershed. Adding the hydrographs of the two subwatersheds results in a higher peak discharge over that which would occur if detention were not present.

Is the location of the detention facility within the watershed suitable for detention? Yes No

Explain:

Standards for Structures (Buildings/Facilities) in Floodplains or Coastal High Hazard Areas

Complete this section *only* if the proposed project involves a new or substantially improved structure or facility located within a floodplain or coastal high hazard area.

a. *Structures in Coastal High Hazard Areas* - Will the structure or facility be located within an NFIP coastal high hazard area?

- Yes No

If no, skip to paragraph 3(b); if yes:

1. Will the structure or facility be located landward of the reach of mean high tide?

- Yes No

2. Will a new structure or facility be located on an undeveloped coastal barrier beach designated by FEMA?

- Yes No

3. If the structure or facility is/will be located within a coastal high hazard area, the structure or facility must be elevated on pilings or columns so that the bottom of the lowest horizontal structural member of the lowest floor (excluding the pilings or columns) is elevated to at least one foot above the base flood level and the pile or column foundation and structure attached thereto must be anchored to resist floatation, collapse and lateral movement due to the effects of wind, velocity waters, hurricane wave wash, and base flood water loads acting simultaneously on all building components.

Does the proposed structure or facility meet these standards? Yes No

The base flood elevation is: ft. (Datum:)

The elevation of the lowest horizontal structural member is: ft. (Datum:)

4. Will the space below the lowest floor be either free of obstruction or constructed with non-supporting breakaway walls?

- Yes No

5. Will fill be used for structural support of any buildings within coastal high hazard areas?

- Yes No

b. *Structures in Floodplain Areas* - Are the structures residential or nonresidential?

- Residential Nonresidential If *nonresidential*, skip to paragraph 3(d) below.

c. *Residential Structures* - If the structure or facility is for human habitation will the lowest floor of such structure or facility, including its basement, be elevated one foot above the level of the 500 year flood?

- Yes No

The 500 year flood elevation is: ft. (Datum:)

The elevation of the lowest floor, including basement, is: ft. (Datum:)

d. *Non-residential Structures* - If the structure or facility is not intended for residential uses, will the lowest floor of such structure or facility, including its basement, be elevated to or above the 100 year flood height or be floodproofed to that height, or in the case of a critical activity, the 500 year flood height?

- Yes No

If yes, the structure will be: Elevated Floodproofed

The base flood elevation is: ft. (Datum:)

The elevation of the lowest floor, including basement, is: ft. (Datum:)

The structure is floodproofed to: ft. (Datum:)

Note: for insurance purposes nonresidential structures must be floodproofed to at least one foot above the base flood elevation. DEP strongly encourages that the height of floodproofing incorporate one foot of freeboard.

Standards for Structures (Buildings/Facilities) in Floodplains or Coastal High Hazard Areas (continued)

- e. *Utilities* - Will service facilities such as electrical, heating, ventilation, plumbing, and air conditioning equipment be constructed at or above the elevation of the base flood or floodproofed with a passive system?

Yes No

- f. *Water Supply Systems* - Does the proposed project include a new or replacement water supply system?

Yes No

If yes, is the water supply system designed to prevent floodwaters from entering and contaminating the system during the base flood?

Yes No

- g. *Sanitary Sewage Systems* - Does the proposed project include a new or replacement sanitary sewage or collection system?

Yes No

If yes, is the sanitary sewage system designed to minimize or eliminate the infiltration of flood waters into the systems and discharges from the systems into flood waters during the base flood?

Yes No

- h. *Foundation Drains* - Are foundation drains of buildings designed to prevent backflow from the 100 year frequency flood into the building?

Yes No No foundation drains

Appendix:

Appendix A – FEMA FIRM/DOCUMENTATION

Appendix B – CT DEEP FISHERIES CORRESPONDENCE

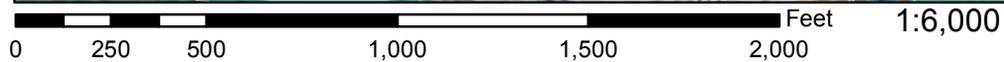
Appendix C – ENVIRONMENTAL PERMIT PLANS

Appendix A – FEMA FIRM/DOCUMENTATION

National Flood Hazard Layer FIRMette



41°10'40.76"N



Legend

SEE FIS REPORT FOR DETAILED LEGEND AND INDEX MAP FOR FIRM PANEL LAYOUT

SPECIAL FLOOD HAZARD AREAS	Without Base Flood Elevation (BFE) Zone A, V, A99	With BFE or Depth Zone AE, AO, AH, VE, AR
	Regulatory Floodway	

		0.2% Annual Chance Flood Hazard, Areas of 1% annual chance flood with average depth less than one foot or with drainage areas of less than one square mile Zone X
		Future Conditions 1% Annual Chance Flood Hazard Zone X
		Area with Reduced Flood Risk due to Levee. See Notes. Zone X
		Area with Flood Risk due to Levee Zone D

OTHER AREAS OF FLOOD HAZARD

		NO SCREEN Area of Minimal Flood Hazard Zone X
		Effective LOMRs
		Area of Undetermined Flood Hazard Zone D

OTHER AREAS

		Channel, Culvert, or Storm Sewer
		Levee, Dike, or Floodwall

GENERAL STRUCTURES

		20.2 Cross Sections with 1% Annual Chance Water Surface Elevation
		17.5 Coastal Transect
		Base Flood Elevation Line (BFE)
		Limit of Study
		Jurisdiction Boundary
		Coastal Transect Baseline
		Profile Baseline
		Hydrographic Feature

OTHER FEATURES

		Digital Data Available
		No Digital Data Available
		Unmapped

MAP PANELS

The pin displayed on the map is an approximate point selected by the user and does not represent an authoritative property location.

This map complies with FEMA's standards for the use of digital flood maps if it is not void as described below. The basemap shown complies with FEMA's basemap accuracy standards

The flood hazard information is derived directly from the authoritative NFHL web services provided by FEMA. This map was exported on 7/25/2019 at 8:52:33 AM and does not reflect changes or amendments subsequent to this date and time. The NFHL and effective information may change or become superseded by new data over time.

This map image is void if the one or more of the following map elements do not appear: basemap imagery, flood zone labels, legend, scale bar, map creation date, community identifiers, FIRM panel number, and FIRM effective date. Map images for unmapped and unmodernized areas cannot be used for regulatory purposes.

73°24'46.24"W

41°10'13.68"N

USGS The National Map: Orthoimagery. Data refreshed April, 2019.

Wright, Darren

From: Aaron Foster
Sent: Tuesday, April 28, 2020 11:19 AM
To: Jenkins, Debra; Tovar, Jeremy
Cc: Scott Young; Pete Parent; Greene, Susan
Subject: RE: EXTERNAL: RE: FEMA Engineering Library Data Request Case NO. B1901106

Hi Debra – Susan Green sent over files.

Thank you,
Aaron

Aaron Foster, PE | Project Manager
afoster@cmeengineering.com
101 East River Drive· East Hartford, CT 06108
T 860-595-3372

From: Jenkins, Debra <Debra.Jenkins@mbakerintl.com>
Sent: Tuesday, April 28, 2020 11:07 AM
To: Aaron Foster <AFoster@cmeengineering.com>; Tovar, Jeremy <Jeremy.Tovar@mbakerintl.com>
Cc: Scott Young <SYoung@cmeengineering.com>; Pete Parent <pparent@cmeengineering.com>
Subject: RE: EXTERNAL: RE: FEMA Engineering Library Data Request Case NO. B1901106

Good Morning Aaron,

Have you received a response from anyone yet?

Respectfully,
Debra

From: Aaron Foster <AFoster@cmeengineering.com>
Sent: Friday, April 17, 2020 10:30 AM
To: Tovar, Jeremy <Jeremy.Tovar@mbakerintl.com>
Cc: Scott Young <SYoung@cmeengineering.com>; Pete Parent <pparent@cmeengineering.com>; Jenkins, Debra <Debra.Jenkins@mbakerintl.com>
Subject: EXTERNAL: RE: FEMA Engineering Library Data Request Case NO. B1901106

Hi Jeremy and Debra,

In October you provided us with the HEC-2 Data for the Norwalk River in Wilton. Looking through the historic information on-line there is a LOMR (attached), requested in February 1998 and made effective in September 1999, that revised Town of Wilton Cross Sections B through E (Current County Wide Cross Sections K through N). This is the area immediately downstream of one of our Bridges (05501 Arrowhead Road). Is the HEC-2 backup data, prepared by Allan Davis Associates, mentioned in the LOMR available?

Let me know if we need to file a separate request, or if you need any additional information.

Thank you,
Aaron

Aaron Foster, PE | Project Manager
afoster@cmeengineering.com
101 East River Drive· East Hartford, CT 06108
T 860-595-3372

From: Tovar, Jeremy <Jeremy.Tovar@mbakerintl.com>
Sent: Tuesday, October 15, 2019 3:05 PM
To: Aaron Foster <AFoster@cmeengineering.com>
Subject: FEMA Engineering Library Data Request Case NO. B1901106

Good afternoon,

We have completed your FEMA engineering library data request, you will receive a second email shortly allowing you to download the available data. Please note we were not able to locate any hydrology for your area of interests.

Thank you,

Jeremy Tovar | Document Control Specialist
3601 Eisenhower Ave, Suite 600 | Alexandria, VA 22304 | [O]571-357-6061 jeremy.tovar@mbakerintl.com |
[www.mbakertnl.com]www.mbakertnl.com |



This email has been scanned for spam and viruses by Proofpoint Essentials. Click [here](#) to report this email as spam.

Wright, Darren

From: Aaron Foster
Sent: Friday, April 17, 2020 1:11 PM
To: Scott Young; Robin Stone
Cc: Pete Parent; Thomas Lopata
Subject: FW: EXTERNAL: RE: FEMA Data Request

Follow Up Flag: Follow up
Flag Status: Flagged

FYI. I will send any additional updates.

Aaron Foster, PE | Project Manager
afoster@cmeengineering.com
101 East River Drive· East Hartford, CT 06108
T 860-595-3372

From: Greene, Susan <Susan.Greene@mbakerintl.com>
Sent: Friday, April 17, 2020 1:10 PM
To: Aaron Foster <AFoster@cmeengineering.com>
Subject: Re: EXTERNAL: RE: FEMA Data Request

I can take a look for this, no problem

Susan

Sent from [Outlook Mobile](#)

From: Aaron Foster <AFoster@cmeengineering.com>
Sent: Friday, April 17, 2020 11:41:49 AM
To: Greene, Susan <Susan.Greene@mbakerintl.com>
Subject: EXTERNAL: RE: FEMA Data Request

Hi Susan –

In October you provided us with the HEC-2 Data for the Norwalk River in Wilton. Looking through the historic information on-line there is a LOMR (attached), requested in February 1998 and made effective in September 1999, that revised Town of Wilton Cross Sections B through E (Current County Wide Cross Sections K through N). This is the area immediately downstream of one of our Bridges (05501 Arrowhead Road). Is the HEC-2 backup data, prepared by Allan Davis Associates, mentioned in the LOMR available?

Let me know if we need to file a separate request, or if you need any additional information.

Thanks in advance,
Aaron

Aaron Foster, PE | Project Manager
afoster@cmeengineering.com

101 East River Drive· East Hartford, CT 06108
T 860-595-3372

From: Greene, Susan <Susan.Greene@mbakerintl.com>
Sent: Friday, April 17, 2020 11:40 AM
To: Aaron Foster <AFoster@cmeengineering.com>
Subject: FEMA Data Request

I am the lead processor, please let me know if there is anything I can do to help complete your request.

Sent from [Outlook Mobile](#)

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This email has been scanned for spam and viruses by Proofpoint Essentials. Click [here](#) to report this email as spam.

Wright, Darren

From: Aaron Foster
Sent: Friday, April 17, 2020 10:58 AM
To: Pete Parent
Cc: Scott Young
Subject: RE: RE: FEMA Engineering Library Data Request Case NO. B1901106

Got it and email request has been sent.

Thanks,
Aaron

Aaron Foster, PE | Project Manager
afoster@cmeengineering.com
101 East River Drive· East Hartford, CT 06108
T 860-595-3372

From: Pete Parent <pparent@cmeengineering.com>
Sent: Friday, April 17, 2020 10:15 AM
To: Aaron Foster <AFoster@cmeengineering.com>
Cc: Scott Young <SYoung@cmeengineering.com>
Subject: FW: RE: FEMA Engineering Library Data Request Case NO. B1901106

Hi Aaron,

Below and attached is the information I sent off to Jeremy for Arrowhead. Let me know if you need anything else to send off to your contact.

From: Pete Parent
Sent: Monday, February 24, 2020 3:40 PM
To: 'Jeremy.Tovar@mbakerintl.com' <Jeremy.Tovar@mbakerintl.com>
Cc: Aaron Foster <AFoster@cmeengineering.com>; Robin Stone <Rstone@cmeengineering.com>; Scott Young <SYoung@cmeengineering.com>; Thomas Lopata <T Lopata@cmeengineering.com>
Subject: FW: RE: FEMA Engineering Library Data Request Case NO. B1901106

Hi Jeremy,

Just following up on this. Have you had an opportunity to see if this data is available?

Thank You,
Pete

From: Pete Parent
Sent: Friday, February 7, 2020 9:20 AM
To: Jeremy.Tovar@mbakerintl.com
Cc: Aaron Foster <AFoster@cmeengineering.com>; Robin Stone <Rstone@cmeengineering.com>; Scott Young <SYoung@cmeengineering.com>; Thomas Lopata <T Lopata@cmeengineering.com>
Subject: RE: FEMA Engineering Library Data Request Case NO. B1901106

Hi Jeremy,

In October you provided us with the HEC-2 Data for the Norwalk River in Wilton. Looking through the historic information on-line there is a LOMR (attached), requested in February 1998 and made effective in September 1999, that revised Town of Wilton Cross Sections B through E (Current County Wide Cross Sections K through N). This is the area immediately downstream of one of our Bridges (05501 Arrowhead Road). Is the HEC-2 backup data, prepared by Allan Davis Associates, mentioned in the LOMR available?

Let me know if we need to file a separate request, or if you need any additional information.

Thank You,
Pete

Pete Parent | Senior Civil Engineer

Professional Engineer: CT, MA, NY

pparent@cmeengineering.com



33 Wilbur Cross Way, Suite 105 · Mansfield, CT 06268

T 860.885.1055 ext. 2013 · C 860.933.2914 · www.cmeengineering.com

Wright, Darren

From: Aaron Foster
Sent: Tuesday, March 24, 2020 11:46 AM
To: Scott Young; Robin Stone
Cc: thomas bulzak; Anand Seshadri (ASeshadri@cmeengineering.com); Don Wurst
Subject: FW: FEMA DATA REQUEST

Folks – FEMA is processing our data request.

-Aaron

Aaron Foster, PE | Project Manager
afoster@cmeengineering.com
101 East River Drive· East Hartford, CT 06108
T 860-595-3372

From: Jenkins, Debra (CTR) <debra.jenkins@associates.fema.dhs.gov>
Sent: Tuesday, March 24, 2020 11:44 AM
To: Aaron Foster <AFoster@cmeengineering.com>
Subject: FEMA DATA REQUEST

We have received your request for data in New Haven & Fairfield County and have assigned it request number B2001051. Susan Greene will process your request. Should she need additional information she will reach out to you. You can contact her directly at susan.greene@associates.fema.dhs.gov

Debra Jenkins | General Clerk
FEMA Engineering Library | Michael Baker International
3601 Eisenhower Avenue, Ste 500 | Alexandria, VA 22304
(O) 571-357-6012

This email has been scanned for spam and viruses by Proofpoint Essentials. Click [here](#) to report this email as spam.

Wright, Darren

From: Aaron Foster
Sent: Tuesday, October 15, 2019 4:15 PM
To: Scott Young; Robin Stone
Subject: FW: FEMA Engineering Library Data Request Case NO. B1901106

Scott/Robin – we received the FEMA back-up data. I put them in the respective FEMA folders for each bridge.

-Aaron

Aaron Foster, PE | Project Manager
afoster@cmeengineering.com
101 East River Drive· East Hartford, CT 06108
T 860.290.4100 ext. 1172

From: Tovar, Jeremy <eFTP@mbakerintl.com>
Sent: Tuesday, October 15, 2019 3:02 PM
To: Aaron Foster <AFoster@cmeengineering.com>
Subject: FEMA Engineering Library Data Request Case NO. B1901106



Jeremy.Tovar@mbakerintl.com has sent you an attachment(s) using Baker eFTP

Message

Text:

To retrieve your attachment(s), click on the secure link below.

<https://eFTP.mbakerintl.com/message/AyunDaCMD1EFoY4BDaCHQj>

Access to this information will expire on 2019-10-31

First time user of the Michael Baker Intl. eFTP system? [Click this link](#) for assistance with the new user creation process. If you are unable to access this website, contact the Michael Baker IT Support Desk at 1-866-447-6333 or e-mail us at ITServices@mbakerintl.com

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Wright, Darren

From: Aaron Foster
Sent: Monday, October 14, 2019 3:30 PM
To: jeremy.tovar@mbakerintl.com
Cc: Jenkins, Debra
Subject: RE: FEMA DATA REQUEST

Good Afternoon Jeremy,

I was wondering if there was any update on the data request?

Thank you very much,
Aaron

Aaron Foster, PE | Project Manager

afoster@cmeengineering.com

101 East River Drive· East Hartford, CT 06108

T 860.290.4100 ext. 1172

From: Jenkins, Debra <Debra.Jenkins@mbakerintl.com>
Sent: Friday, September 13, 2019 11:06 AM
To: Aaron Foster <AFoster@cmeengineering.com>
Subject: FEMA DATA REQUEST

We have received your request for data in Hartford and Fairfield Counties and have assigned it request # B1901106. Jeremy Tovar will process your request. Please contact him directly @ jeremy.tovar@mbakerintl.com

Debra Jenkins | General Clerk

Michael Baker International

3601 Eisenhower Ave, Suite 600 | Alexandria, VA 22304

[O] 571-357-6012

debra.jenkins@mbakerintl.com | www.MBakerintl.com

Appendix B – CT DEEP FISHERIES CORRESPONDENCE



**Connecticut Department of
Energy & Environmental Protection**

Bureau of Natural Resources
Fisheries Division
Habitat Conservation and Enhancement Program
Western District Headquarters
230 Plymouth Road
Harwinton, CT 06791
Tel: (860) 424-3926

TO: Marilyn Gould, Transportation Planner
FROM: Matthew Goclowski, Fisheries Biologist
DATE: November 12, 2019
SUBJECT: Fisheries Review DOT Project 161-143

Type of Permit:

1. **DOT Culvert/Bridge Projects** **Project#:**161-143 **Bridge#:** 05501
 2. **Diversion**
 3. **PGP/Inland Wetland**
 4. **Water Quality Certification**

Applicant: Connecticut Department of Transportation

Permit Application Number: N/A **Town:** Wilton

Waters: Norwalk River **Sub Regional Basin #:** 7300

Project Scope: The project involves replacing an existing single span structure 60 feet in length that conveys Arrowhead Road over the Norwalk River. The current structure provides for unrestricted upstream fish passage.

Fisheries Resources: Fisheries Division sampling data indicates that the Norwalk River supports a diverse fish community that includes wild Brown Trout, Cutlips Minnow, Blacknose Dace, White Sucker, Tessellated Darter, Redbreast Sunfish, and the catadromous American Eel. The Norwalk River managed as a Class 3 Wild Trout Management Area and is stocked with approximately 5,500 adult trout and 4,000 Brown Trout Fry annually. In recent years, the Norwalk River has been host to a number of large scale stream restoration projects including several dam removal and instream habitat enhancement projects. With the removal of the Flock Process Dam in 2018, diadromous fish species including Alewife, Blueback Herring, Sea Lamprey, and sea-run Brown Trout regained access to portion of the Norwalk River that flows

through the project area.

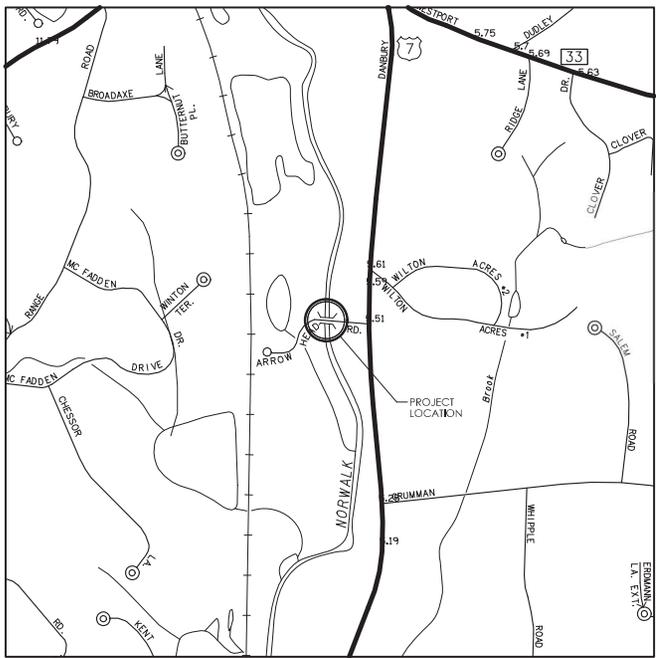
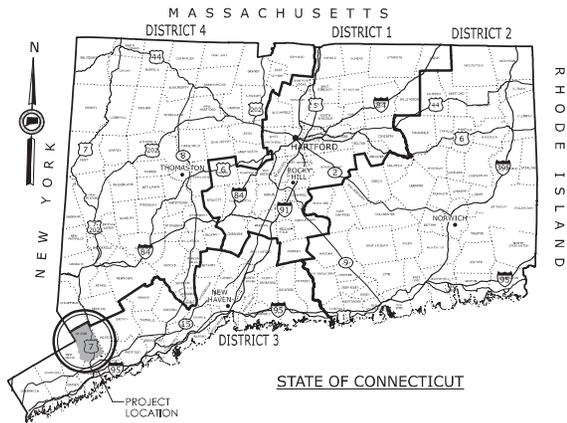
Instream habitat at the existing crossing consists of a wide, channelized, relatively homogenous run that flows through the project area. Water depth in the run is generally less than 1 foot deep with a maximum depth of approximately 2 feet. Substrate primarily consists of heavily embedded cobble. Large boulders and cut-stone armor the nearly vertical banks throughout the project area.

Comments/Recommendations:

1. The Fisheries Division will provide additional comments once a preliminary design is available for review. It is critical that upstream fish passage is maintained at this location.
2. The Norwalk River is channelized with relatively homogenous instream habitat throughout the project area. Clusters of boulders 2-4ft in diameter should be placed upstream and downstream of the new crossing. The boulder clusters will serve to enhance instream habitat by providing cover and increasing the diversity of localized water depth and velocity.
3. As a best management practice, any unconfined instream work within the Norwalk River should be restricted to the period from July 1 to September 30, inclusive.
4. It is critical that proper erosion and sedimentation controls be installed and maintained throughout the duration of this project. Care should be exercised so as not to increase turbidity levels.

cc. S. Gephard
B. Murphy

ENVIRONMENTAL PERMIT PLANS STATE PROJECT NO. 0161-0143 BRIDGE NO. 05501 IN THE TOWN OF WILTON



LOCATION PLAN
NOT TO SCALE

Digitally signed
by Matthew
Goclowski
Date:
2022.06.09
12:49:52 -04'00'

GENERAL NOTES

1. THESE PLANS ARE NOT FOR CONSTRUCTION AND ARE INTENDED ONLY FOR ENVIRONMENTAL PERMITTING PURPOSES. THESE PLANS HOLD AUTHORITY FOR ALL ACTIVITIES CONCERNING THE REGULATED AREA. FOR DETAILED PLANIMETRIC INFORMATION AND PAYMENT, REFER TO THE APPLICABLE CONTRACT DOCUMENTS.
2. THE DEPARTMENT OF TRANSPORTATION WILL ONLY SUBMIT REVISIONS TO DEEP AND USACE FOR CHANGES TO THE DESIGN THAT WILL DIRECTLY AFFECT REGULATED AREAS.
3. FOR A DESCRIPTION OF THE WATERCOURSES, WETLANDS AND WETLAND SOILS, SEE RELEVANT SECTIONS OF THE PERMIT APPLICATION.
4. 400 FOOT GRID BASED ON CONNECTICUT COORDINATE SYSTEM N.A.D 1983/2011 VERTICAL DATUM BASED ON NAVD OF 1988.
5. ALL CONSTRUCTION ACTIVITIES WILL BE CONDUCTED IN ACCORDANCE WITH THE DEPARTMENT'S STANDARD SPECIFICATIONS FOR ROADS, BRIDGES, AND INCIDENTAL CONSTRUCTION, FORM 818 SECTION 1.10 AND WILL ALSO FOLLOW REQUIRED BEST MANAGEMENT PRACTICES (BMPs) AND SEDIMENT AND EROSION CONTROL MEASURES IN ACCORDANCE WITH THE 2002 EROSION AND SEDIMENTATION CONTROL GUIDELINES AND THE 2004 STORMWATER QUALITY MANUAL.

LIST OF DRAWINGS	
DRAWING NO.	DRAWING TITLE
PMT-01	TITLE SHEET
PMT-02	GENERAL SITE PLAN
PMT-03	CONSTRUCTION DETAILS
PMT-04	EROSION DETAILS
PMT-05	WETLAND/WATERCOURSE IMPACT PLAN
PMT-06	100-YEAR FLOOD IMPACT PLAN
PMT-07	BRIDGE PLAN, ELEVATION, AND SECTION
PMT-08	WATER HANDLING AND CONSTRUCTION STAGING PLAN
PMT-09	WATER HANDLING NOTES AND DETAILS
PMT-10	PERMIT FLOWING PLAN

DESIGNED BY:
MOTT MACDONALD M M

175 Capital Blvd
Suite 420
Rocky Hill, CT 06867



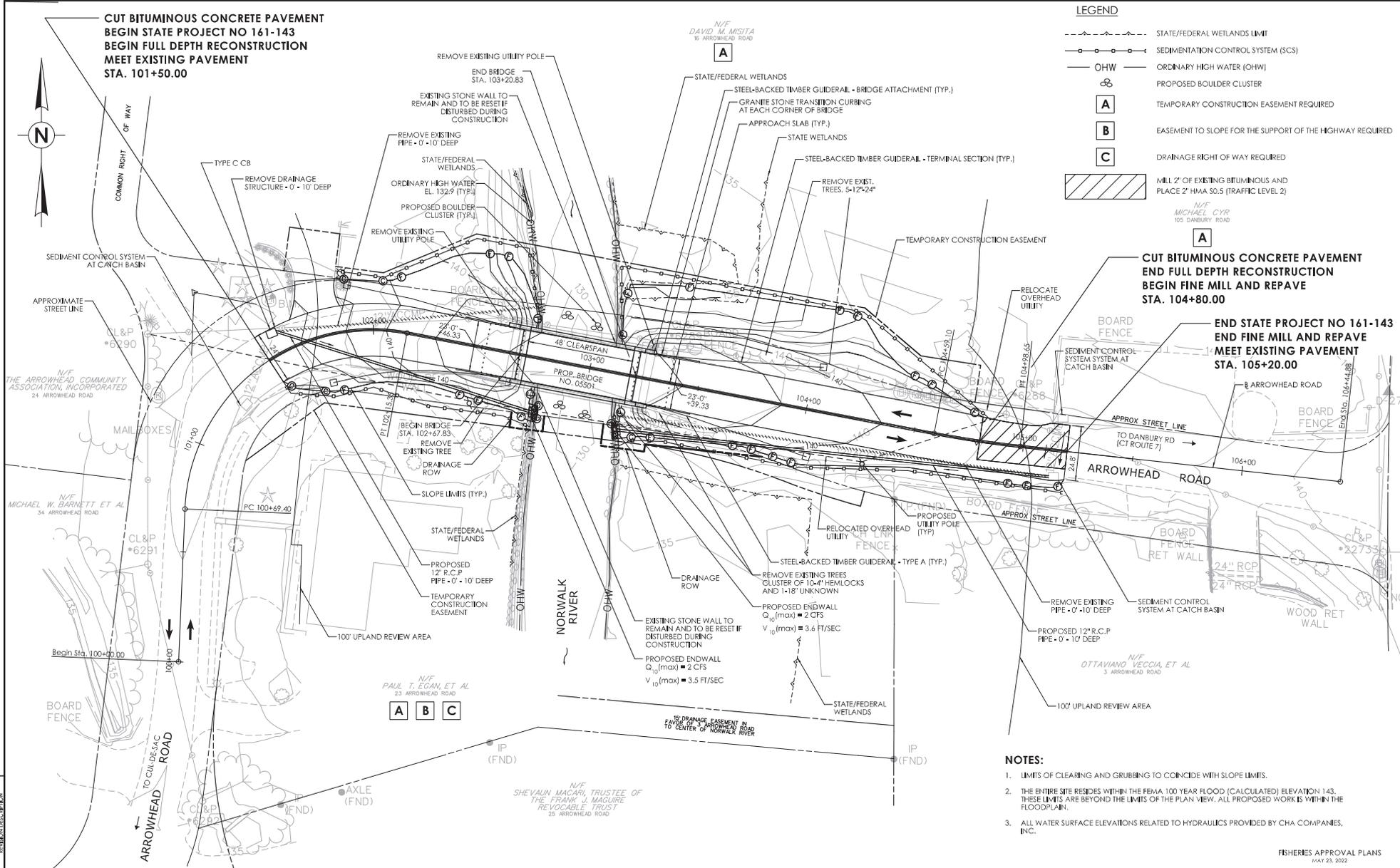
Jeffrey J. Long
2022.05.24
17:00:41-04'00'

FISHERIES APPROVAL PLANS
MAY 23, 2022

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**CUT BITUMINOUS CONCRETE PAVEMENT
BEGIN STATE PROJECT NO 161-143
BEGIN FULL DEPTH RECONSTRUCTION
MEET EXISTING PAVEMENT
STA. 101+50.00**

- LEGEND**
- STATE/FEDERAL WETLANDS LIMIT
 - SEDIMENTATION CONTROL SYSTEM (SCS)
 - OHW --- ORDINARY HIGH WATER (OHW)
 - PROPOSED BOULDER CLUSTER
 - A** TEMPORARY CONSTRUCTION EASEMENT REQUIRED
 - B** EASEMENT TO SLOPE FOR THE SUPPORT OF THE HIGHWAY REQUIRED
 - C** DRAINAGE RIGHT OF WAY REQUIRED
 - ▨ MILL 2" OF EXISTING BITUMINOUS AND PLACE 2" HMA SO.5 (TRAFFIC LEVEL 2)



- NOTES:**
- LIMITS OF CLEARING AND GRUBBING TO COINCIDE WITH SLOPE LIMITS.
 - THE ENTIRE SITE RESIDES WITHIN THE FEMA 100 YEAR FLOOD (CALCULATED) ELEVATION 143. THESE LIMITS ARE BEYOND THE LIMITS OF THE PLAN VIEW. ALL PROPOSED WORK IS WITHIN THE FLOODPLAIN.
 - ALL WATER SURFACE ELEVATIONS RELATED TO HYDRAULICS PROVIDED BY CHA COMPANIES, INC.

FISHERIES APPROVAL PLANS
MAY 23, 2022

NO.	DATE	DESCRIPTION

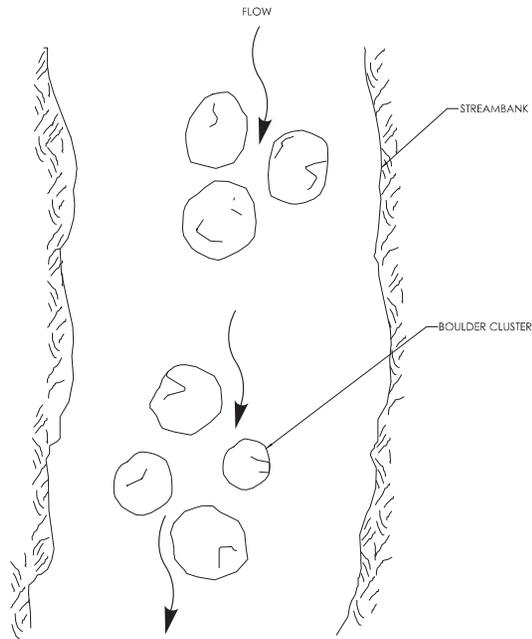
CLIENT: SHERIDAN, D.T.L. CHECKED BY: A.L.D.G. DRAWING NO.: PMT-02
 FILE NAME: c:\pwworking\mottm\186393\00139795\0161-143\161-02_General Site Plan.dgn SHEET NO.: 02
 PLOTTED DATE: 5/23/22

101 STATION DRIVE
 SUITE 130
 WESTWOOD, MA. 02090

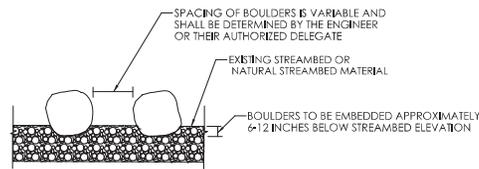
PROJECT NUMBER: 0161-0143
 PROJECT DESCRIPTION: REPLACEMENT OF BRIDGE NO. 05501 ARROWHEAD ROAD OVER NORWALK RIVER
 TOWN: WILTON
 DRAWING TITLE: GENERAL SITE PLAN

NOTES

1. **ROUNDED BOULDERS APPROXIMATELY 2' TO 4' FEET IN DIAMETER SHALL BE PLACED IN CLUSTERS AND STABILIZED, AS DIRECTED IN THE FIELD BY THE FISHERIES SPECIALIST FROM THE CTDEEP. SEE SPECIAL PROVISION "PLACEMENT OF CHANNEL BOULDER."**
2. **FOR MULTIPLE CLUSTERS, THE DISTANCE BETWEEN CLUSTERS WILL BE BASED ON FIELD CONDITIONS.**
3. **ALL WORK ASSOCIATED WITH THE PLACEMENT OF CHANNEL BOULDERS TO BE PAID FOR UNDER SPECIAL PROVISION "PLACEMENT OF CHANNEL BOULDERS, EXISTING OR NATURAL STREAMBED MATERIAL TO BE PAID FOR UNDER SPECIAL PROVISION "EXCAVATION AND REUSE OF EXISTING CHANNEL BOTTOM MATERIAL" AND IF SPECIFIED, "SUPPLEMENTAL STREAMBED CHANNEL MATERIAL."**
4. **BOULDERS SHALL BE PLACED WITHIN THE TOWN'S RIGHT-OF-WAY. BOULDERS SHALL NOT BE PLACED UNDER THE BRIDGE.**
5. **TEN DAYS BEFORE THE INSTALLATION OF THE CHANNEL BOULDERS CONTACT BRUCE WILLIAMS OF DEEP FISHERIES AT BRUCE.WILLIAMS@CT.GOV TO OVERSEE THE INSTALLATION OF THE CHANNEL BOULDERS.**



PLACEMENT OF CHANNEL BOULDERS
PLAN VIEW
N.T.S.



PLACEMENT OF CHANNEL BOULDERS
SECTION VIEW
N.T.S.

FISHERIES APPROVAL PLANS
MAY 23, 2022

REV.	DATE	DESCRIPTION

DRAWN BY: J.S.H./D.A.T. CHECKED BY: M.D.G.
SCALE AS NOTED

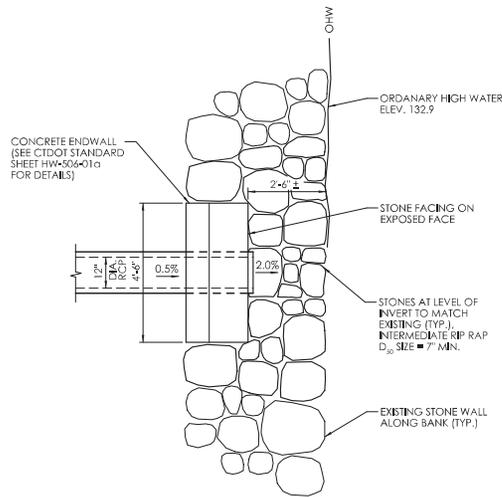


M M
MOTT
MACDONALD
101 STATION DRIVE
SUITE 130
WESTWOOD, MA. 02090

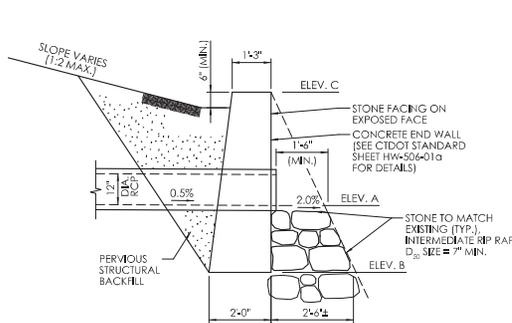


PROJECT NUMBER: 0161-0143
PROJECT DESCRIPTION: REPLACEMENT OF BRIDGE NO. 05501 ARROWHEAD ROAD OVER NORWALK RIVER
TOWNSHIP: WILTON
DRAWING TITLE: CONSTRUCTION DETAILS

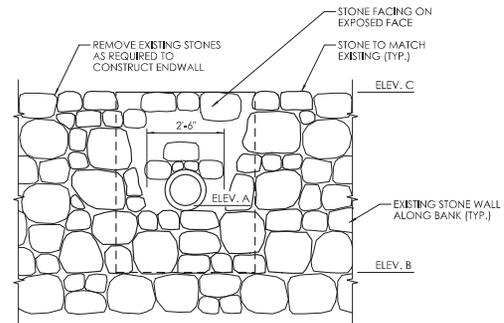
DRAWING NO:
PMT-03
SHEET NO:
03



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



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



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

ENDWALL LOCATION	ELEV. A	ELEV. B	ELEV. C	TOTAL HEIGHT
SE QUADRANT	134.32	132.32	136.82	4.5 FT
SW QUADRANT	133.34	131.34	137.50	6.16 FT

NOTES:

- ELEVATION "C" (TOP OF ENDWALL) IS ALSO THE APPROXIMATE TOP OF THE EXISTING STONE WALL ALONG BANK.
- FACE OF NEW STONES TO MATCH SLOPE OF EXISTING STONE WALL.

FISHERIES APPROVAL PLANS
MAY 23, 2022

NO.	DATE	DESCRIPTION

DESIGNER/DRAWER: D.T.K. CHECKED BY: D.L.
 LASTED SAVED BY: 18-86293 FILE NAME: c:\pwworking\mymv\186293\d0139795\016140143_PMT_ENDWALL_DETAILS.dgn
 SC: PLOTTER: DATE: 5/23/2022



101 STATION DRIVE
SUITE 130
WESTWOOD, MA. 02090

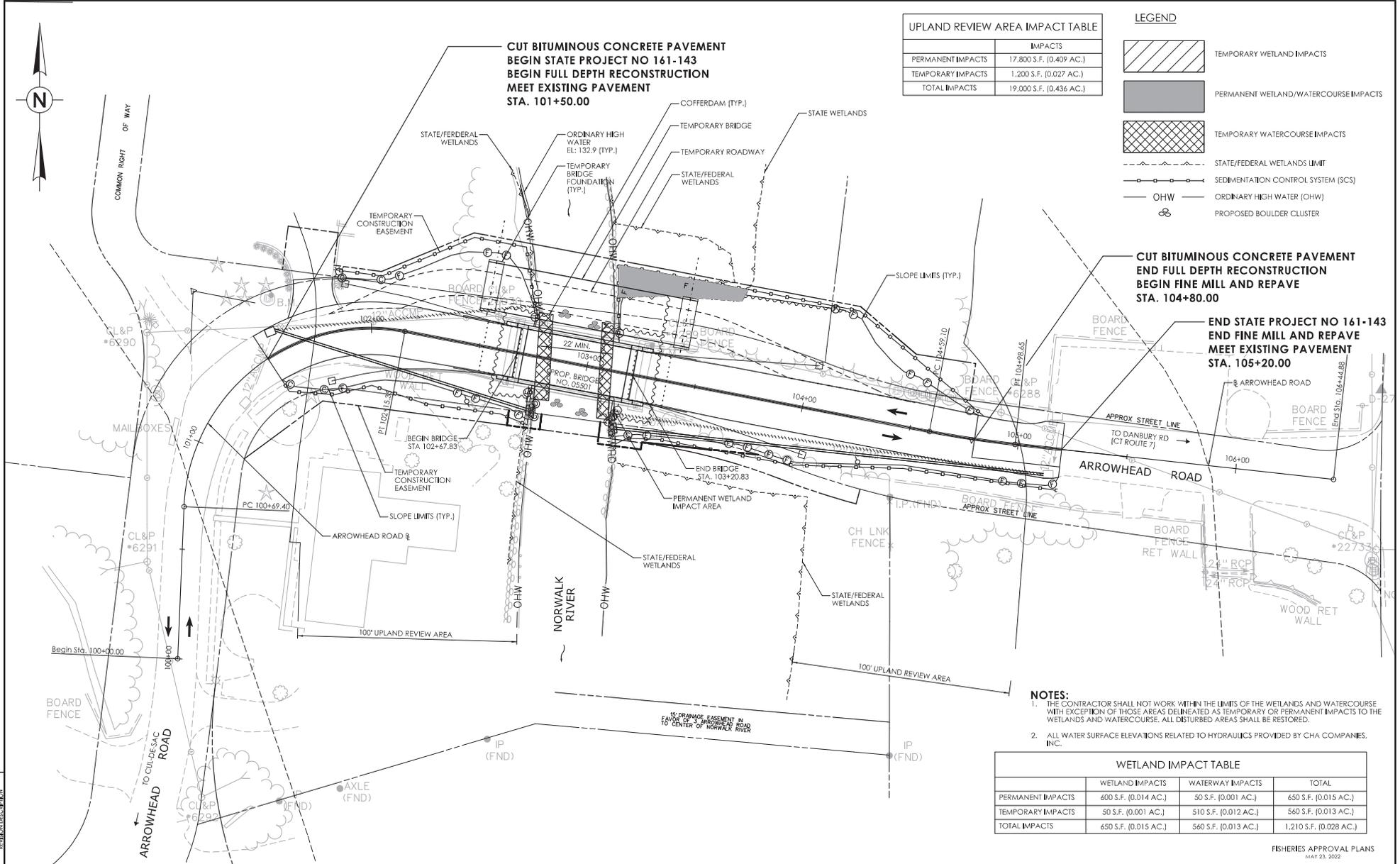


TOWN OF
WILTON



PROJECT NUMBER: 0161-0143
 PROJECT DESCRIPTION: REPLACEMENT OF BRIDGE NO. 05501 ARROWHEAD ROAD OVER NORWALK RIVER
 TOWNSHIP: WILTON
 DRAWING TITLE: ENDWALL DETAILS

DRAWING NO.:
PMT-04
SHEET NO.:
04



UPLAND REVIEW AREA IMPACT TABLE	
	IMPACTS
PERMANENT IMPACTS	17,800 S.F. (0.409 AC.)
TEMPORARY IMPACTS	1,200 S.F. (0.027 AC.)
TOTAL IMPACTS	19,000 S.F. (0.436 AC.)

LEGEND

- TEMPORARY WETLAND IMPACTS
- PERMANENT WETLAND/WATERCOURSE IMPACTS
- TEMPORARY WATERCOURSE IMPACTS
- STATE/FEDERAL WETLANDS LIMIT
- SEDIMENTATION CONTROL SYSTEM (SCS)
- OHW - ORDINARY HIGH WATER (OHW)
- PROPOSED BOULDER CLUSTER

- NOTES:**
- THE CONTRACTOR SHALL NOT WORK WITHIN THE LIMITS OF THE WETLANDS AND WATERCOURSE WITH EXCEPTION OF THOSE AREAS DELINEATED AS TEMPORARY OR PERMANENT IMPACTS TO THE WETLANDS AND WATERCOURSE. ALL DISTURBED AREAS SHALL BE RESTORED.
 - ALL WATER SURFACE ELEVATIONS RELATED TO HYDRAULICS PROVIDED BY CHA COMPANIES, INC.

WETLAND IMPACT TABLE			
	WETLAND IMPACTS	WATERWAY IMPACTS	TOTAL
PERMANENT IMPACTS	600 S.F. (0.014 AC.)	50 S.F. (0.001 AC.)	650 S.F. (0.015 AC.)
TEMPORARY IMPACTS	50 S.F. (0.001 AC.)	510 S.F. (0.012 AC.)	560 S.F. (0.013 AC.)
TOTAL IMPACTS	650 S.F. (0.015 AC.)	560 S.F. (0.013 AC.)	1,210 S.F. (0.028 AC.)

FISHERIES APPROVAL PLANS
MAY 23, 2022

NO.	DATE	DESCRIPTION

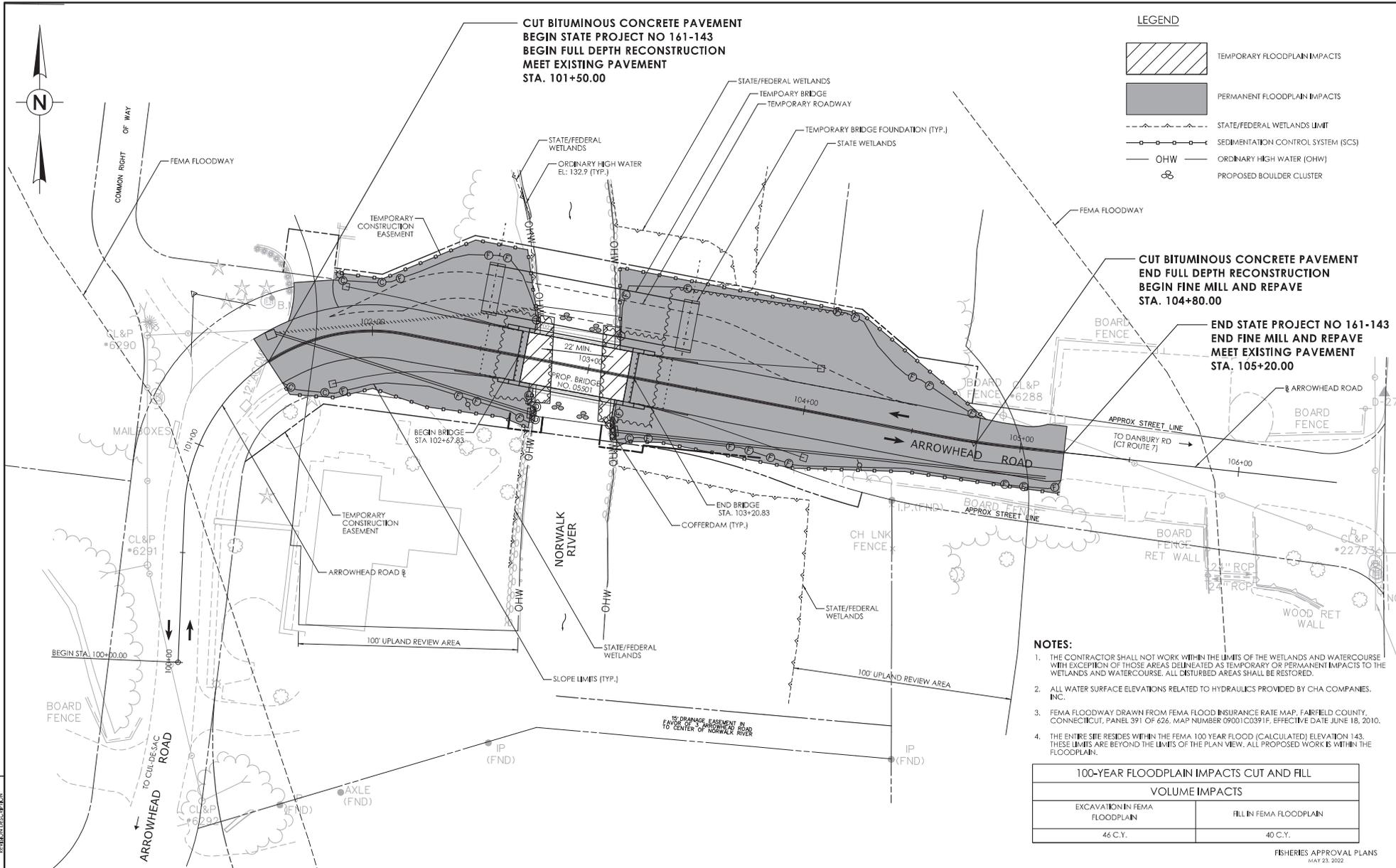
DRAWN BY: J.SHERIDAN/ATT: D.T.L. CHECKED BY: A.L.D.G. PROJECT NUMBER: 0161-0143 PROJECT DESCRIPTION: REPLACEMENT OF BRIDGE NO. 05501 ARROWHEAD ROAD OVER NORWALK RIVER TOWN: WILTON DRAWING TITLE: WETLAND/WATERCOURSE IMPACT PLAN

101 STATION DRIVE SUITE 130 WESTWOOD, MA. 02090 TOWN OF WILTON

MOTT MACDONALD 151 Station Drive Suite 100 Westwood, MA 02090

LASTED SAVED BY: J.SHERIDAN FILE NAME: c:\pwworking\jsherman\1866293\d0139795\0161-0143_Wetland\WetlandImpactPlan.dgn PLOTTED DATE: 5/22/2022

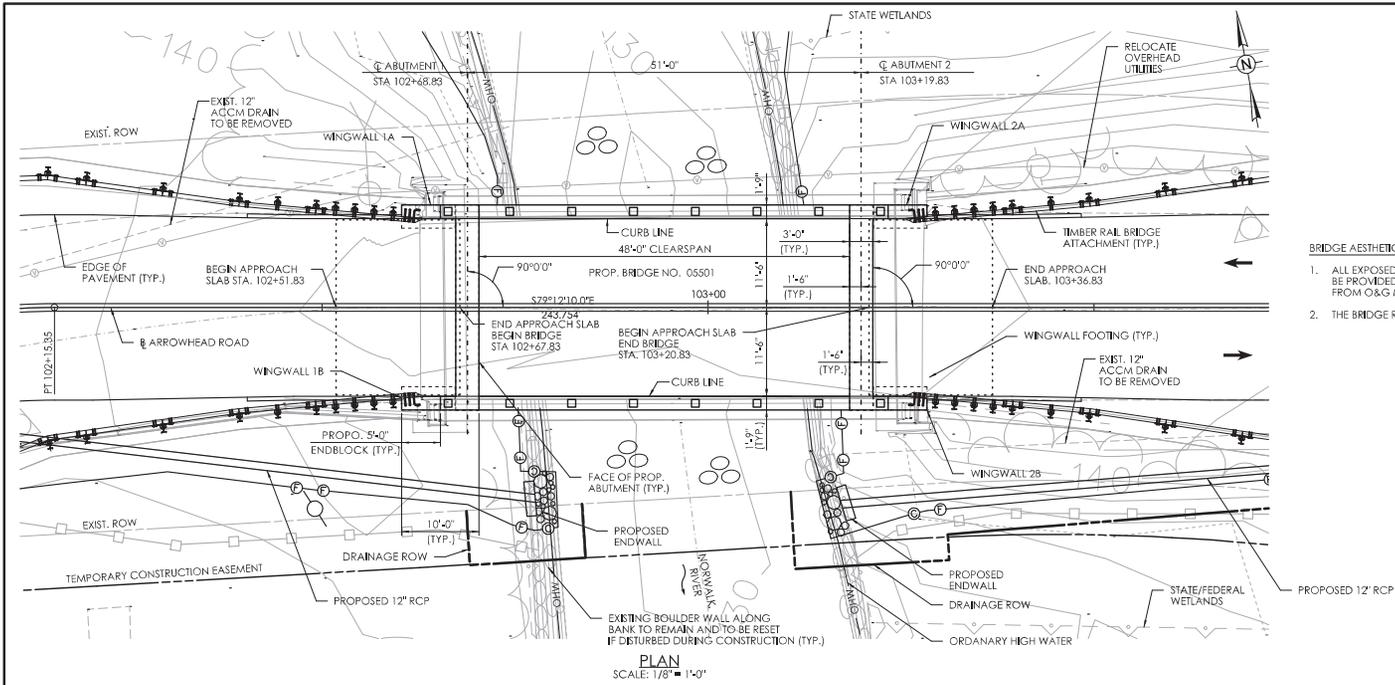
DRAWING NO.: PMT-05 SHEET NO.: 05



- NOTES:**
1. THE CONTRACTOR SHALL NOT WORK WITHIN THE LIMITS OF THE WETLANDS AND WATERCOURSE WITH EXCEPTION OF THOSE AREAS DELINEATED AS TEMPORARY OR PERMANENT IMPACTS TO THE WETLANDS AND WATERCOURSE. ALL DISTURBED AREAS SHALL BE RESTORED.
 2. ALL WATER SURFACE ELEVATIONS RELATED TO HYDRAULICS PROVIDED BY CHA COMPANIES, INC.
 3. FEMA FLOODWAY DRAWN FROM FEMA FLOOD INSURANCE RATE MAP, FAIRFIELD COUNTY, CONNECTICUT, PANEL 391 OF 626, MAP NUMBER 0901C0391F, EFFECTIVE DATE JUNE 18, 2010.
 4. THE ENTIRE SITE RESIDES WITHIN THE FEMA 100 YEAR FLOOD (CALCULATED) ELEVATION 143. THESE LIMITS ARE BEYOND THE LIMITS OF THE PLAN VIEW. ALL PROPOSED WORK IS WITHIN THE FLOODPLAIN.

100-YEAR FLOODPLAIN IMPACTS CUT AND FILL	
VOLUME IMPACTS	
EXCAVATION IN FEMA FLOODPLAIN	FILL IN FEMA FLOODPLAIN
46 C.Y.	40 C.Y.

FISHERIES APPROVAL PLANS
MAY 23, 2022

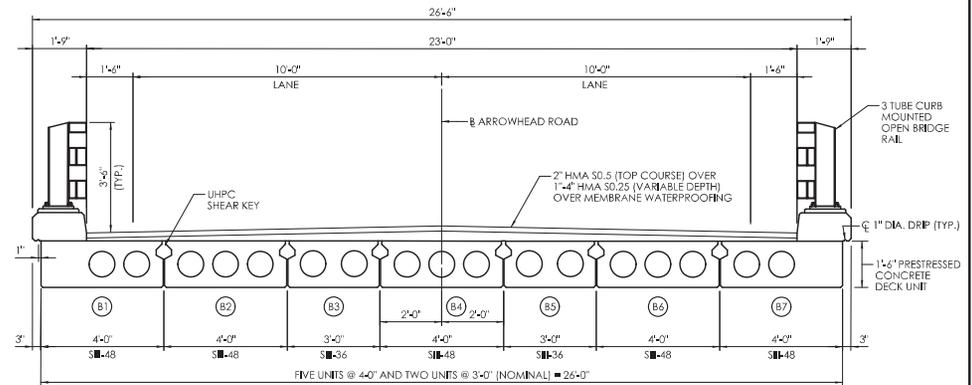
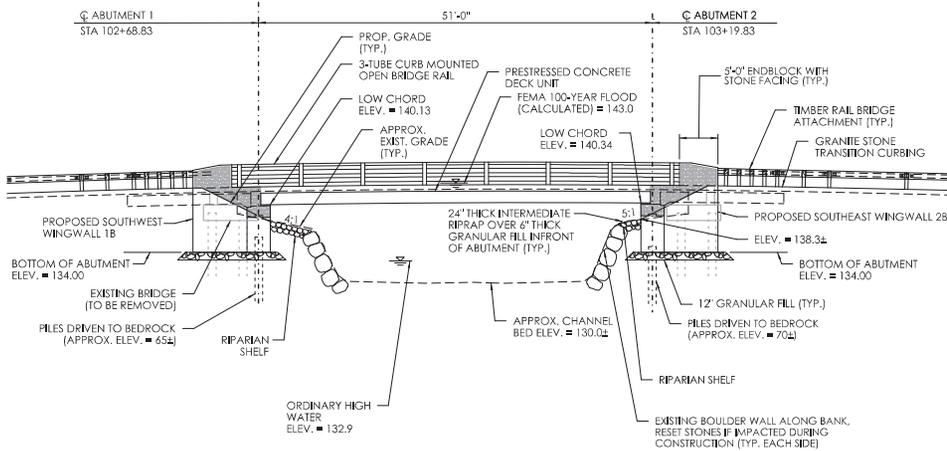


HYDRAULIC SUMMARY DATA		
DRAINAGE AREA [mi ²]	29	
DESIGN FREQUENCY [YEAR]	100	
DESIGN DISCHARGE [cfs]	4,850	
AVERAGE DAILY FLOW [cfs]	55	
DESIGN WATER SURFACE ELEVATION [feet]	UPSTREAM	UPSTREAM
	140.1	139.6
MAXIMUM SCOUR ELEVATION [feet]	122.0'	
WORST SCOUR SUBSTRUCTURE UNIT	ABUTMENT 2 (EAST)	

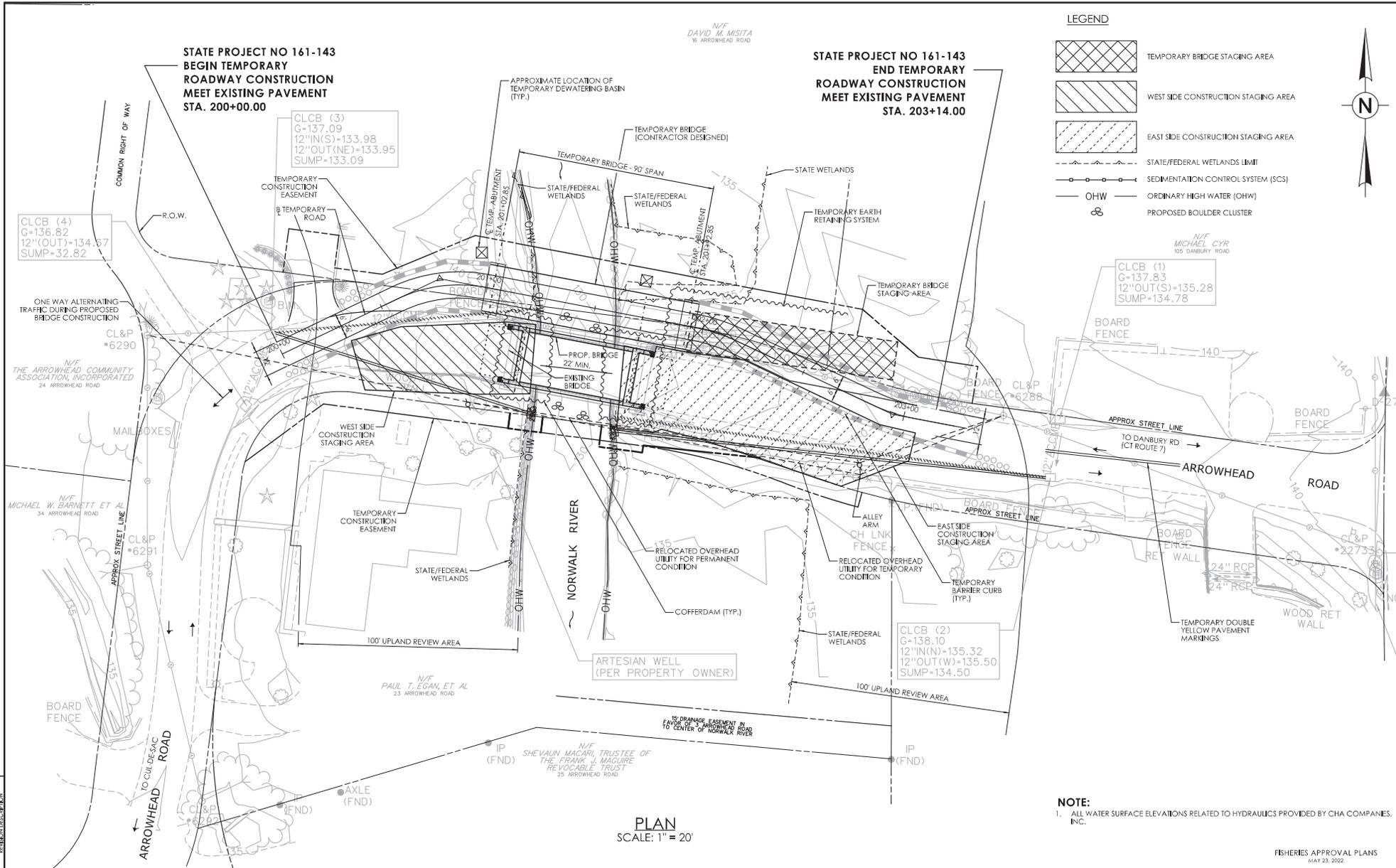
NOTE: ALL HYDRAULIC DATA PROVIDED BY CHA CONSULTING, INC.

BRIDGE AESTHETIC NOTES:

1. ALL EXPOSED CONCRETE SURFACES OF ABUTMENTS (FASCIA ONLY), WINGWALLS (FASCIA ONLY), AND END BLOCKS SHALL BE PROVIDED WITH A STONE MASONRY FACING. THE STONE PATTERN SHALL BE A "GREEN MOUNTAIN ASHLAR" PATTERN FROM O&G MASON PRODUCTS OR AN APPROVED EQUAL.
2. THE BRIDGE RAILS, POSTS AND HARDWARE SHALL BE METALLIZED TO A COLOR APPROVED BY THE TOWN.



FISHERIES APPROVAL PLANS
MAY 23, 2022



NO.	DATE	DESCRIPTION

DESIGNED BY: J.S. BARNETT, D.T.E. CHECKED BY: A.L.D.G.
 LASTED SAVED BY: 18-06293 FILE NAME: c:\pwworking\mnm\18-06293\d0139795\0161-143\plan\Water Handling.dwg
 PLOTTED DATE: 5/22/2022



M M
 101 STATION DRIVE
 SUITE 130
 WESTWOOD, MA. 02090



PROJECT NUMBER: 0161-0143
 PROJECT DESCRIPTION: REPLACEMENT OF BRIDGE NO. 05501 ARROWHEAD OVER NORWALK RIVER
 TOWNSHIP: WILTON
 DRAWING TITLE: WATER HANDLING AND CONSTRUCTION STAGING PLANS

FISHERIES APPROVAL PLANS
 MAY 23, 2022

DRAWING NO.: PMT-08
 SHEET NO.: 08

WATER HANDLING NOTES:

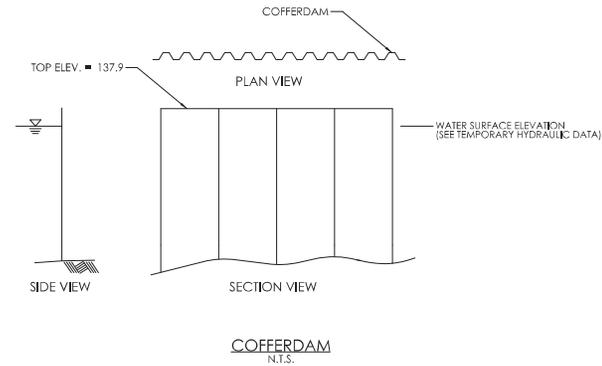
1. COFFERDAMS SHALL CONSIST OF SHEETPILES OR ANY OTHER APPROVED SYSTEM THAT THE CONTRACTOR ELECTS TO USE WHICH WILL SAFELY CONVEY WATER FLOWS THROUGH THE CONSTRUCTION AREA. SHALL BE ABLE TO SUPPORT CONSTRUCTION ACTIVITY AND EXCAVATION, AND SHALL CONFORM TO PERMITS. COFFERDAMS ARE PAID FOR UNDER THE "COFFERDAM AND DEWATERING" ITEM.
2. BEFORE INITIATING CONSTRUCTION, THE CONTRACTOR SHALL SUBMIT A PLAN FOR APPROVAL THAT DEFINES THE METHODS AND MATERIALS FOR CONTROLLING WATER, STRUCTURE EXCAVATION, AND PROTECTING THE STREAM DURING CONSTRUCTION. THE COST OF THIS WORK SHALL BE INCLUDED IN THE COST OF THE "COFFERDAM AND DEWATERING" ITEM.
3. EQUIPMENT SHALL NOT BE PERMITTED IN THE RIVER WHEN TEMPORARY COFFERDAM SYSTEM IS NOT IN PLACE WITHOUT APPROVAL FROM THE ENGINEER.
4. THE INSTALLATION AND REMOVAL OF TEMPORARY COFFERDAM CAN OCCUR AT ANY TIME OF THE YEAR. WORK BEHIND COFFERDAM CAN OCCUR AT ANY TIME OF THE YEAR.
5. WATER HANDLING MEASURES SHALL NOT EXCEED IMPACT AREAS SHOWN ON THE WETLAND AND FLOODPLAIN IMPACT SHEETS OF THE PERMIT PLANS.
6. A DEWATERING BASIN SHALL BE ESTABLISHED OUTSIDE OF THE WETLAND LIMITS. THE LOCATION OF THE DEWATERING BASIN IS APPROXIMATE. THE EXACT POSITION MAY VARY BASED ON THE PUMPING DESIGN SUBMISSION APPROVED BY THE ENGINEER.

TIME-OF-YEAR RESTRICTIONS

ANY "UNCONFINED" INSTREAM WORK WITHIN THE RIVER SHALL BE RESTRICTED TO THE PERIOD FROM JULY 1 TO SEPTEMBER 30, INCLUSIVE.

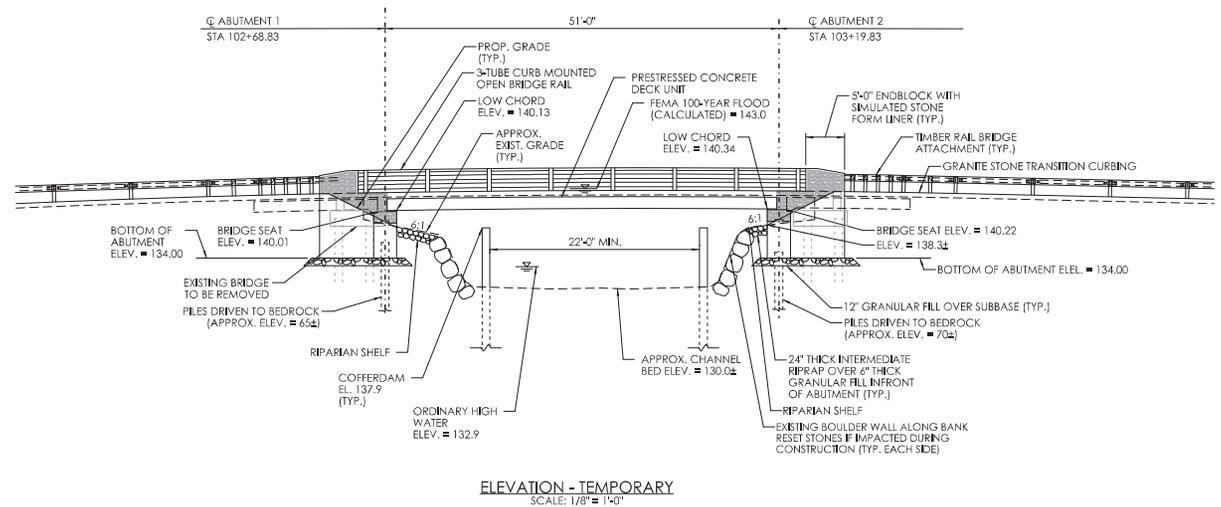
SUGGESTED SEQUENCE OF CONSTRUCTION:

1. CLEAR AND GRUB THE WORK AREA AND INSTALL SEDIMENTATION CONTROL SYSTEM (SCS).
2. CONSTRUCT TEMPORARY ROADWAY AND STAGING AREAS.
3. CONSTRUCT TEMPORARY BRIDGE. DIVERT TRAFFIC ONTO TEMPORARY BRIDGE.
4. INSTALL DEBRIS SHIELD AND DEMOLISH EXISTING BRIDGE SUPERSTRUCTURE.
5. INSTALL COFFERDAMS.
6. DEMOLISH EXISTING SUBSTRUCTURES AND EXCAVATE FOR PROPOSED SUBSTRUCTURES. REMOVE PORTIONS OF EXISTING STONE WALLS AS NEEDED.
7. DRIVE PILES AND CONSTRUCT NEW SUBSTRUCTURES AND BACKFILL.
8. REMOVE COFFERDAMS.
9. COMPLETE CONSTRUCTION OF PROPOSED BRIDGE.
10. DIVERT TRAFFIC ONTO THE PROPOSED BRIDGE AND REMOVE TEMPORARY BRIDGE.
11. COMPLETE SITE RESTORATION.



TEMPORARY HYDRAULIC DATA		
AVERAGE DAILY FLOW (ADF) [CFS]	55	
AVERAGE SPRING FLOW (AFS) [CFS]	101	
2-YEAR FREQUENCY DISCHARGE [CFS]	1,050	
TEMPORARY DESIGN DISCHARGE [CFS]	1,050	
TEMPORARY DESIGN FREQUENCY	2-YEAR	
TEMPORARY WATER SURFACE ELEVATION (FEET)	UPSTREAM	UPSTREAM
	136.9	135.7

NOTE: ALL TEMPORARY HYDRAULIC DATA PROVIDED BY CHA COMPANIES, INC.

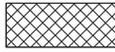
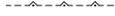
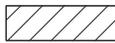


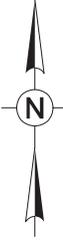
FISHERIES APPROVAL PLANS
MAY 23, 2022

REV.	DATE	DESCRIPTION

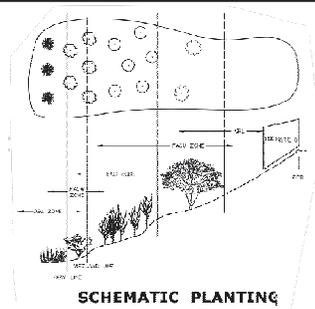
DESIGNER/DRAWER: D.T.K.	CHECKED BY: D.L.	SCALE AS NOTED	SIGNATURE BLOCK		101 STATION DRIVE SUITE 130 WESTWOOD, MA. 02090		PROJECT NUMBER: 0161-0143 PROJECT DESCRIPTION: REPLACEMENT OF BRIDGE NO. 05501 ARROWHEAD ROAD OVER NORWALK RIVER TOWN: WILTON DRAWING TITLE: WATER HANDLING NOTES AND DETAILS	DRAWING NO: PM1-09 SHEET NO: 09
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LEGEND

-  AREA TO BE RESTORED WITH PLANTINGS
-  CONTROL AND REMOVAL OF INVASIVE VEGETATION
-  STATE/FEDERAL WETLANDS LIMIT
-  SEDIMENTATION CONTROL SYSTEM (SCS)
-  OHW — ORDINARY HIGH WATER (OHW)
-  PROPOSED BOULDER CLUSTER
-  MILL 2" OF EXISTING BITUMINOUS AND PLACE 2" HMA SO.5 (TRAFFIC LEVEL 2)

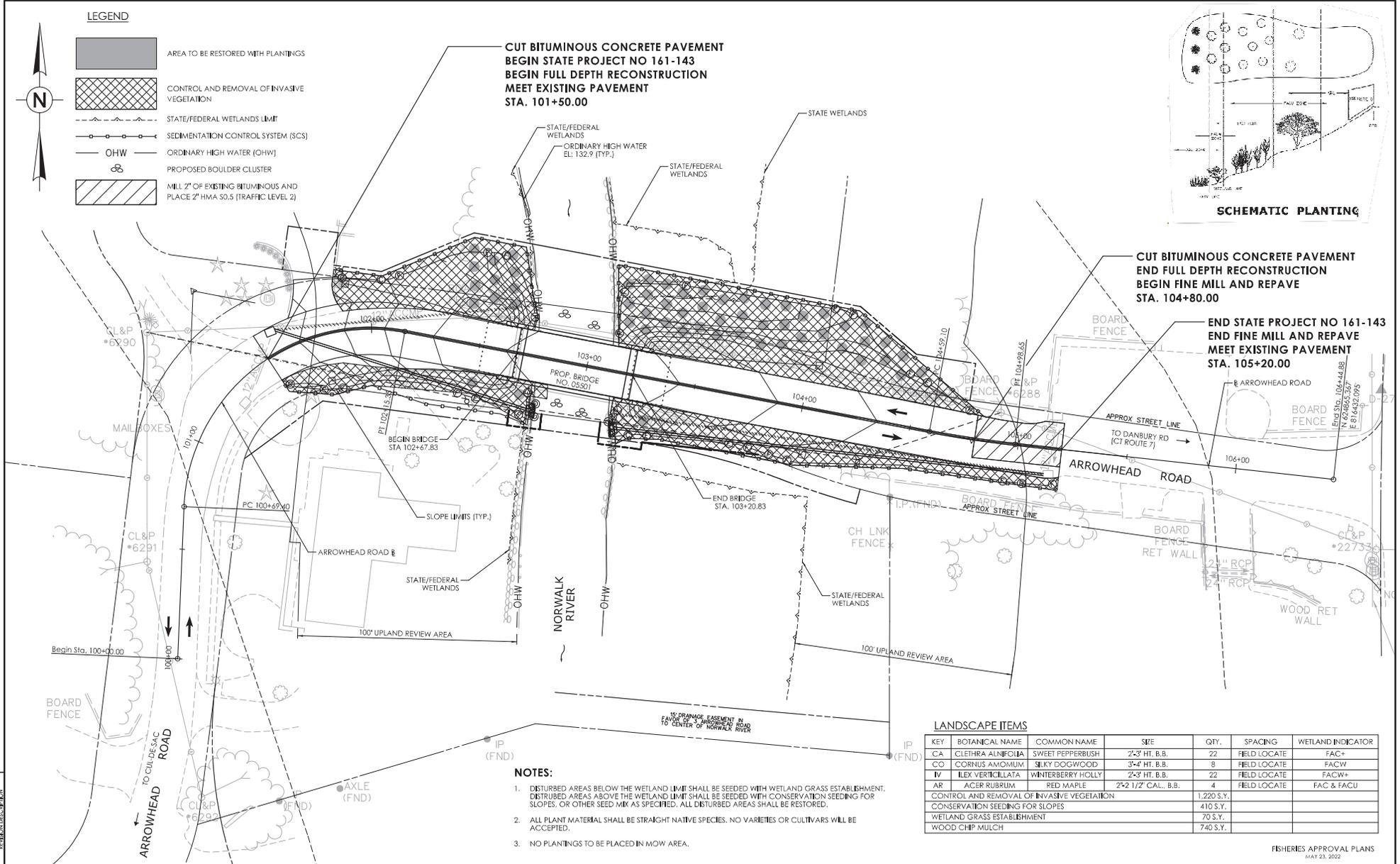


**CUT BITUMINOUS CONCRETE PAVEMENT
BEGIN STATE PROJECT NO 161-143
BEGIN FULL DEPTH RECONSTRUCTION
MEET EXISTING PAVEMENT
STA. 101+50.00**



**CUT BITUMINOUS CONCRETE PAVEMENT
END FULL DEPTH RECONSTRUCTION
BEGIN FINE MILL AND REPAVE
STA. 104+80.00**

**END STATE PROJECT NO 161-143
END FINE MILL AND REPAVE
MEET EXISTING PAVEMENT
STA. 105+20.00**



LANDSCAPE ITEMS

KEY	BOTANICAL NAME	COMMON NAME	SIZE	QTY.	SPACING	WETLAND INDICATOR
CA	CLETHRA ALNIFOLIA	SWEET PEPPERBUSH	2'-3" HT. B.B.	22	FIELD LOCATE	FAC+
CO	CORNUS AMOMUM	SILKY DOGWOOD	3'-4" HT. B.B.	8	FIELD LOCATE	FACW
IV	ILEX VERTICILLATA	WINTERBERRY HOLLY	2'-3" HT. B.B.	22	FIELD LOCATE	FACW+
AR	ACER RUBRUM	RED MAPLE	2'-2 1/2" CAL. B.B.	4	FIELD LOCATE	FAC & FACU
CONTROL AND REMOVAL OF INVASIVE VEGETATION				1,220 S.Y.		
CONSERVATION SEEDING FOR SLOPES				410 S.Y.		
WETLAND GRASS ESTABLISHMENT				70 S.Y.		
WOOD CHIP MULCH				740 S.Y.		

NOTES:

1. DISTURBED AREAS BELOW THE WETLAND LIMIT SHALL BE SEEDED WITH WETLAND GRASS ESTABLISHMENT. DISTURBED AREAS ABOVE THE WETLAND LIMIT SHALL BE SEEDED WITH CONSERVATION SEEDING FOR SLOPES, OR OTHER SEED MIX AS SPECIFIED. ALL DISTURBED AREAS SHALL BE RESTORED.
2. ALL PLANT MATERIAL SHALL BE STRAIGHT NATIVE SPECIES. NO VARIETIES OR CULTIVARS WILL BE ACCEPTED.
3. NO PLANTINGS TO BE PLACED IN MOW AREA.

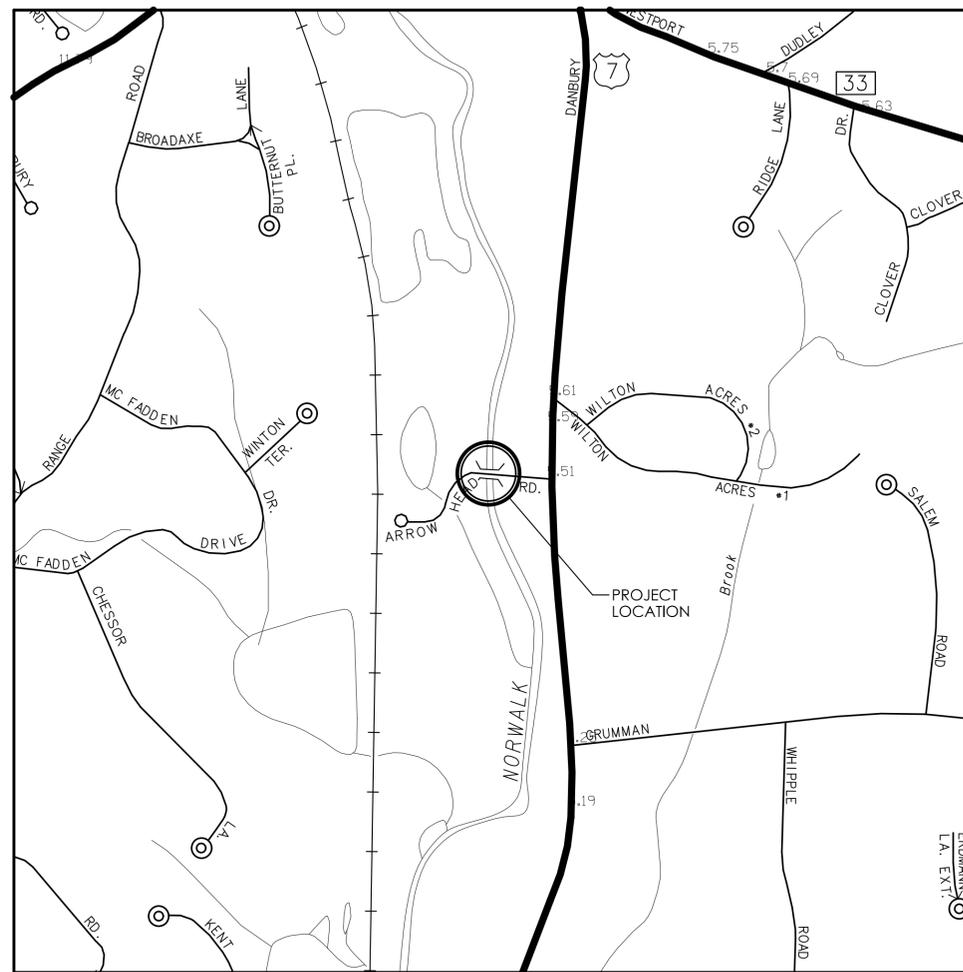
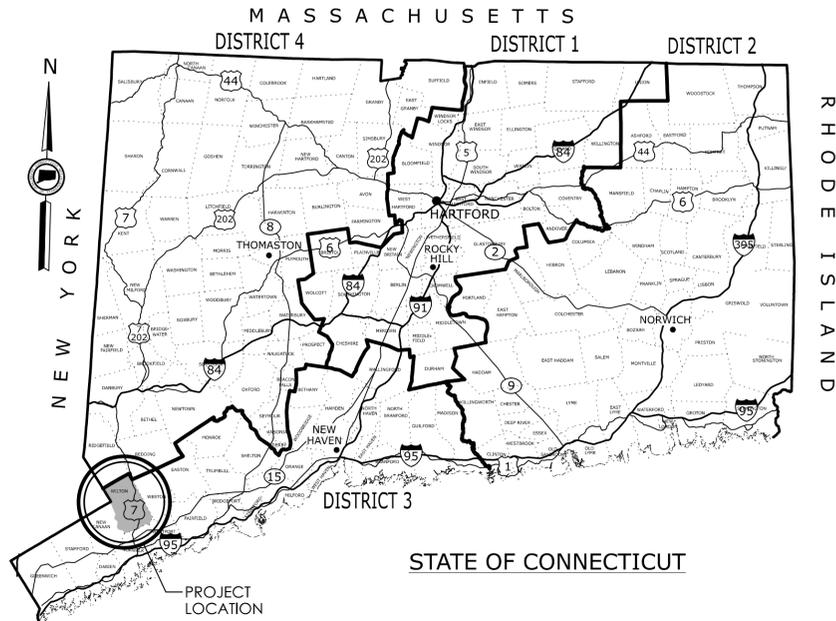
FISHERIES APPROVAL PLANS
MAY 23, 2022

NO.	DATE	DESCRIPTION

CLIENT: SHERBORNE, D.T.L. CHECKED BY: M.D.G.
15' PRIMARILY BASEMENT IN FAVOR OF SHERBORNE ROAD TO CENTER OF NORWALK RIVER
101 STATION DRIVE, SUITE 130, WESTWOOD, MA. 02090
PROJECT NUMBER: 0161-0143
TOWN OF WILTON
PROJECT DESCRIPTION: REPLACEMENT OF BRIDGE NO. 05501 ARROWHEAD ROAD OVER NORWALK RIVER
TOWN OF WILTON
DRAWING TITLE: PERMIT PLANNING PLAN
DRAWING NO.: PMT-10
SHEET NO.: 10

Appendix C – ENVIRONMENTAL PERMIT PLANS

ENVIRONMENTAL PERMIT PLANS STATE PROJECT NO. 0161-0143 BRIDGE NO. 05501 IN THE TOWN OF WILTON



LOCATION PLAN
NOT TO SCALE

GENERAL NOTES

1. THESE PLANS ARE NOT FOR CONSTRUCTION AND ARE INTENDED ONLY FOR ENVIRONMENTAL PERMITTING PURPOSES. THESE PLANS HOLD AUTHORITY FOR ALL ACTIVITIES CONCERNING THE REGULATED AREA. FOR DETAILED PLANIMETRIC INFORMATION AND PAYMENT, REFER TO THE APPLICABLE CONTRACT DOCUMENTS.
2. FOR A DESCRIPTION OF THE WATERCOURSES, WETLANDS AND WETLAND SOILS, SEE RELEVANT SECTIONS OF THE PERMIT APPLICATION.
3. 400 FOOT GRID BASED ON CONNECTICUT COORDINATE SYSTEM N.A.D 1983/2011 VERTICAL DATUM BASED ON NAVD OF 1988.
4. ALL CONSTRUCTION ACTIVITIES WILL BE CONDUCTED IN ACCORDANCE WITH THE DEPARTMENT'S STANDARD SPECIFICATIONS FOR ROADS, BRIDGES, AND INCIDENTAL CONSTRUCTION, FORM 818 SECTION 1.10 AND WILL ALSO FOLLOW REQUIRED BEST MANAGEMENT PRACTICES (BMPs) AND SEDIMENT AND EROSION CONTROL MEASURES IN ACCORDANCE WITH THE 2002 EROSION AND SEDIMENTATION CONTROL GUIDELINES AND THE 2004 STORMWATER QUALITY MANUAL.

LIST OF DRAWINGS	
DRAWING NO.	DRAWING TITLE
PMT-01	TITLE SHEET
PMT-02	GENERAL SITE PLAN
PMT-03	CONSTRUCTION DETAILS
PMT-04	ENDWALL DETAILS
PMT-05	WETLAND/WATERCOURSE IMPACT PLAN
PMT-06	100-YEAR FLOOD IMPACT PLAN
PMT-07	BRIDGE PLAN, ELEVATION, AND SECTION
PMT-08	WATER HANDLING AND CONSTRUCTION STAGING PLAN
PMT-09	WATER HANDLING NOTES AND DETAILS
PMT-10	PERMIT PLANTING PLAN

DESIGNED BY:

MOTT MACDONALD M M

175 Capital Blvd
4th Floor
Rocky Hill, CT 06067

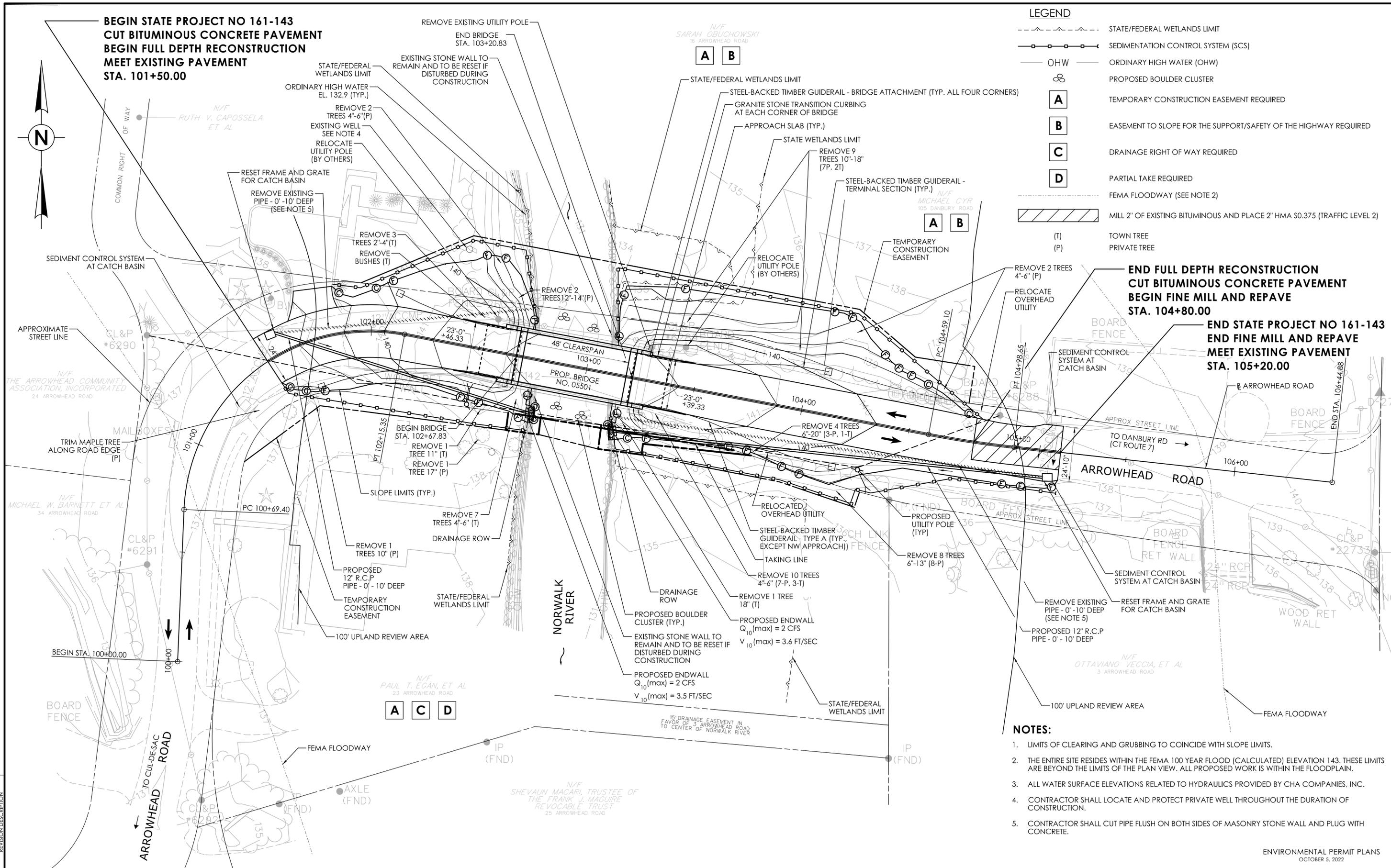
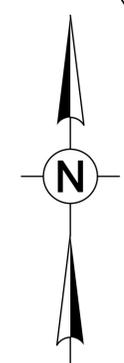
Jeffrey J. Long
2022.10.05
19:22:39-04'00'

REV.	DATE	REVISION DESCRIPTION

**BEGIN STATE PROJECT NO 161-143
CUT BITUMINOUS CONCRETE PAVEMENT
BEGIN FULL DEPTH RECONSTRUCTION
MEET EXISTING PAVEMENT
STA. 101+50.00**

LEGEND

- STATE/FEDERAL WETLANDS LIMIT
- SEDIMENTATION CONTROL SYSTEM (SCS)
- OHW — ORDINARY HIGH WATER (OHW)
- PROPOSED BOULDER CLUSTER
- A** TEMPORARY CONSTRUCTION EASEMENT REQUIRED
- B** EASEMENT TO SLOPE FOR THE SUPPORT/SAFETY OF THE HIGHWAY REQUIRED
- C** DRAINAGE RIGHT OF WAY REQUIRED
- D** PARTIAL TAKE REQUIRED
- FEMA FLOODWAY (SEE NOTE 2)
- MILL 2" OF EXISTING BITUMINOUS AND PLACE 2" HMA S0.375 (TRAFFIC LEVEL 2)
- (T) TOWN TREE
- (P) PRIVATE TREE



**END FULL DEPTH RECONSTRUCTION
CUT BITUMINOUS CONCRETE PAVEMENT
BEGIN FINE MILL AND REPAVE
STA. 104+80.00**

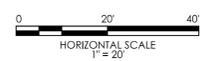
**END STATE PROJECT NO 161-143
END FINE MILL AND REPAVE
MEET EXISTING PAVEMENT
STA. 105+20.00**

NOTES:

1. LIMITS OF CLEARING AND GRUBBING TO COINCIDE WITH SLOPE LIMITS.
2. THE ENTIRE SITE RESIDES WITHIN THE FEMA 100 YEAR FLOOD (CALCULATED) ELEVATION 143. THESE LIMITS ARE BEYOND THE LIMITS OF THE PLAN VIEW. ALL PROPOSED WORK IS WITHIN THE FLOODPLAIN.
3. ALL WATER SURFACE ELEVATIONS RELATED TO HYDRAULICS PROVIDED BY CHA COMPANIES, INC.
4. CONTRACTOR SHALL LOCATE AND PROTECT PRIVATE WELL THROUGHOUT THE DURATION OF CONSTRUCTION.
5. CONTRACTOR SHALL CUT PIPE FLUSH ON BOTH SIDES OF MASONRY STONE WALL AND PLUG WITH CONCRETE.

REV.	DATE	REVISION DESCRIPTION

DESIGNER/DRAFTER: D.T.K. CHECKED BY: M.D.G.
 LASTED SAVED BY: KIN8393 FILE NAME: c:\pwworking\hmm\kin8393\d0139795\0161-0143_PMT-02_General Site Plan.dgn
 PLOTTED DATE: 10/5/2022



SIGNATURE/BLOCK:

 Mott MacDonald
 175 Capital Blvd
 4th Floor
 Rocky Hill, CT 06067

M M
MOTT MACDONALD
 175 CAPITAL BLVD
 4TH FLOOR
 ROCKY HILL, CT 06067

TOWN OF WILTON

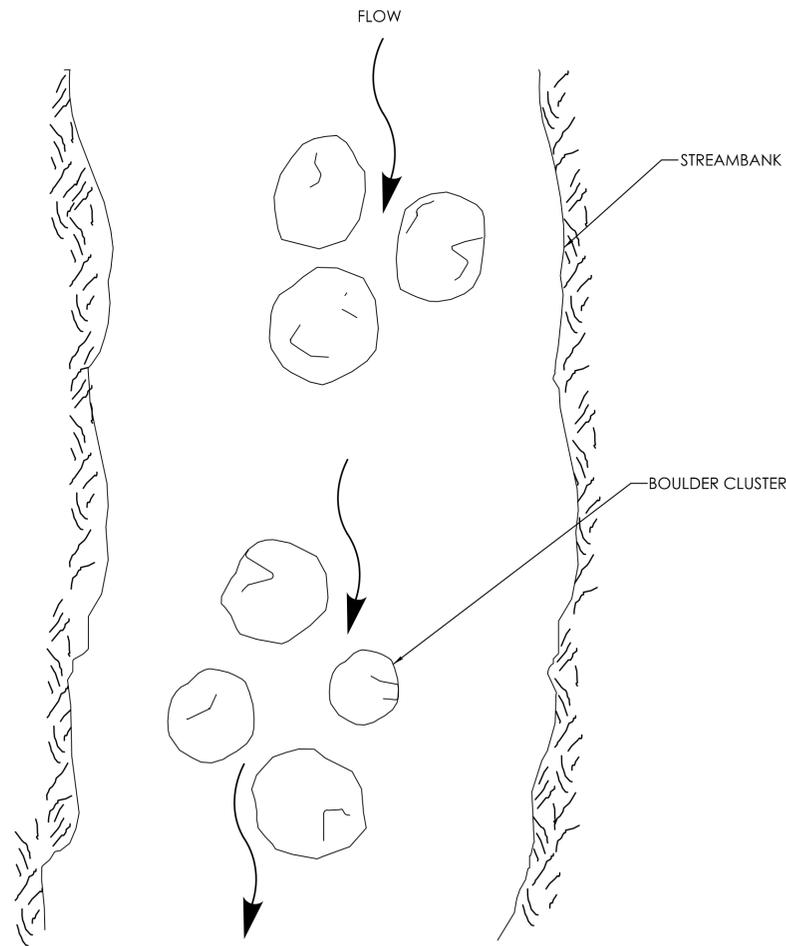
PROJECT NUMBER: 0161-0143
 PROJECT DESCRIPTION: REPLACEMENT OF BRIDGE NO. 05501 ARROWHEAD ROAD OVER NORWALK RIVER
 TOWN(S): WILTON
 DRAWING TITLE: GENERAL SITE PLAN

ENVIRONMENTAL PERMIT PLANS
 OCTOBER 5, 2022

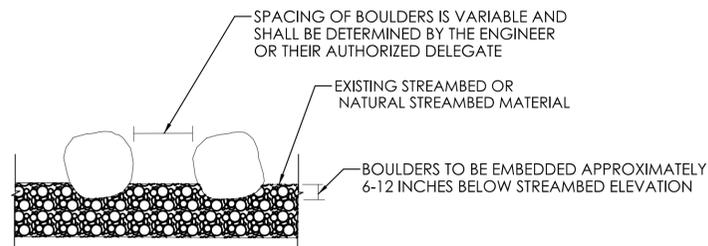
DRAWING NO. PMT-02
 SHEET NO. 02

NOTES

1. ROUNDED BOULDERS APPROXIMATELY 2' TO 4' FEET IN DIAMETER SHALL BE PLACED IN CLUSTERS AND STABILIZED, AS DIRECTED IN THE FIELD BY THE FISHERIES SPECIALIST FROM THE CTDEEP. SEE SPECIAL PROVISION "PLACEMENT OF CHANNEL BOULDER."
2. FOR MULTIPLE CLUSTERS, THE DISTANCE BETWEEN CLUSTERS WILL BE BASED ON FIELD CONDITIONS.
3. ALL WORK ASSOCIATED WITH THE PLACEMENT OF CHANNEL BOULDERS TO BE PAID FOR UNDER SPECIAL PROVISION "PLACEMENT OF CHANNEL BOULDER", EXISTING OR NATURAL STREAMBED MATERIAL TO BE PAID FOR UNDER SPECIAL PROVISION "EXCAVATION AND REUSE OF EXISTING CHANNEL BOTTOM MATERIAL" AND IF SPECIFIED, "SUPPLEMENTAL STREAMBED CHANNEL MATERIAL".
4. BOULDERS SHALL BE PLACED WITHIN THE TOWN'S RIGHT-OF-WAY. BOULDERS SHALL NOT BE PLACED UNDER THE BRIDGE.
5. TEN DAYS BEFORE THE INSTALLATION OF THE CHANNEL BOULDERS CONTACT BRUCE WILLIAMS OF DEEP FISHERIES AT BRUCE.WILLIAMS@CT.GOV TO OVERSEE THE INSTALLATION OF THE CHANNEL BOULDERS.



PLACEMENT OF CHANNEL BOULDERS
PLAN VIEW
N.T.S.



PLACEMENT OF CHANNEL BOULDERS
SECTION VIEW
N.T.S.

REV.	DATE	REVISION DESCRIPTION

DESIGNER/DRAFTER: D.T.K. CHECKED BY: M.D.G.

SCALE AS NOTED

SIGNATURE/
BLOCK:  Mott MacDonald
175 Capital Blvd
4th Floor
Rocky Hill, CT 06067.

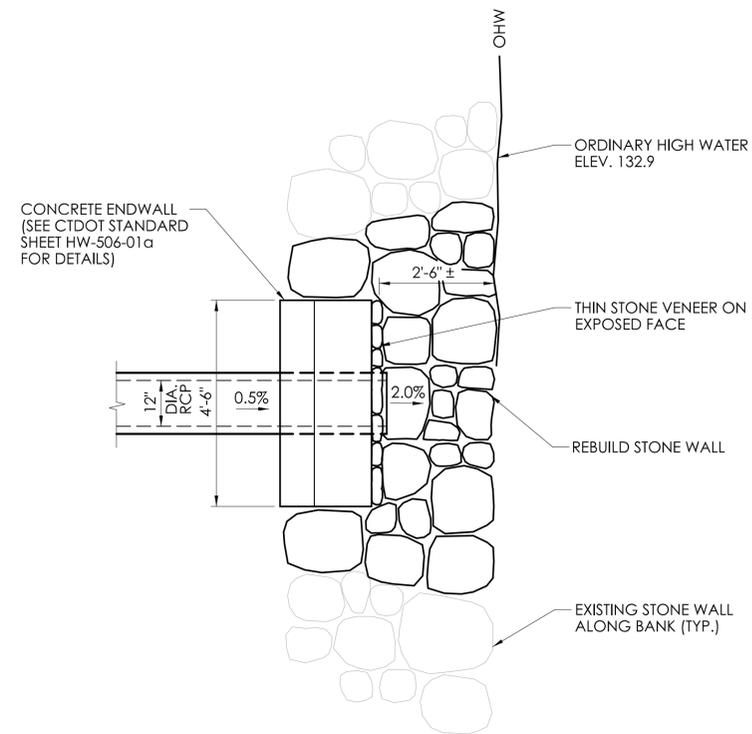
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MOTT MACDONALD
175 CAPITAL BLVD
4TH FLOOR
ROCKY HILL, CT 06067

 **TOWN OF WILTON**

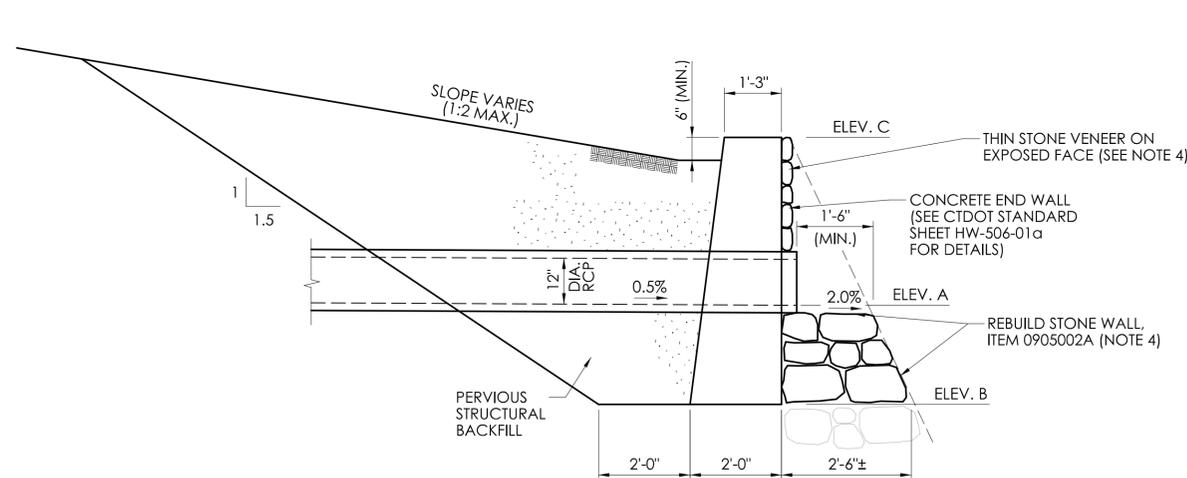
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PROJECT DESCRIPTION: REPLACEMENT OF BRIDGE NO. 05501 ARROWHEAD ROAD OVER NORWALK RIVER
TOWN(S): WILTON
DRAWING TITLE: CONSTRUCTION DETAILS

ENVIRONMENTAL PERMIT PLANS
OCTOBER 5, 2022

DRAWING NO.
PMT-03
SHEET NO.
03



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

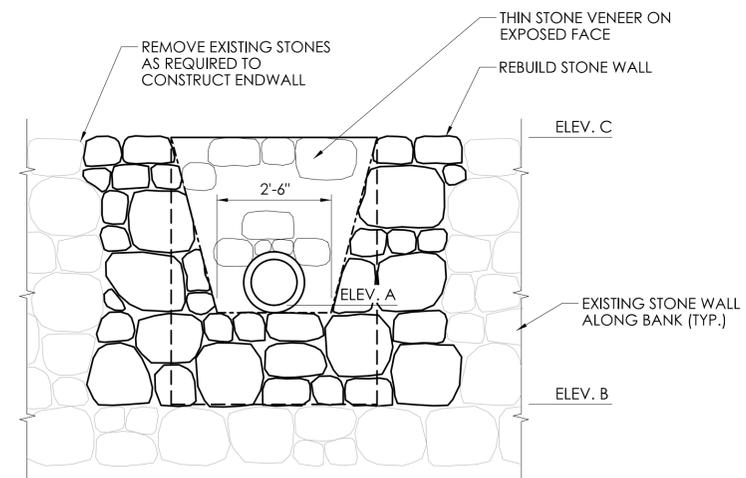


SECTION
SCALE: 1/2" = 1'-0"

ENDWALL LOCATION	ELEV. A	ELEV. B	ELEV. C	TOTAL HEIGHT
SE QUADRANT	134.32	132.32	136.82	4.5 FT
SW QUADRANT	133.34	131.34	137.50	6.16 FT

NOTES:

- ELEVATION "C" (TOP OF ENDWALL) IS ALSO THE APPROXIMATE TOP OF THE EXISTING STONE WALL ALONG BANK.
- ENDWALLS TO BE PAID UNDER THE ITEM "TYPE "D-G" ENDWALL".
- FACE OF NEW STONES TO MATCH SLOPE OF EXISTING STONE WALL.
- CONFINEMENT FROM THE RIVER SHALL BE PROVIDED FOR THE CONSTRUCTION OF DRAINAGE RELOCATION, ENDWALLS AND REBUILD STONE WALL. THE COST FOR CONFINEMENT SHALL BE INCLUDED IN THE ITEM 0204151 - HANDLING WATER.
- CONTRACTOR SHALL RE-PURPOSE EXISTING BOULDERS AND CREEK STONE REMOVED FROM THE BANK FOR THE END WALL STONE VENEER. ALL ASSOCIATED EFFORT TO BE PAID UNDER THE ITEM "MASONRY FACING". SEE SPECIAL PROVISIONS.



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

REV.	DATE	REVISION DESCRIPTION

DESIGNER/DRAFTER: D.T.K. CHECKED BY: I.J.

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

SIGNATURE/BLOCK:

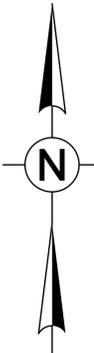
 Mott MacDonald
 175 Capital Blvd
 4th Floor
 Rocky Hill, CT 06067.

M M
MOTT MACDONALD
 175 CAPITAL BLVD
 4TH FLOOR
 ROCKY HILL, CT 06067

TOWN OF WILTON

PROJECT NUMBER: 0161-0143
 PROJECT DESCRIPTION: REPLACEMENT OF BRIDGE NO. 05501 ARROWHEAD ROAD OVER NORWALK RIVER
 TOWN(S): WILTON
 DRAWING TITLE: ENDWALL DETAILS

DRAWING NO. PMT-04
 SHEET NO. 04



UPLAND REVIEW AREA IMPACT TABLE	
	IMPACTS
PERMANENT IMPACTS	17,100 S.F. (0.393 AC.)
TEMPORARY IMPACTS	2,600 S.F. (0.060 AC.)
TOTAL IMPACTS	19,700 S.F. (0.453 AC.)

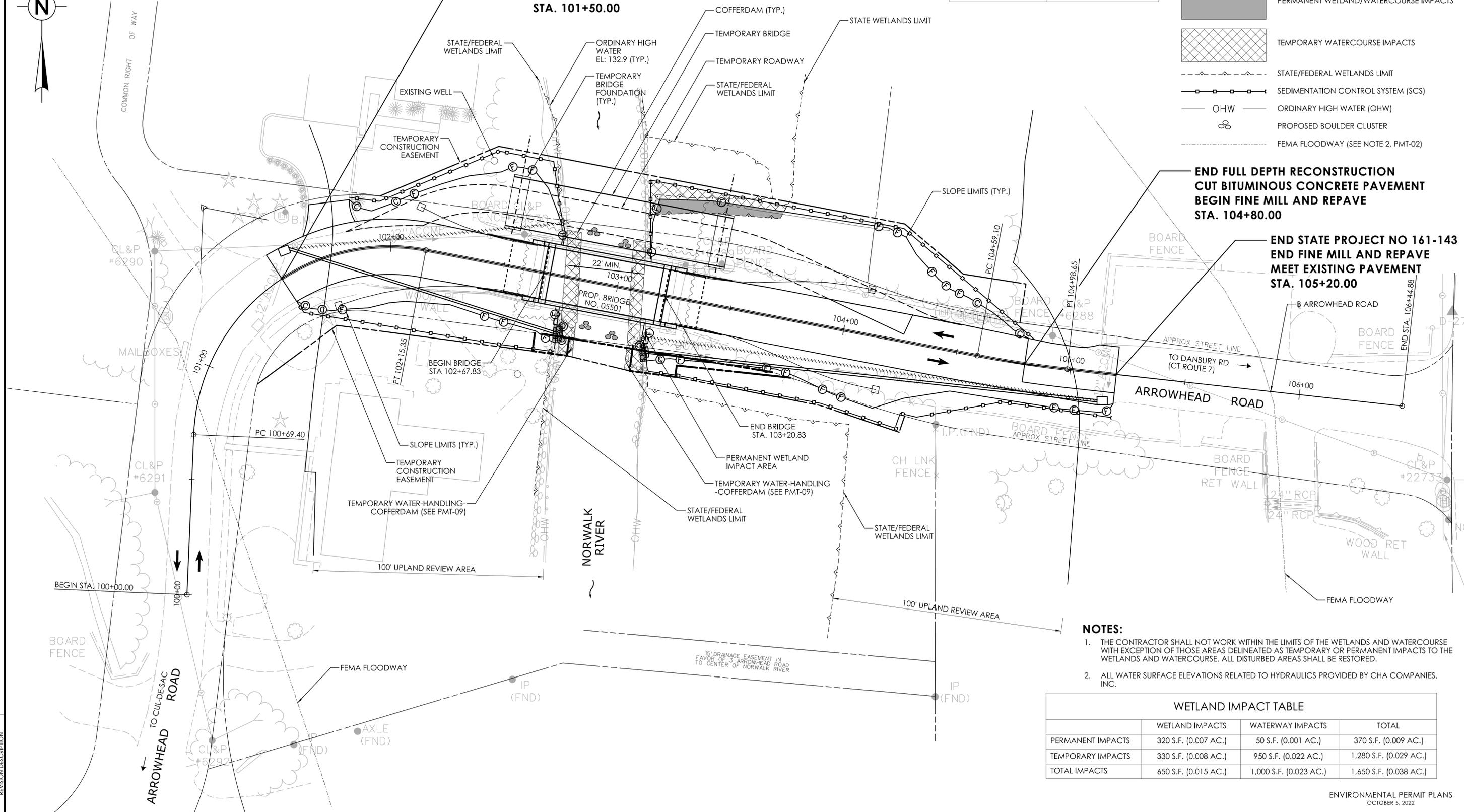
LEGEND

- TEMPORARY WETLAND IMPACTS
- PERMANENT WETLAND/WATERCOURSE IMPACTS
- TEMPORARY WATERCOURSE IMPACTS
- STATE/FEDERAL WETLANDS LIMIT
- SEDIMENTATION CONTROL SYSTEM (SCS)
- OHW — ORDINARY HIGH WATER (OHW)
- PROPOSED BOULDER CLUSTER
- FEMA FLOODWAY (SEE NOTE 2, PMT-02)

**BEGIN STATE PROJECT NO 161-143
CUT BITUMINOUS CONCRETE PAVEMENT
BEGIN FULL DEPTH RECONSTRUCTION
MEET EXISTING PAVEMENT
STA. 101+50.00**

**END FULL DEPTH RECONSTRUCTION
CUT BITUMINOUS CONCRETE PAVEMENT
BEGIN FINE MILL AND REPAVE
STA. 104+80.00**

**END STATE PROJECT NO 161-143
END FINE MILL AND REPAVE
MEET EXISTING PAVEMENT
STA. 105+20.00**



- NOTES:**
1. THE CONTRACTOR SHALL NOT WORK WITHIN THE LIMITS OF THE WETLANDS AND WATERCOURSE WITH EXCEPTION OF THOSE AREAS DELINEATED AS TEMPORARY OR PERMANENT IMPACTS TO THE WETLANDS AND WATERCOURSE. ALL DISTURBED AREAS SHALL BE RESTORED.
 2. ALL WATER SURFACE ELEVATIONS RELATED TO HYDRAULICS PROVIDED BY CHA COMPANIES, INC.

WETLAND IMPACT TABLE			
	WETLAND IMPACTS	WATERWAY IMPACTS	TOTAL
PERMANENT IMPACTS	320 S.F. (0.007 AC.)	50 S.F. (0.001 AC.)	370 S.F. (0.009 AC.)
TEMPORARY IMPACTS	330 S.F. (0.008 AC.)	950 S.F. (0.022 AC.)	1,280 S.F. (0.029 AC.)
TOTAL IMPACTS	650 S.F. (0.015 AC.)	1,000 S.F. (0.023 AC.)	1,650 S.F. (0.038 AC.)

REV.	DATE	REVISION DESCRIPTION

DESIGNER/DRAFTER: D.T.K. CHECKED BY: M.D.G.
 LASTED SAVED BY: KIN86393 FILE NAME: c:\pwworking\hmm\kin86393\d0139795\0161-0143_PMT-05_Wetland Impact Plan.dgn
 PLOTTED DATE: 10/5/2022

SIGNATURE/BLOCK:

 Mott MacDonald
 175 Capital Blvd
 4th Floor
 Rocky Hill, CT 06067

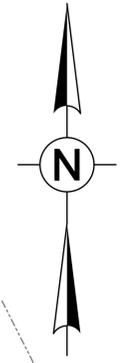
M M
MOTT MACDONALD
 175 CAPITAL BLVD
 4TH FLOOR
 ROCKY HILL, CT 06067

TOWN OF WILTON

PROJECT NUMBER: 0161-0143
 PROJECT DESCRIPTION: REPLACEMENT OF BRIDGE NO. 05501 ARROWHEAD ROAD OVER NORWALK RIVER
 TOWN(S): WILTON
 DRAWING TITLE: WETLAND/WATERCOURSE IMPACT PLAN

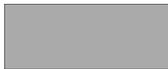
ENVIRONMENTAL PERMIT PLANS
 OCTOBER 5, 2022

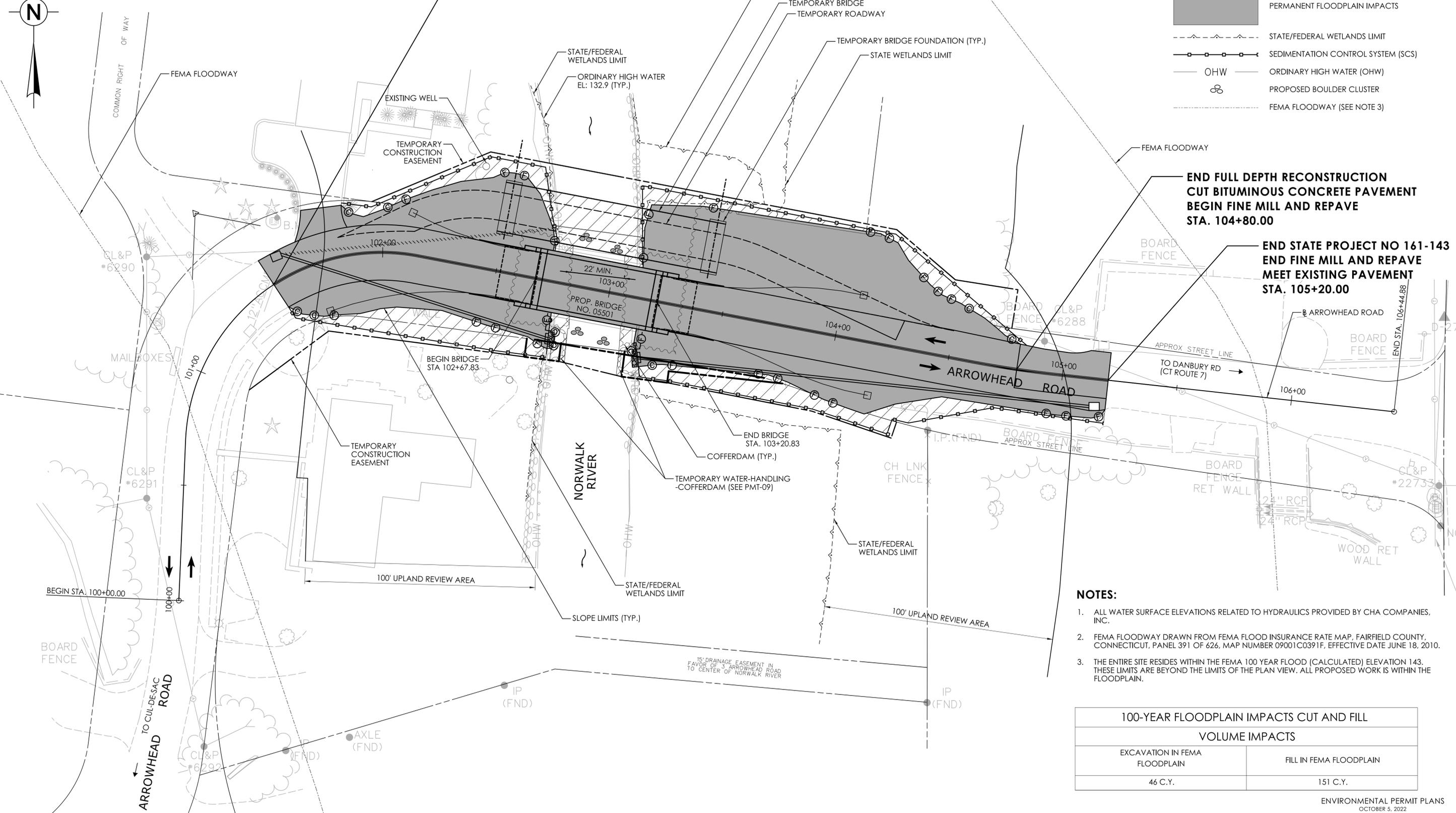
DRAWING NO.
PMT-05
 SHEET NO.
05



**BEGIN STATE PROJECT NO 161-143
CUT BITUMINOUS CONCRETE PAVEMENT
BEGIN FULL DEPTH RECONSTRUCTION
MEET EXISTING PAVEMENT
STA. 101+50.00**

LEGEND

-  TEMPORARY FLOODPLAIN IMPACTS
-  PERMANENT FLOODPLAIN IMPACTS
-  STATE/FEDERAL WETLANDS LIMIT
-  SEDIMENTATION CONTROL SYSTEM (SCS)
-  OHW
-  PROPOSED BOULDER CLUSTER
-  FEMA FLOODWAY (SEE NOTE 3)



**END FULL DEPTH RECONSTRUCTION
CUT BITUMINOUS CONCRETE PAVEMENT
BEGIN FINE MILL AND REPAVE
STA. 104+80.00**

**END STATE PROJECT NO 161-143
END FINE MILL AND REPAVE
MEET EXISTING PAVEMENT
STA. 105+20.00**

NOTES:

1. ALL WATER SURFACE ELEVATIONS RELATED TO HYDRAULICS PROVIDED BY CHA COMPANIES, INC.
2. FEMA FLOODWAY DRAWN FROM FEMA FLOOD INSURANCE RATE MAP, FAIRFIELD COUNTY, CONNECTICUT, PANEL 391 OF 626, MAP NUMBER 09001C0391F, EFFECTIVE DATE JUNE 18, 2010.
3. THE ENTIRE SITE RESIDES WITHIN THE FEMA 100 YEAR FLOOD (CALCULATED) ELEVATION 143. THESE LIMITS ARE BEYOND THE LIMITS OF THE PLAN VIEW. ALL PROPOSED WORK IS WITHIN THE FLOODPLAIN.

100-YEAR FLOODPLAIN IMPACTS CUT AND FILL	
VOLUME IMPACTS	
EXCAVATION IN FEMA FLOODPLAIN	FILL IN FEMA FLOODPLAIN
46 C.Y.	151 C.Y.

ENVIRONMENTAL PERMIT PLANS
OCTOBER 5, 2022

REV.	DATE	REVISION DESCRIPTION

DESIGNER/DRAFTER: D.T.K. CHECKED BY: M.D.G.
 LASTED SAVED BY: KIN8393 FILE NAME: c:\pwworking\himm\kin8393\d0139795\0161-0143_PMT-06_100 Year Flood Impact Plan.dgn
 PLOTTED DATE: 10/5/2022

SIGNATURE/BLOCK:

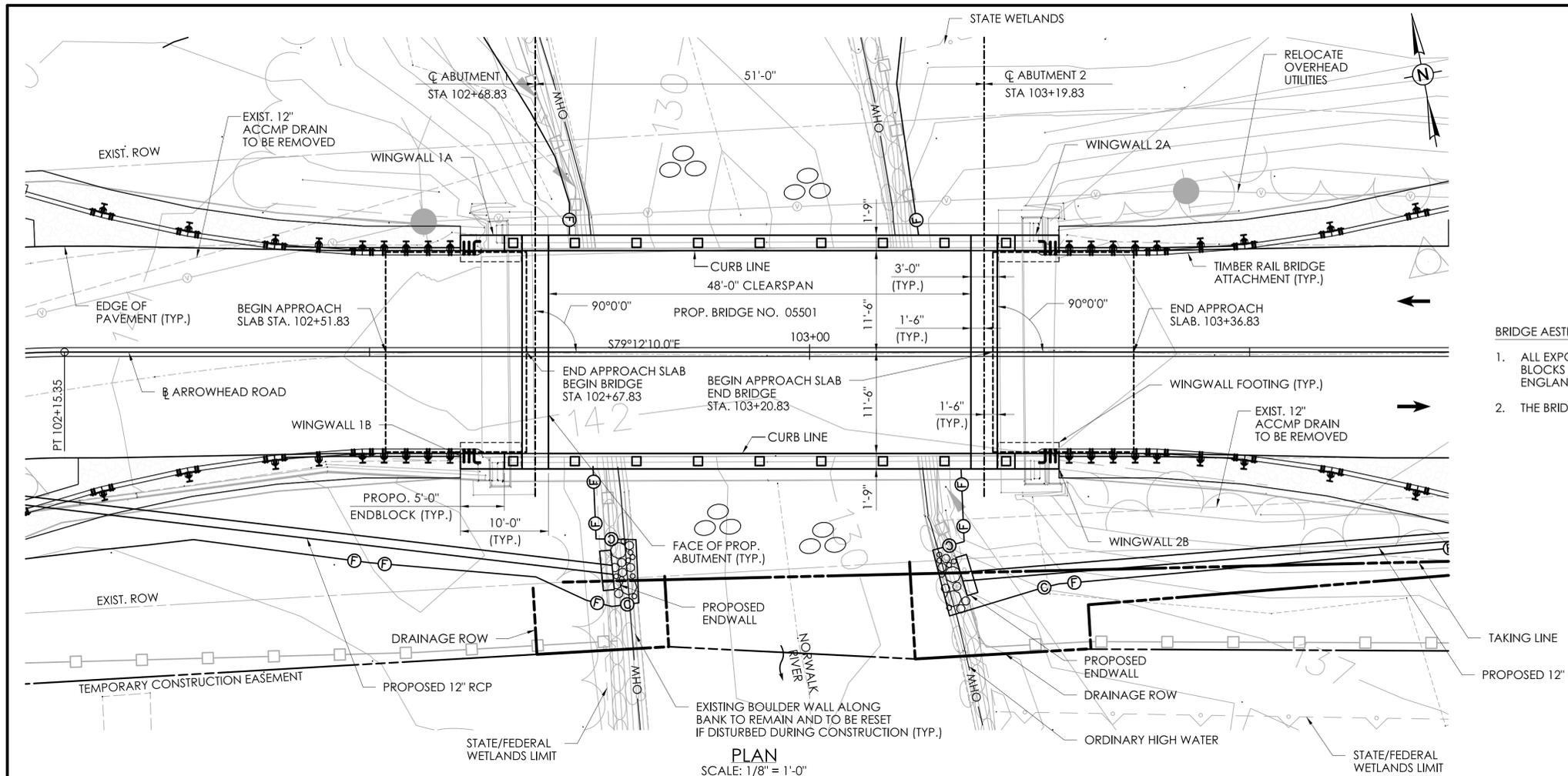
 Mott MacDonald
 175 Capital Blvd
 4th Floor
 Rocky Hill, CT 06067

M M
MOTT MACDONALD
 175 CAPITAL BLVD
 4TH FLOOR
 ROCKY HILL, CT 06067


TOWN OF WILTON

PROJECT NUMBER: 0161-0143
 PROJECT DESCRIPTION: REPLACEMENT OF BRIDGE NO. 05501 ARROWHEAD ROAD OVER NORWALK RIVER
 TOWN(S): WILTON
 DRAWING TITLE: 100-YEAR FLOOD IMPACT PLAN

DRAWING NO.
PMT-06
 SHEET NO.
06

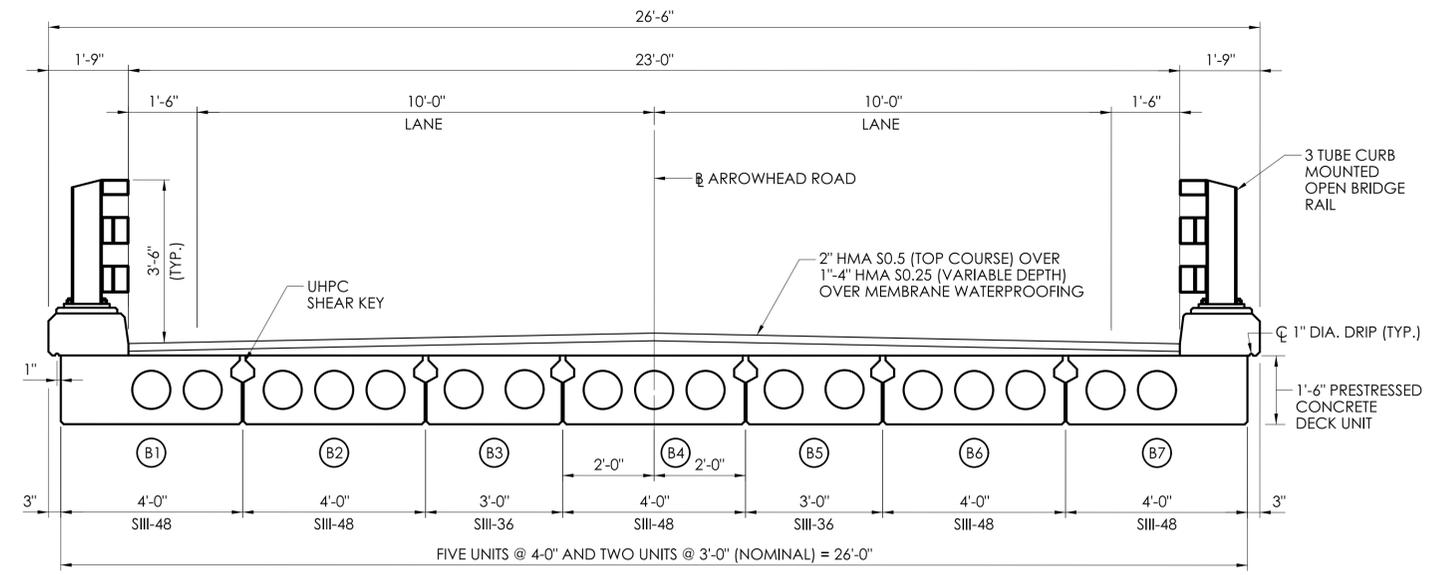
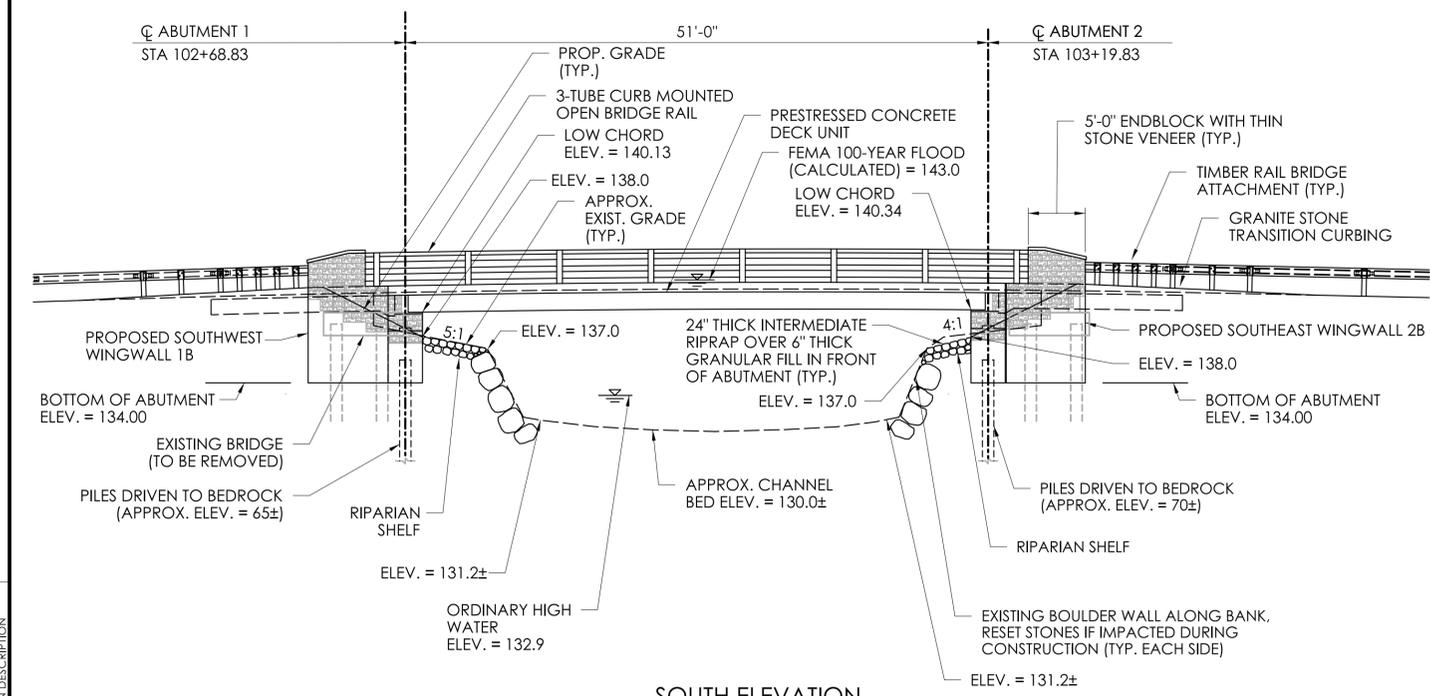


HYDRAULIC SUMMARY DATA		
DRAINAGE AREA [mi ²]	29	
DESIGN FREQUENCY [YEAR]	100	
DESIGN DISCHARGE [cfs]	4,850	
AVERAGE DAILY FLOW [cfs]	55	
DESIGN WATER SURFACE ELEVATION [feet]	UPSTREAM	DOWNSTREAM
	140.1	139.6
MAXIMUM SCOUR FREQUENCY [years]	50*	
MAXIMUM SCOUR ELEVATION [feet]	122.0'	
WORST SCOUR SUBSTRUCTURE UNIT	ABUTMENT 2 (EAST)	

NOTE: ALL HYDRAULIC DATA PROVIDED BY CHA CONSULTING, INC. *50-YEAR STORM IS THE INCIPIENT OVERTOPPING FLOW, WHICH RESULTS IN GREATER SCOUR THAN THE TYPICAL 200-YEAR DESIGN AND 500-YEAR CHECK STORMS FOR SCOUR EVALUATION.

BRIDGE AESTHETIC NOTES:

- ALL EXPOSED CONCRETE SURFACES OF ABUTMENTS (FASCIA ONLY), WINGWALLS (FASCIA ONLY), AND END BLOCKS SHALL BE PROVIDED WITH A STONE MASONRY FACING. THE STONE PATTERN SHALL BE A "NEW ENGLAND FIELDSTONE MOSAIC" PATTERN FROM CONNECTICUT STONE PRODUCTS OR AN APPROVED EQUAL.
- THE BRIDGE RAILS, POSTS AND HARDWARE SHALL BE METALLIZED TO A COLOR APPROVED BY THE TOWN.

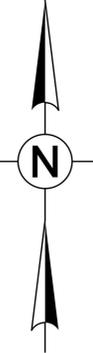


REV.	DATE	REVISION DESCRIPTION

N/F
SARAH OBUCHOWSKI
16 ARROWHEAD ROAD

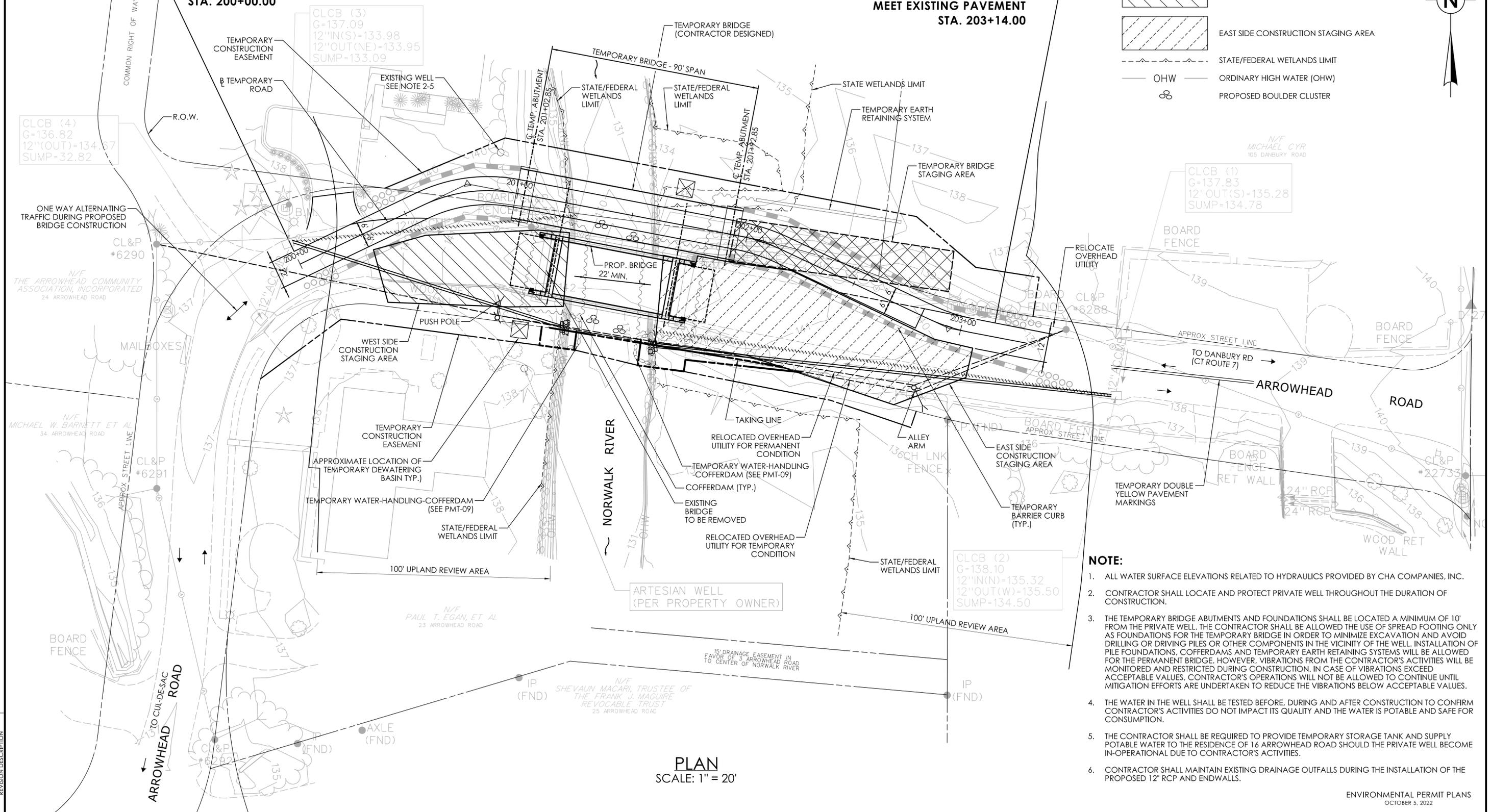
LEGEND

-  TEMPORARY BRIDGE STAGING AREA
-  WEST SIDE CONSTRUCTION STAGING AREA
-  EAST SIDE CONSTRUCTION STAGING AREA
-  STATE/FEDERAL WETLANDS LIMIT
-  OHW — ORDINARY HIGH WATER (OHW)
-  PROPOSED BOULDER CLUSTER



STATE PROJECT NO 161-143
BEGIN TEMPORARY
ROADWAY CONSTRUCTION
MEET EXISTING PAVEMENT
STA. 200+00.00

STATE PROJECT NO 161-143
END TEMPORARY
ROADWAY CONSTRUCTION
MEET EXISTING PAVEMENT
STA. 203+14.00



NOTE:

1. ALL WATER SURFACE ELEVATIONS RELATED TO HYDRAULICS PROVIDED BY CHA COMPANIES, INC.
2. CONTRACTOR SHALL LOCATE AND PROTECT PRIVATE WELL THROUGHOUT THE DURATION OF CONSTRUCTION.
3. THE TEMPORARY BRIDGE ABUTMENTS AND FOUNDATIONS SHALL BE LOCATED A MINIMUM OF 10' FROM THE PRIVATE WELL. THE CONTRACTOR SHALL BE ALLOWED THE USE OF SPREAD FOOTING ONLY AS FOUNDATIONS FOR THE TEMPORARY BRIDGE IN ORDER TO MINIMIZE EXCAVATION AND AVOID DRILLING OR DRIVING PILES OR OTHER COMPONENTS IN THE VICINITY OF THE WELL. INSTALLATION OF PILE FOUNDATIONS, COFFERDAMS AND TEMPORARY EARTH RETAINING SYSTEMS WILL BE ALLOWED FOR THE PERMANENT BRIDGE. HOWEVER, VIBRATIONS FROM THE CONTRACTOR'S ACTIVITIES WILL BE MONITORED AND RESTRICTED DURING CONSTRUCTION. IN CASE OF VIBRATIONS EXCEED ACCEPTABLE VALUES, CONTRACTOR'S OPERATIONS WILL NOT BE ALLOWED TO CONTINUE UNTIL MITIGATION EFFORTS ARE UNDERTAKEN TO REDUCE THE VIBRATIONS BELOW ACCEPTABLE VALUES.
4. THE WATER IN THE WELL SHALL BE TESTED BEFORE, DURING AND AFTER CONSTRUCTION TO CONFIRM CONTRACTOR'S ACTIVITIES DO NOT IMPACT ITS QUALITY AND THE WATER IS POTABLE AND SAFE FOR CONSUMPTION.
5. THE CONTRACTOR SHALL BE REQUIRED TO PROVIDE TEMPORARY STORAGE TANK AND SUPPLY POTABLE WATER TO THE RESIDENCE OF 16 ARROWHEAD ROAD SHOULD THE PRIVATE WELL BECOME IN-OPERATIONAL DUE TO CONTRACTOR'S ACTIVITIES.
6. CONTRACTOR SHALL MAINTAIN EXISTING DRAINAGE OUTFALLS DURING THE INSTALLATION OF THE PROPOSED 12" RCP AND ENDWALLS.

PLAN
SCALE: 1" = 20'

REV.	DATE	REVISION DESCRIPTION

DESIGNER/DRAFTER: D.T.K. CHECKED BY: M.D.G.
LASTED SAVED BY: KIN8393 FILE NAME: c:\pwworking\hmm\kin8393\d0139795\0161-0143_PMT-08_Water Handling Plan.dgn
PLOTTED DATE: 10/5/2022

SIGNATURE/BLOCK:

Mott MacDonald
175 Capital Blvd
4th Floor
Rocky Hill, CT 06067

M M
MOTT
MACDONALD
175 CAPITAL BLVD
4TH FLOOR
ROCKY HILL, CT 06067


TOWN
OF
WILTON

PROJECT NUMBER: 0161-0143
PROJECT DESCRIPTION: REPLACEMENT OF BRIDGE NO. 05501 ARROWHEAD ROAD OVER NORWALK RIVER
TOWN(S): WILTON
DRAWING TITLE: WATER HANDLING AND CONSTRUCTION STAGING PLANS

ENVIRONMENTAL PERMIT PLANS
OCTOBER 5, 2022

DRAWING NO.
PMT-08
SHEET NO.
08

WATER HANDLING NOTES:

1. COFFERDAMS SHALL CONSIST OF ANY APPROVED SYSTEM THAT THE CONTRACTOR DESIGNS AND ELECTS TO USE WHICH WILL SAFELY CONVEY WATER FLOWS THROUGH THE CONSTRUCTION AREA, SHALL BE ABLE TO SUPPORT CONSTRUCTION ACTIVITY AND EXCAVATION, AND SHALL CONFORM TO PERMITS. COFFERDAMS ARE PAID FOR UNDER THE "COFFERDAM AND DEWATERING" ITEM #0204111.
2. BEFORE INITIATING CONSTRUCTION, THE CONTRACTOR SHALL SUBMIT A PLAN FOR APPROVAL THAT DEFINES THE METHODS AND MATERIALS FOR CONTROLLING WATER, STRUCTURE EXCAVATION, AND PROTECTING THE STREAM DURING CONSTRUCTION. THE COST OF THIS WORK SHALL BE INCLUDED IN THE COST OF THE "COFFERDAM AND DEWATERING" ITEM.
3. EQUIPMENT SHALL NOT BE PERMITTED IN THE RIVER WHEN COFFERDAM AND DEWATERING SYSTEM IS NOT IN PLACE WITHOUT APPROVAL FROM THE ENGINEER.
4. THE INSTALLATION AND REMOVAL OF COFFERDAM AND DEWATERING SYSTEM CAN OCCUR AT ANY TIME OF THE YEAR. WORK BEHIND COFFERDAM CAN OCCUR AT ANY TIME OF THE YEAR.
5. COFFERDAM AND TERS SHALL NOT EXCEED IMPACT AREAS SHOWN ON THE WETLAND AND FLOODPLAIN IMPACT SHEETS OF THE PERMIT PLANS.
6. A DEWATERING BASIN SHALL BE ESTABLISHED OUTSIDE OF THE WETLAND LIMITS. THE LOCATION OF THE DEWATERING BASIN IS APPROXIMATE. THE EXACT POSITION MAY VARY BASED ON THE PUMPING DESIGN SUBMISSION APPROVED BY THE ENGINEER.
7. PRESENCE OF OBSTRUCTIONS IN THE FILL AND NATURAL SOILS, AND THE PRESENCE OF FINE-GRAINED GRANULAR SOILS THAT ARE SUSCEPTIBLE TO DISTURBANCE IN THE PRESENCE OF WATER, SHALL BE CONSIDERED BY THE CONTRACTOR IN DESIGNING AND PROVIDING THE COFFERDAM AND DEWATERING SYSTEM. THE CONTRACTOR SHALL REVIEW THE BORING LOGS ON DRAWINGS S-04, S-05 AND IN THE FINAL GEOTECHNICAL ENGINEERING REPORT.
8. COFFERDAM AND DEWATERING SYSTEM SHALL BE REMOVED IN ITS ENTIRETY AT THE END OF CONSTRUCTION.
9. TEMPORARY-WATER HANDLING-COFFERDAMS SHALL CONSIST OF PLASTIC LINER, SANDBAGS OR ANY OTHER APPROVED SYSTEM THAT THE CONTRACTOR ELECTS TO USE WHICH WILL SAFELY CONVEY WATER FLOWS AROUND THE CONSTRUCTION AREA, SHALL BE ABLE TO SUPPORT CONSTRUCTION ACTIVITY AND EXCAVATION, AND SHALL CONFORM TO PERMITS. TEMPORARY-WATER-HANDLING-COFFERDAMS ARE PAID FOR UNDER "HANDLING WATER". THIS DETAIL APPLIES TO THE CONSTRUCTION OF DRAINAGE PIPE RELOCATIONS, ENDWALLS AND REBUILT STONE WALLS AT THE SOUTHWEST AND SOUTHEAST QUADRANTS OF THE BRIDGE. A 22' (MIN.) CHANNEL OPENING SHALL BE MAINTAINED; INSTALL TEMPORARY-WATER-HANDLING-COFFERDAM ON ONE SIDE OF THE RIVER AT A TIME IF THE CONFIGURATION OF THE SYSTEM DOES NOT ALLOW FOR THE MINIMUM CHANNEL OPENING TO BE MAINTAINED IF INSTALLED SIMULTANEOUSLY ON BOTH SIDES OF THE RIVER.

TIME-OF-YEAR RESTRICTIONS

ANY "UNCONFINED" INSTREAM WORK WITHIN THE RIVER SHALL BE RESTRICTED TO THE PERIOD FROM JULY 1 TO SEPTEMBER 30, INCLUSIVE.

SUGGESTED SEQUENCE OF CONSTRUCTION:

1. CLEAR AND GRUB THE WORK AREA AND INSTALL SEDIMENTATION CONTROL SYSTEM (SCS).
2. INSTALL TERS.
3. CONSTRUCT TEMPORARY ROADWAY AND STAGING AREAS.
4. CONSTRUCT TEMPORARY BRIDGE. DIVERT TRAFFIC ONTO TEMPORARY BRIDGE.
5. INSTALL DEBRIS SHIELD ABOVE ELEVATION 138.0 MIN. AND DEMOLISH EXISTING BRIDGE SUPERSTRUCTURE.
6. INSTALL COFFERDAMS.
7. DEMOLISH EXISTING SUBSTRUCTURES AND EXCAVATE FOR PROPOSED SUBSTRUCTURES. CUT OFF EXISTING PILES 2 FEET BELOW BOTTOM OF PROPOSED ABUTMENTS OR WINGWALLS (ELEV. 132.0 MIN.) REMOVE PORTIONS OF EXISTING STONE WALLS AS NEEDED.
8. DRIVE PILES AND CONSTRUCT NEW SUBSTRUCTURES AND BACKFILL.
9. REMOVE COFFERDAMS.
10. COMPLETE CONSTRUCTION OF PROPOSED BRIDGE.
11. DIVERT TRAFFIC ONTO THE PROPOSED BRIDGE AND REMOVE TEMPORARY BRIDGE.
12. REMOVE TREES.
13. COMPLETE SITE RESTORATION.

NATIVE STREAMBED MATERIAL NOTE:

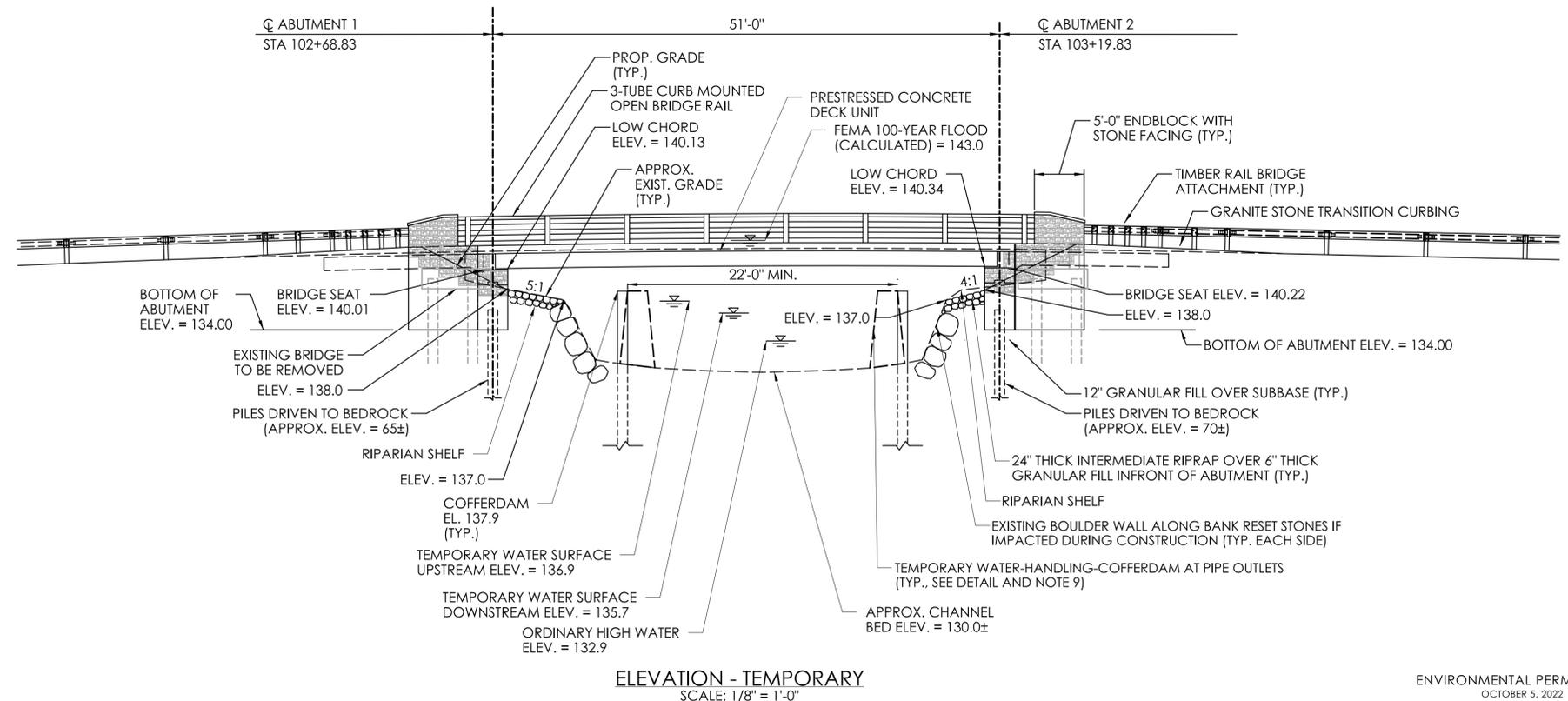
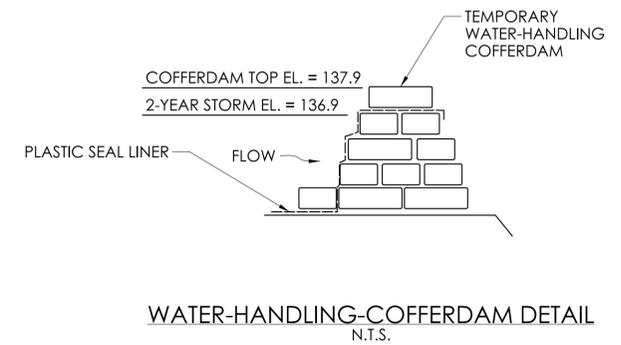
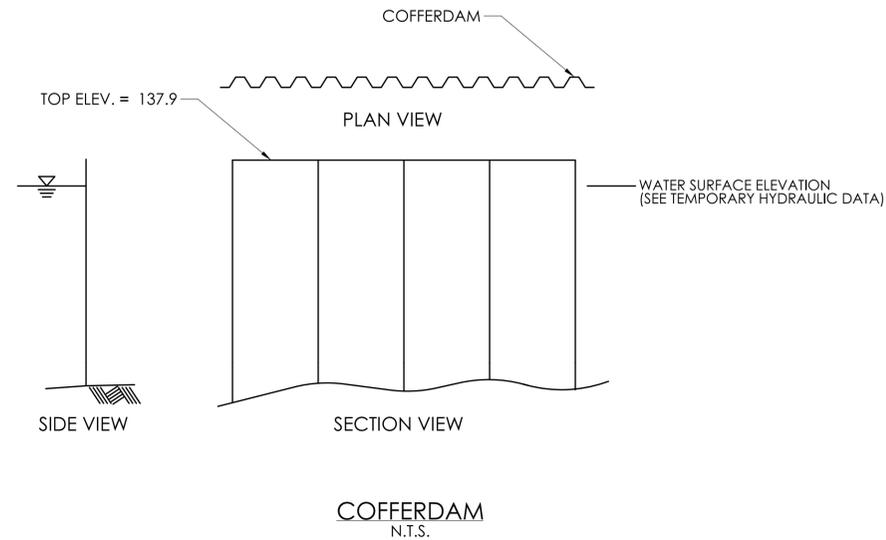
NATIVE STREAMBED MATERIAL EXCAVATED DURING THE STRUCTURE INSTALLATION SHALL BE STOCKPILED AND THEN REPLACED WITHIN THE STRUCTURE TO THE DEPTH SHOWN ON THE PLANS OR AS DIRECTED BY THE ENGINEER IN ACCORDANCE WITH THE SPECIAL PROVISION "EXCAVATION AND REUSE OF EXISTING CHANNEL BOTTOM MATERIAL."

ADDITIONAL STREAMBED MATERIAL, IF REQUESTED, SHALL BE IN ACCORDANCE WITH SPECIAL PROVISION "SUPPLEMENTAL STREAMBED CHANNEL MATERIAL."

THE STOCKPILE SHALL BE LOCATED OUTSIDE THE WETLAND LIMITS AND PROTECTED WITH SEDIMENTATION CONTROL SYSTEM.

TEMPORARY HYDRAULIC DATA		
AVERAGE DAILY FLOW (ADF) [CFS]	55	
AVERAGE SPRING FLOW (AFS) [CFS]	101	
2-YEAR FREQUENCY DISCHARGE [CFS]	1,050	
TEMPORARY DESIGN DISCHARGE [CFS]	1,050	
TEMPORARY DESIGN FREQUENCY	2-YEAR	
TEMPORARY WATER SURFACE ELEVATION [FEET]	UPSTREAM	DOWNSTREAM
	136.9	135.7

NOTE: ALL TEMPORARY HYDRAULIC DATA PROVIDED BY CHA COMPANIES, INC.



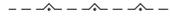
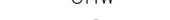
ELEVATION - TEMPORARY
SCALE: 1/8" = 1'-0"

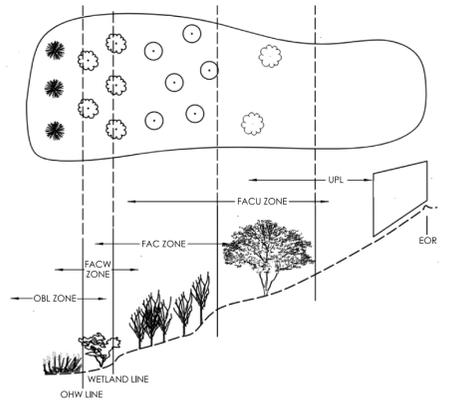
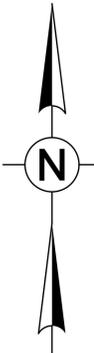
ENVIRONMENTAL PERMIT PLANS
OCTOBER 5, 2022

REV.	DATE	REVISION DESCRIPTION

DESIGNER/DRAFTER: D.T.K.	CHECKED BY: D.L.	SIGNATURE/BLOCK:	 175 CAPITAL BLVD 4TH FLOOR ROCKY HILL, CT 06067	 TOWN OF WILTON	PROJECT NUMBER: 0161-0143 PROJECT DESCRIPTION: REPLACEMENT OF BRIDGE NO. 05501 ARROWHEAD ROAD OVER NORWALK RIVER TOWN(S): WILTON DRAWING TITLE: WATER HANDLING NOTES AND DETAILS	DRAWING NO.: PMT-09 SHEET NO.: 09
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LEGEND

-  AREA TO BE RESTORED WITH PLANTINGS
-  CONTROL AND REMOVAL OF INVASIVE VEGETATION
-  STATE/FEDERAL WETLANDS LIMIT
-  SEDIMENTATION CONTROL SYSTEM (SCS)
-  OHW — ORDINARY HIGH WATER (OHW)
-  PROPOSED BOULDER CLUSTER

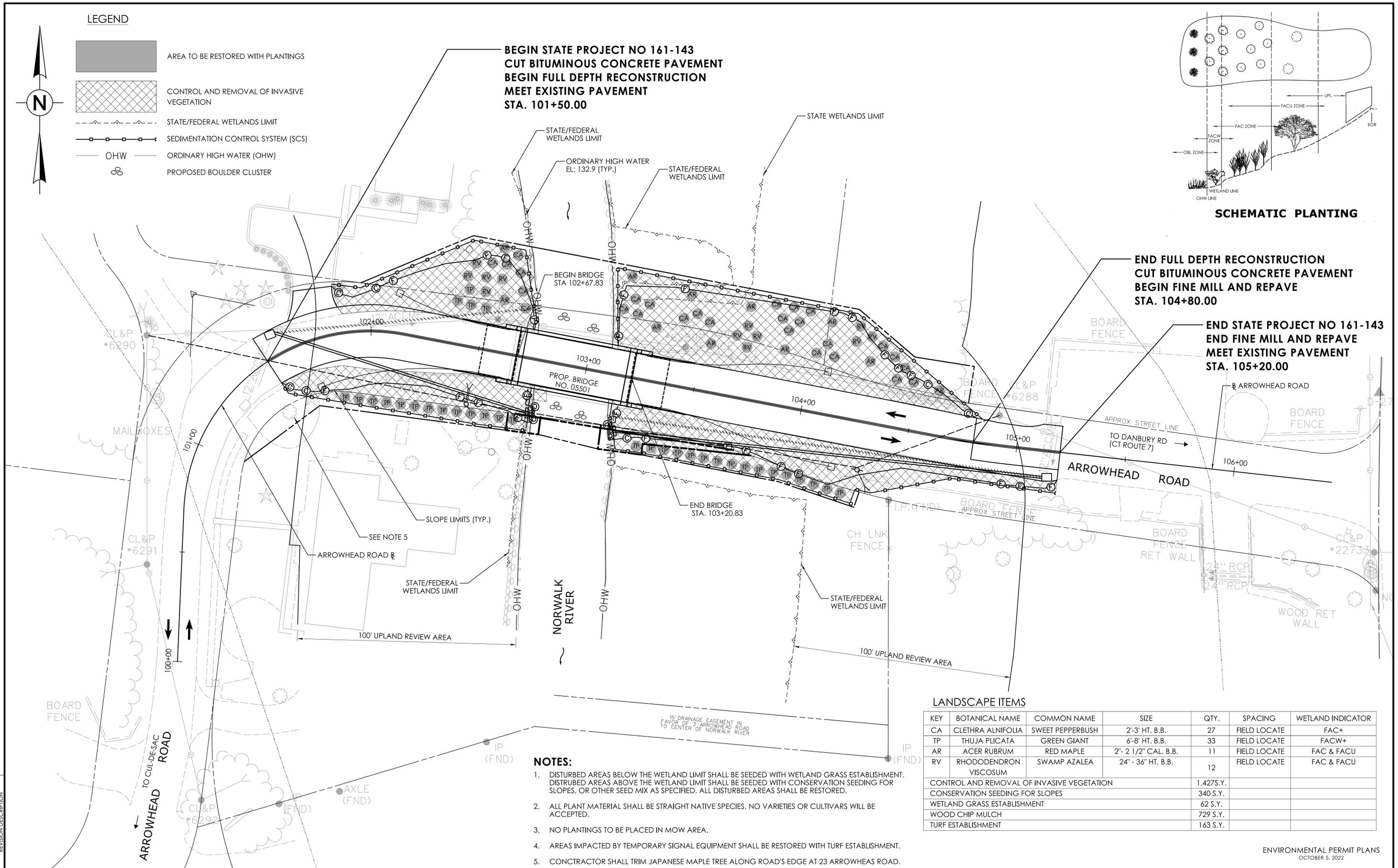


SCHEMATIC PLANTING

**BEGIN STATE PROJECT NO 161-143
CUT BITUMINOUS CONCRETE PAVEMENT
BEGIN FULL DEPTH RECONSTRUCTION
MEET EXISTING PAVEMENT
STA. 101+50.00**

**END FULL DEPTH RECONSTRUCTION
CUT BITUMINOUS CONCRETE PAVEMENT
BEGIN FINE MILL AND REPAVE
STA. 104+80.00**

**END STATE PROJECT NO 161-143
END FINE MILL AND REPAVE
MEET EXISTING PAVEMENT
STA. 105+20.00**



LANDSCAPE ITEMS

KEY	BOTANICAL NAME	COMMON NAME	SIZE	QTY.	SPACING	WETLAND INDICATOR
CA	CLETHRA ALNIFOLIA	SWEET PEPPERBUSH	2'-3' HT. B.B.	27	FIELD LOCATE	FAC+
TP	THUJA PLICATA	GREEN GIANT	6'-8' HT. B.B.	33	FIELD LOCATE	FACW+
AR	ACER RUBRUM	RED MAPLE	2"- 2 1/2" CAL. B.B.	11	FIELD LOCATE	FAC & FACU
RV	RHODODENDRON VISCOSUM	SWAMP AZALEA	24" - 36" HT. B.B.	12	FIELD LOCATE	FAC & FACU
CONTROL AND REMOVAL OF INVASIVE VEGETATION				1,427S.Y.		
CONSERVATION SEEDING FOR SLOPES				340 S.Y.		
WETLAND GRASS ESTABLISHMENT				62 S.Y.		
WOOD CHIP MULCH				729 S.Y.		
TURF ESTABLISHMENT				163 S.Y.		

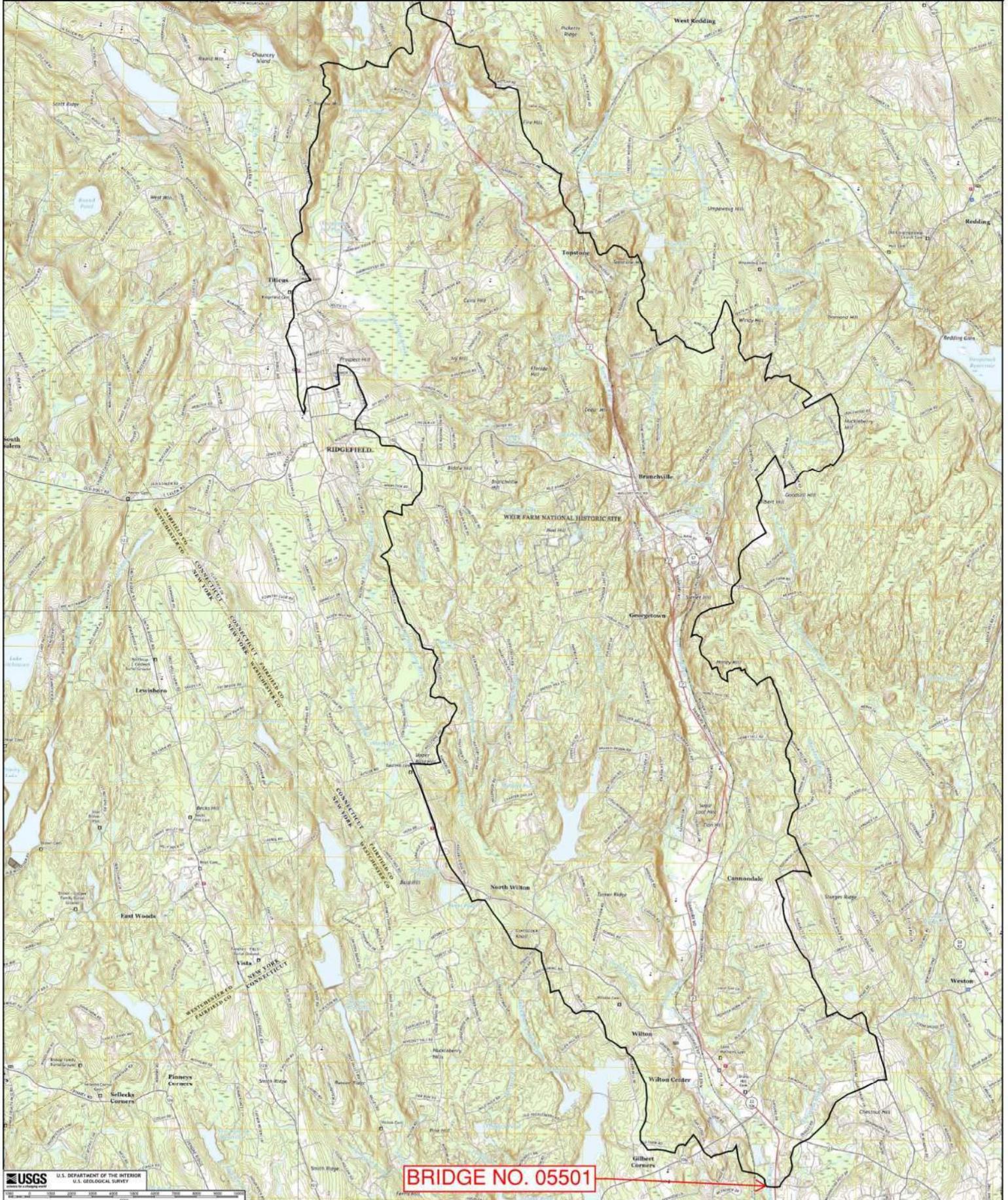
NOTES:

1. DISTURBED AREAS BELOW THE WETLAND LIMIT SHALL BE SEEDED WITH WETLAND GRASS ESTABLISHMENT. DISTURBED AREAS ABOVE THE WETLAND LIMIT SHALL BE SEEDED WITH CONSERVATION SEEDING FOR SLOPES, OR OTHER SEED MIX AS SPECIFIED. ALL DISTURBED AREAS SHALL BE RESTORED.
2. ALL PLANT MATERIAL SHALL BE STRAIGHT NATIVE SPECIES. NO VARIETIES OR CULTIVARS WILL BE ACCEPTED.
3. NO PLANTINGS TO BE PLACED IN MOW AREA.
4. AREAS IMPACTED BY TEMPORARY SIGNAL EQUIPMENT SHALL BE RESTORED WITH TURF ESTABLISHMENT.
5. CONTRACTOR SHALL TRIM JAPANESE MAPLE TREE ALONG ROAD'S EDGE AT 23 ARROWHEAD ROAD.

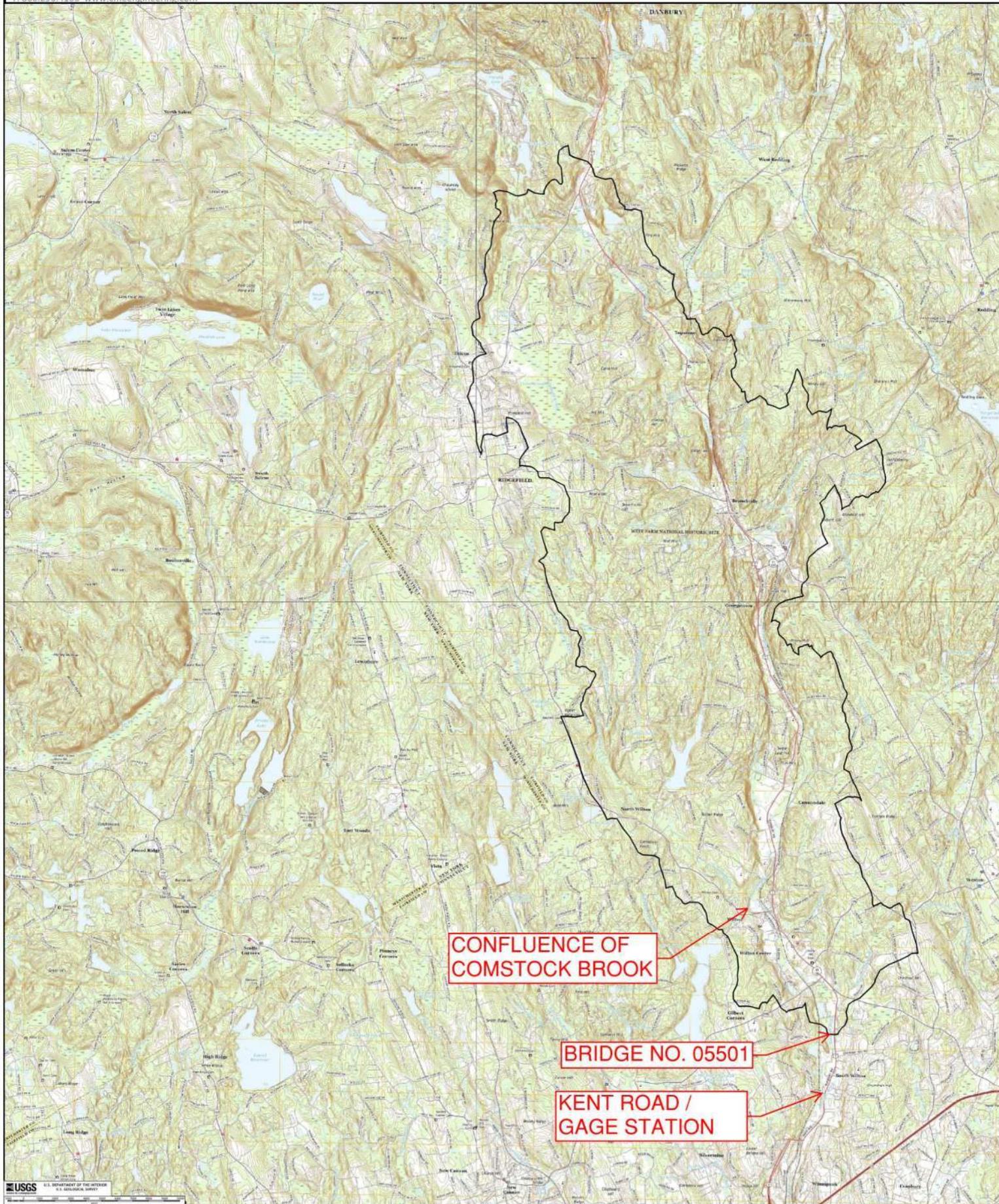
REV.	DATE	REVISION DESCRIPTION

LASTED SAVED BY: KIN8393 FILE NAME: c:\pwworking\himm\kin8393\d0139795\0161-0143_PMT-10_Permit Planting Plan.dgn PLOTTED DATE: 10/5/2022

DRAINAGE AREA MAP: USGS QUAD BRIDGE NO. 05501 IN WILTON, CT ARROWHEAD ROAD OVER NORWALK RIVER



DRAINAGE AREA MAP: USGS QUAD BRIDGE NO. 05501 IN WILTON, CT ARROWHEAD ROAD OVER NORWALK RIVER



Natural Diversity Data Base Areas

WILTON, CT

June 2022

-  State and Federal Listed Species
-  Critical Habitat
-  Town Boundary

NOTE: This map shows general locations of State and Federal Listed Species and Critical Habitats. Information on listed species is collected and compiled by the Natural Diversity Data Base (NDDB) from a variety of data sources. Exact locations of species have been buffered to produce the generalized locations.

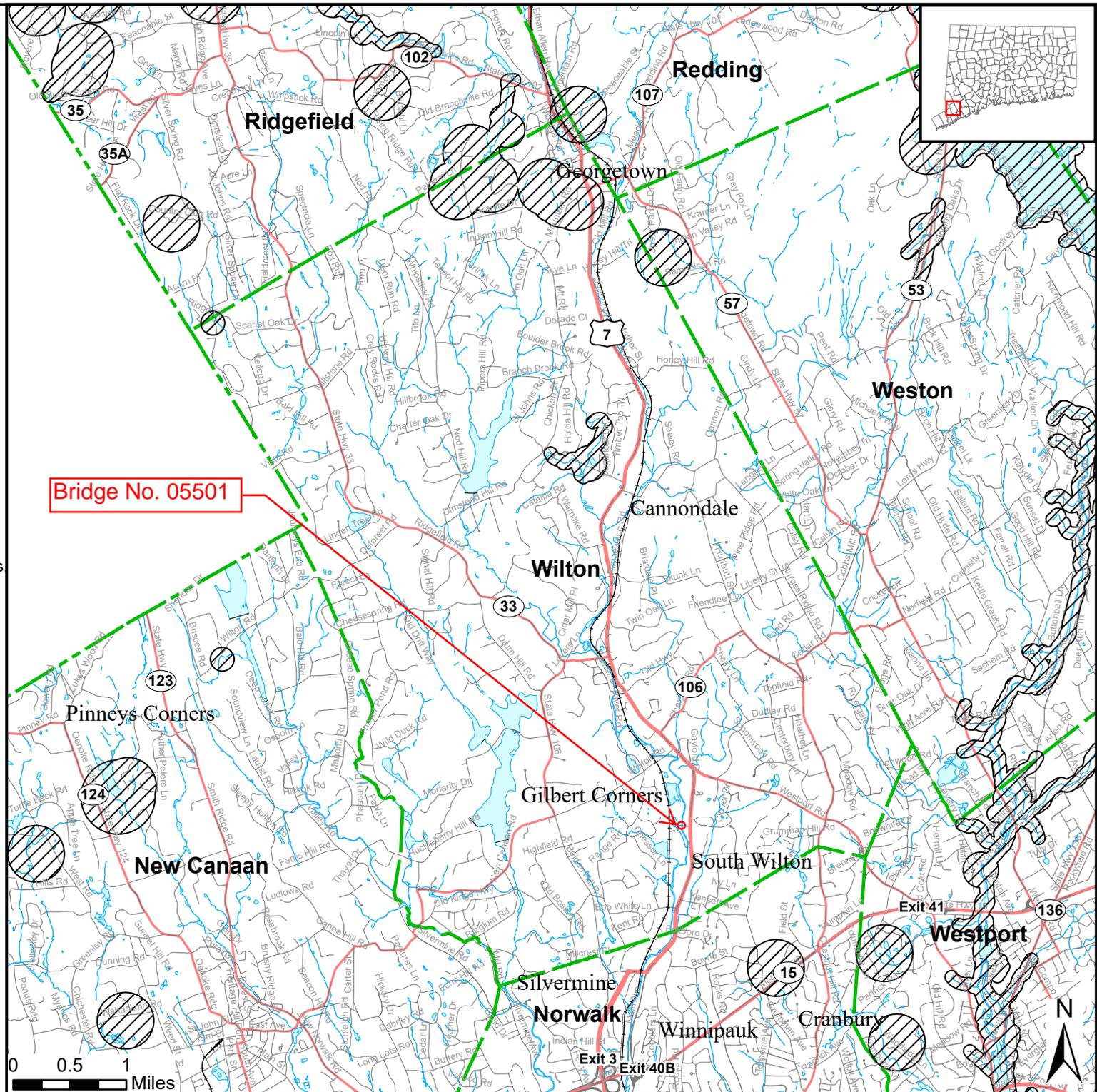
This map is intended for use as a preliminary screening tool for conducting a Natural Diversity Data Base Review Request. To use the map, locate the project boundaries and any additional affected areas. If the project is within a hatched area there may be a potential conflict with a listed species. For more information, complete a Request for Natural Diversity Data Base State Listed Species Review form (DEP-APP-007), and submit it to the NDDB along with the required maps and information. More detailed instructions are provided with the request form on our website.
<https://portal.ct.gov/deep-nddbrequest>

Use the CTECO Interactive Map Viewers at <http://cteco.uconn.edu> to more precisely search for and locate a site and to view aerial imagery with NDDB Areas.

QUESTIONS: Department of Energy and Environmental Protection (DEEP)
79 Elm St, Hartford, CT 06106
email: deep.nddbrequest@ct.gov
Phone: (860) 424-3011



Connecticut Department of Energy & Environmental Protection
Bureau of Natural Resources
Wildlife Division



AQUIFER PROTECTION AREAS

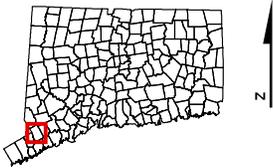
Wilton, CT

December 23, 2021

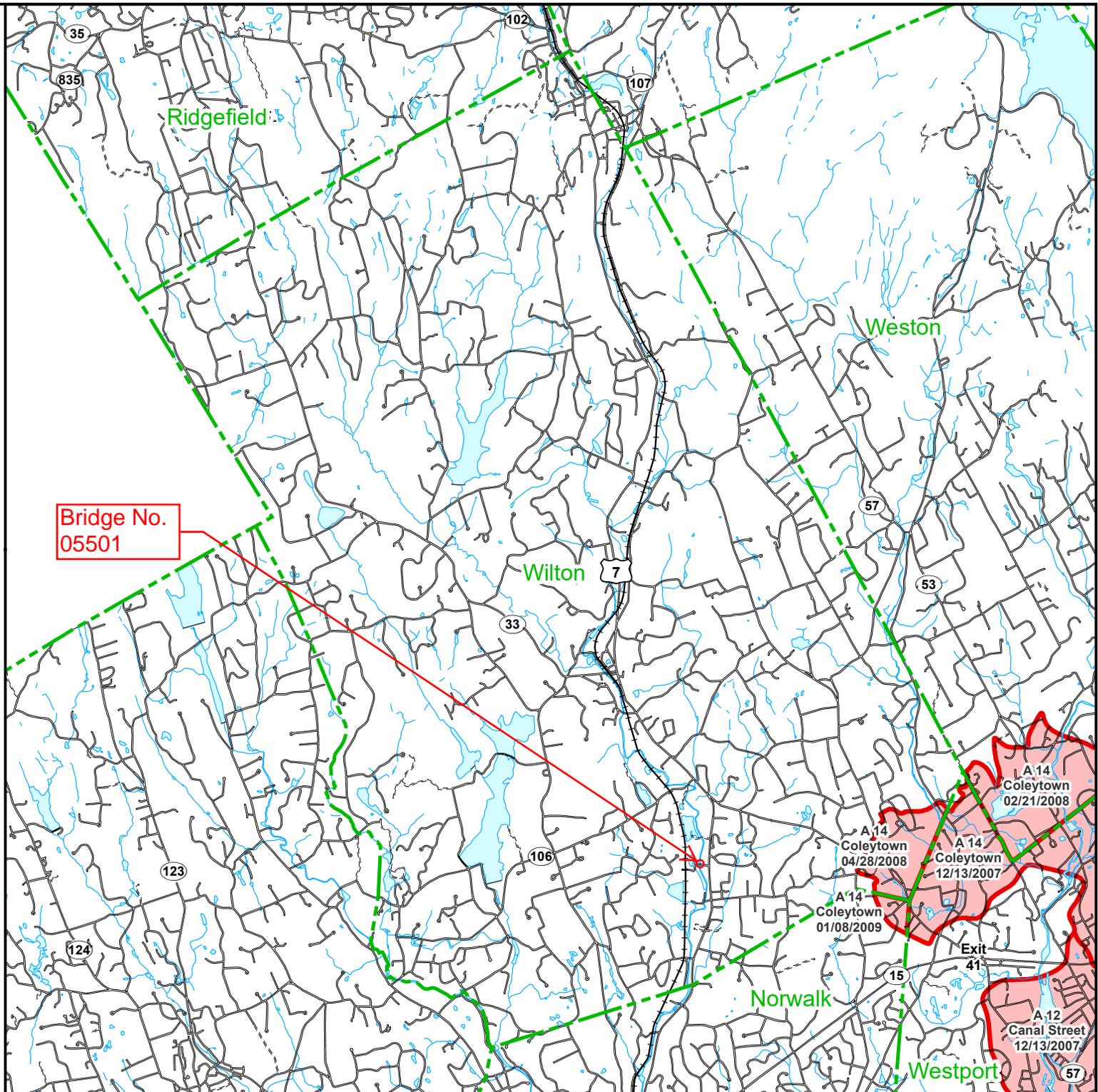
-  Level A APA (Final Adopted)
-  Level A APA (Final)
-  Level B APA (Preliminary)
-  Town Boundary

NOTE: The Aquifer Protection Areas were delineated through Connecticut's Level A and Level B Mapping Processes. Aquifer Protection Areas are delineated for active public water supply wells in stratified drift that serve more than 1000 people, in accordance with Sections 22a-354c and 22a-354z of the Connecticut General Statutes. Level B Mapping delineates a preliminary aquifer protection area, providing an estimate of the land area from which the well draws its water. Level A Mapping delineates the final Aquifer Protection Area, which becomes the regulatory boundary for land use controls designed to protect the well from contamination. As Level A Mapping is completed for each well field and approved by DEEP, it replaces the Level B Mapping. Final Adopted Level A Areas are those where towns have land use regulations for them. Massachusetts and Rhode Island Wellhead Protection Areas may be shown for informational purposes.

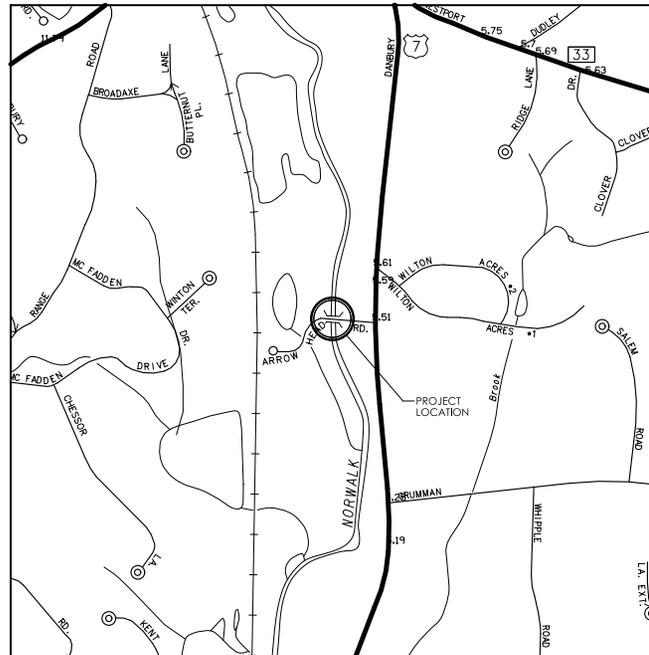
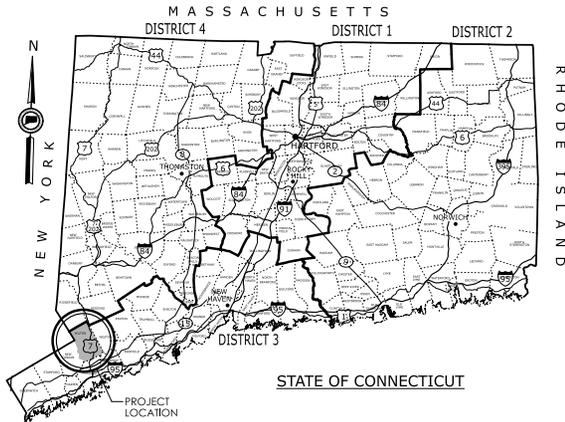
QUESTIONS:
 Bureau of Water Protection and Land Reuse
 Planning and Standards Division
 Phone: (860) 424-3020
www.ct.gov/deep/aquiferprotection



STATE OF CONNECTICUT
 DEPARTMENT OF
 ENERGY & ENVIRONMENTAL PROTECTION
 79 Elm Street
 Hartford, CT 06106-5127



ENVIRONMENTAL PERMIT PLANS STATE PROJECT NO. 0161-0143 BRIDGE NO. 05501 IN THE TOWN OF WILTON



LOCATION PLAN
NOT TO SCALE

GENERAL NOTES

1. THESE PLANS ARE NOT FOR CONSTRUCTION AND ARE INTENDED ONLY FOR ENVIRONMENTAL PERMITTING PURPOSES. THESE PLANS HOLD AUTHORITY FOR ALL ACTIVITIES CONCERNING THE REGULATED AREA, FOR DETAILED PLANIMETRIC INFORMATION AND PAYMENT, REFER TO THE APPLICABLE CONTRACT DOCUMENTS.
2. FOR A DESCRIPTION OF THE WATERCOURSES, WETLANDS AND WETLAND SOILS, SEE RELEVANT SECTIONS OF THE PERMIT APPLICATION.
3. 400 FOOT GRID BASED ON CONNECTICUT COORDINATE SYSTEM N.A.D 1983/2011 VERTICAL DATUM BASED ON NAVD OF 1988.
4. ALL CONSTRUCTION ACTIVITIES WILL BE CONDUCTED IN ACCORDANCE WITH THE DEPARTMENT'S STANDARD SPECIFICATIONS FOR ROADS, BRIDGES, AND INCIDENTAL CONSTRUCTION, FORM 818 SECTION 1.10 AND WILL ALSO FOLLOW REQUIRED BEST MANAGEMENT PRACTICES (BMPs) AND SEDIMENT AND EROSION CONTROL MEASURES IN ACCORDANCE WITH THE 2002 EROSION AND SEDIMENTATION CONTROL GUIDELINES AND THE 2004 STORMWATER QUALITY MANUAL.

LIST OF DRAWINGS	
DRAWING NO.	DRAWING TITLE
PMT-01	TITLE SHEET
PMT-02	GENERAL SITE PLAN
PMT-03	CONSTRUCTION DETAILS
PMT-04	EROSION DETAILS
PMT-05	WETLAND/WATERCOURSE IMPACT PLAN
PMT-06	100-YEAR FLOOD IMPACT PLAN
PMT-07	BRIDGE PLAN, ELEVATION, AND SECTION
PMT-08	WATER HANDLING AND CONSTRUCTION STAGING PLAN
PMT-09	WATER HANDLING NOTES AND DETAILS
PMT-10	PERMIT PLANTING PLAN

DESIGNED BY:
MOTT MACDONALD M M
175 Capital Blvd
4th Floor
Rocky Hill, CT 06067



Jeffrey J. Long
2022.11.10
16:58:59-05'00"

ENVIRONMENTAL PERMIT PLANS
NOVEMBER 10, 2022

<p>DESIGNER/DRAFTER: D.T.K. CHECKED BY: M.D.G.</p>	<p>SCALE AS NOTED</p>	<p>SIGNATURE/BLOCK:  Mott MacDonald 175 Capital Blvd 4th Floor Rocky Hill, CT 06067</p>	<p>MOTT MACDONALD</p> <p>175 CAPITAL BLVD 4TH FLOOR ROCKY HILL, CT 06067</p>	<p>TOWN OF WILTON</p>	<p>PROJECT NUMBER: 0161-0143 PROJECT DESCRIPTION: REPLACEMENT OF BRIDGE NO. 05501 ARROWHEAD ROAD OVER NORWALK RIVER TOWNS: WILTON DRAWING TITLE: TITLE SHEET</p>	<p>DRAWING NO.: PMT-01 SHEET NO.: 01</p>
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**BEGIN STATE PROJECT NO 161-143
CUT BITUMINOUS CONCRETE PAVEMENT
BEGIN FULL DEPTH RECONSTRUCTION
MEET EXISTING PAVEMENT
STA. 101+50.00**

REMOVE EXISTING UTILITY POLE
END BRIDGE
STA. 103+20.83

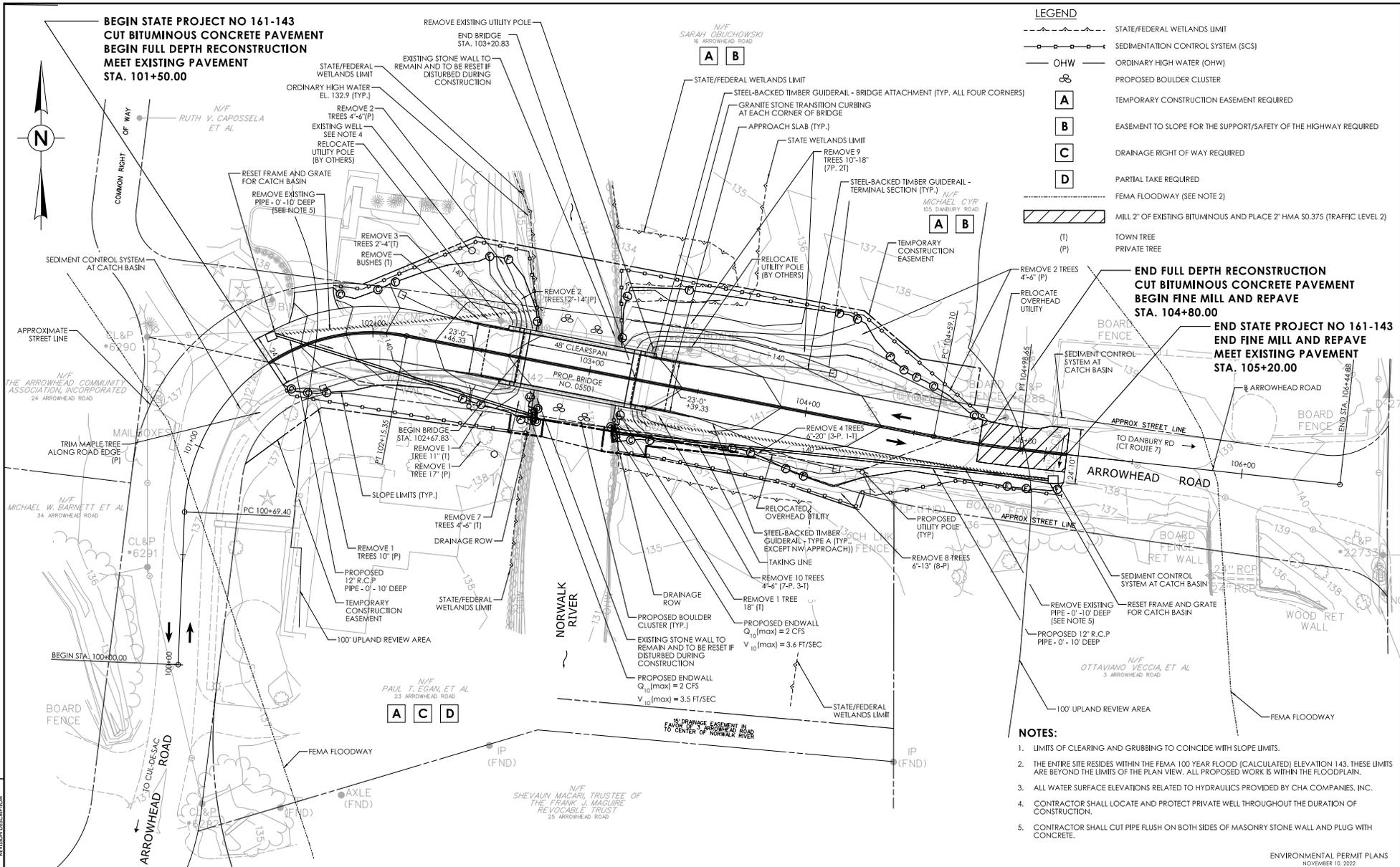
N/F
SARAH OBUCHOWSKI
105 ARROWHEAD ROAD
[A] [B]

LEGEND

- STATE/FEDERAL WETLANDS LIMIT
- SEDIMENTATION CONTROL SYSTEM (SCS)
- OHW — ORDINARY HIGH WATER (OHW)
- PROPOSED BOULDER CLUSTER
- [A] TEMPORARY CONSTRUCTION EASEMENT REQUIRED
- [B] EASEMENT TO SLOPE FOR THE SUPPORT/SAFETY OF THE HIGHWAY REQUIRED
- [C] DRAINAGE RIGHT OF WAY REQUIRED
- [D] PARTIAL TAKE REQUIRED
- FEMA FLOODWAY (SEE NOTE 2)
- MILL 2" OF EXISTING BITUMINOUS AND PLACE 2" HMA S0.375 (TRAFFIC LEVEL 2)
- (T) TOWN TREE
- (P) PRIVATE TREE

**END FULL DEPTH RECONSTRUCTION
CUT BITUMINOUS CONCRETE PAVEMENT
BEGIN FINE MILL AND REPAVE
STA. 104+80.00**

**END STATE PROJECT NO 161-143
END FINE MILL AND REPAVE
MEET EXISTING PAVEMENT
STA. 105+20.00**



- NOTES:**
- LIMITS OF CLEARING AND GRUBBING TO COINCIDE WITH SLOPE LIMITS.
 - THE ENTIRE SITE RESIDES WITHIN THE FEMA 100 YEAR FLOOD (CALCULATED) ELEVATION 14.3. THESE LIMITS ARE BEYOND THE LIMITS OF THE PLAN VIEW. ALL PROPOSED WORK IS WITHIN THE FLOODPLAIN.
 - ALL WATER SURFACE ELEVATIONS RELATED TO HYDRAULICS PROVIDED BY CHA COMPANIES, INC.
 - CONTRACTOR SHALL LOCATE AND PROTECT PRIVATE WELL THROUGHOUT THE DURATION OF CONSTRUCTION.
 - CONTRACTOR SHALL CUT PIPE FLUSH ON BOTH SIDES OF MASONRY STONE WALL AND PLUG WITH CONCRETE.

ENVIRONMENTAL PERMIT PLANS
NOVEMBER 10, 2022

NO.	DATE	REVISION DESCRIPTION

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PLOTTED DATE: 11/16/2022

SIGNATURE/ BLOCK
Mott MacDonald
175 Capital Blvd
Rocky Hill, CT 06067

M M
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MACDONALD
175 CAPITAL BLVD
4TH FLOOR
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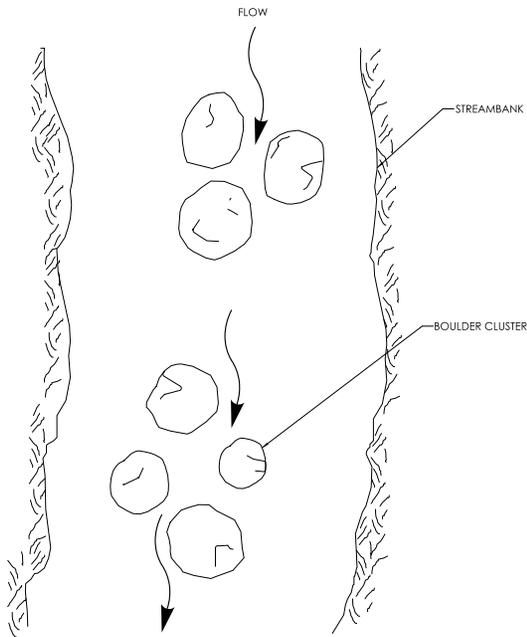
TOWN OF
WILTON

PROJECT NUMBER: 0161-0143
PROJECT DESCRIPTION: REPLACEMENT OF BRIDGE NO. 05501 ARROWHEAD ROAD OVER NORWALK RIVER
TOWNSHIP: WILTON
DRAWING TITLE: GENERAL SITE PLAN

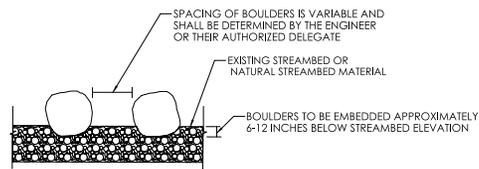
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SHEET NO.: 02

NOTES

1. ROUNDED BOULDERS APPROXIMATELY 2 TO 4' FEET IN DIAMETER SHALL BE PLACED IN CLUSTERS AND STABILIZED, AS DIRECTED IN THE FIELD BY THE FISHERIES SPECIALIST FROM THE CIDEEP. SEE SPECIAL PROVISION "PLACEMENT OF CHANNEL BOULDER."
2. FOR MULTIPLE CLUSTERS, THE DISTANCE BETWEEN CLUSTERS WILL BE BASED ON FIELD CONDITIONS.
3. ALL WORK ASSOCIATED WITH THE PLACEMENT OF CHANNEL BOULDERS TO BE PAID FOR UNDER SPECIAL PROVISION "PLACEMENT OF CHANNEL BOULDER," EXISTING OR NATURAL STREAMBED MATERIAL TO BE PAID FOR UNDER SPECIAL PROVISION "EXCAVATION AND REUSE OF EXISTING CHANNEL BOTTOM MATERIAL" AND IF SPECIFIED, "SUPPLEMENTAL STREAMBED CHANNEL MATERIAL."
4. BOULDERS SHALL BE PLACED WITHIN THE TOWN'S RIGHT-OF-WAY. BOULDERS SHALL NOT BE PLACED UNDER THE BRIDGE.
5. TEN DAYS BEFORE THE INSTALLATION OF THE CHANNEL BOULDERS CONTACT BRUCE WILLIAMS OF DEEP FISHERIES AT BRUCE.WILLIAMS@CT.GOV TO OVERSEE THE INSTALLATION OF THE CHANNEL BOULDERS.



PLACEMENT OF CHANNEL BOULDERS
PLAN VIEW
N.T.S.



PLACEMENT OF CHANNEL BOULDERS
SECTION VIEW
N.T.S.

ENVIRONMENTAL PERMIT PLANS
NOVEMBER 10, 2022

NO.	DATE	REVISION DESCRIPTION

DESIGNER/DRAFTER: D.T.K. CHECKED BY: M.D.G.

SCALE AS NOTED

SIGNATURE BLOCK



175 CAPITAL BLVD
4TH FLOOR
ROCKY HILL, CT 06067



TOWN OF WILTON



PROJECT NUMBER: 0141-0143

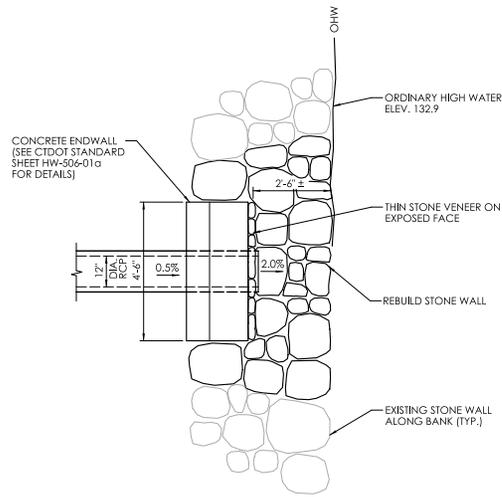
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TOWNSHIP: WILTON

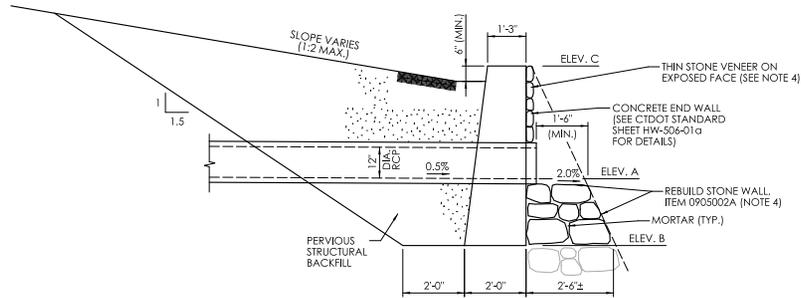
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DRAWING NO.
PMT-03

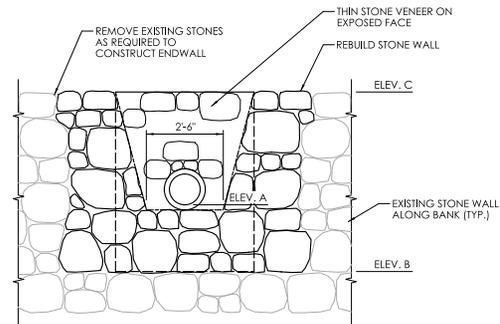
SHEET NO.
03



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



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



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

ENDWALL LOCATION	ELEV. A	ELEV. B	ELEV. C	TOTAL HEIGHT
SE QUADRANT	134.32	132.32	136.82	4.5 FT
SW QUADRANT	133.34	131.34	137.50	6.16 FT

NOTES:

- ELEVATION "C" (TOP OF ENDWALL) IS ALSO THE APPROXIMATE TOP OF THE EXISTING STONE WALL ALONG BANK.
- ENDWALLS TO BE PAID UNDER THE ITEM "TYPE 'D-G' ENDWALL".
- FACE OF NEW STONES TO MATCH SLOPE OF EXISTING STONE WALL.
- CONFINEMENT FROM THE RIVER SHALL BE PROVIDED FOR THE CONSTRUCTION OF DRAINAGE RELOCATION, ENDWALLS AND REBUILD STONE WALL. THE COST FOR CONFINEMENT SHALL BE INCLUDED IN THE ITEM 0204151 - HANDLING WATER.
- CONTRACTOR SHALL RE-PURPOSE EXISTING BOULDERS AND CREEK STONE REMOVED FROM THE BANK FOR THE END WALL STONE VENEER. ALL ASSOCIATED EFFORT TO BE PAID UNDER THE ITEM "MASONRY FACING". SEE SPECIAL PROVISIONS.

ENVIRONMENTAL PERMIT PLANS
NOVEMBER 10, 2022

REV.	DATE	DESCRIPTION

DESIGNER/DRAWER: D.T.K. CHECKED BY: L.J.
SCALE: 1/2" = 1'-0"

SIGNATURE/BLOCK:

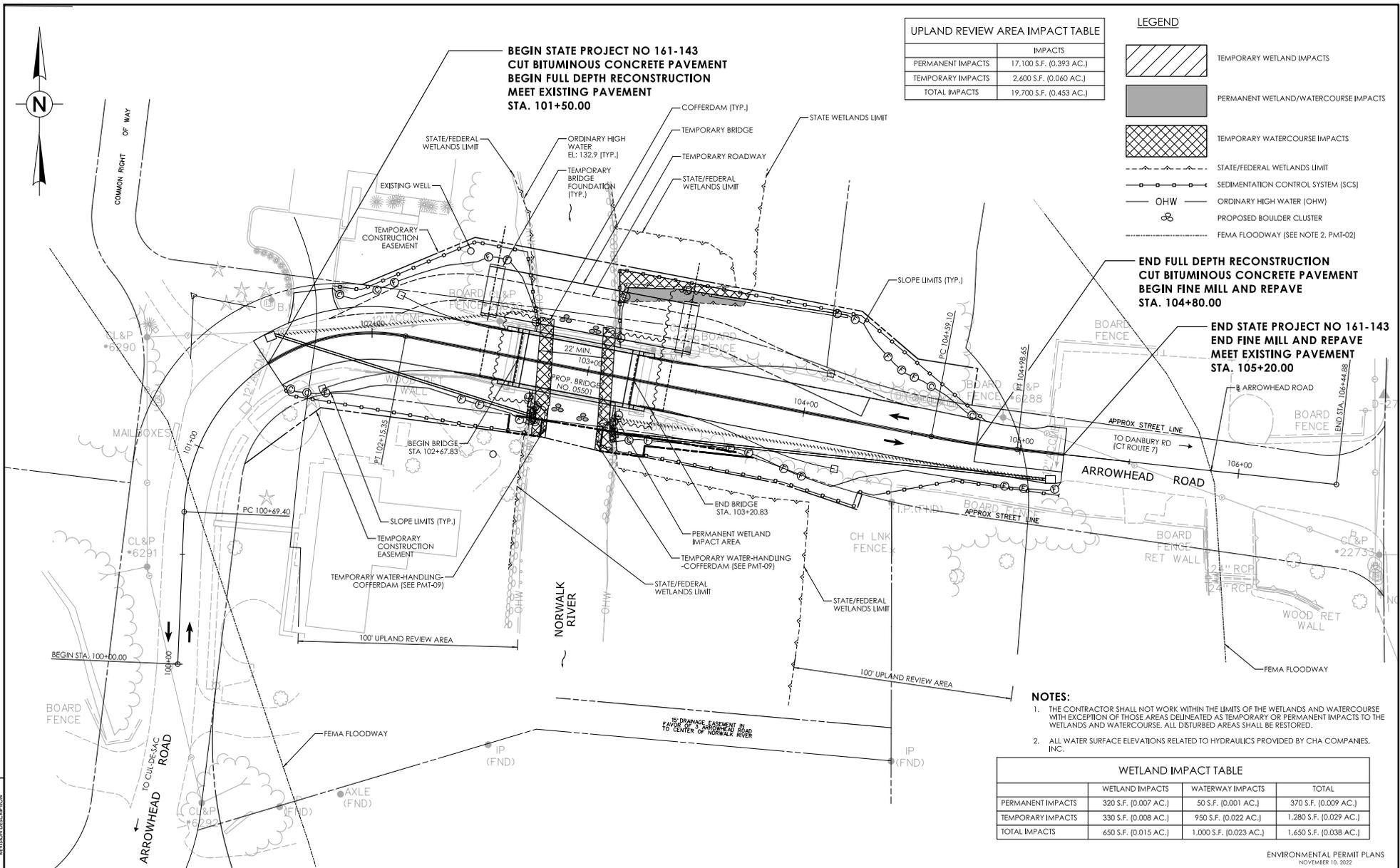
MOTT MACDONALD
 175 CAPITAL BLVD
 4TH FLOOR
 ROCKY HILL, CT 06067

TOWN OF WILTON



PROJECT NUMBER: 0161-0143
 PROJECT DESCRIPTION: REPLACEMENT OF BRIDGE NO. 05501 ARROWHEAD ROAD OVER NORWALK RIVER
 TOWNSHIP: WILTON
 DRAWING TITLE: ENDWALL DETAILS

DRAWING NO.
PMT-04
SHEET NO.
04



UPLAND REVIEW AREA IMPACT TABLE

	IMPACTS
PERMANENT IMPACTS	17,100 S.F. (0.393 AC.)
TEMPORARY IMPACTS	2,600 S.F. (0.060 AC.)
TOTAL IMPACTS	19,700 S.F. (0.453 AC.)

LEGEND

- TEMPORARY WETLAND IMPACTS
- PERMANENT WETLAND/WATERCOURSE IMPACTS
- TEMPORARY WATERCOURSE IMPACTS
- STATE/FEDERAL WETLANDS LIMIT
- SEDIMENTATION CONTROL SYSTEM (SCS)
- OHW
- PROPOSED BOULDER CLUSTER
- FEMA FLOODWAY (SEE NOTE 2, PMT-02)

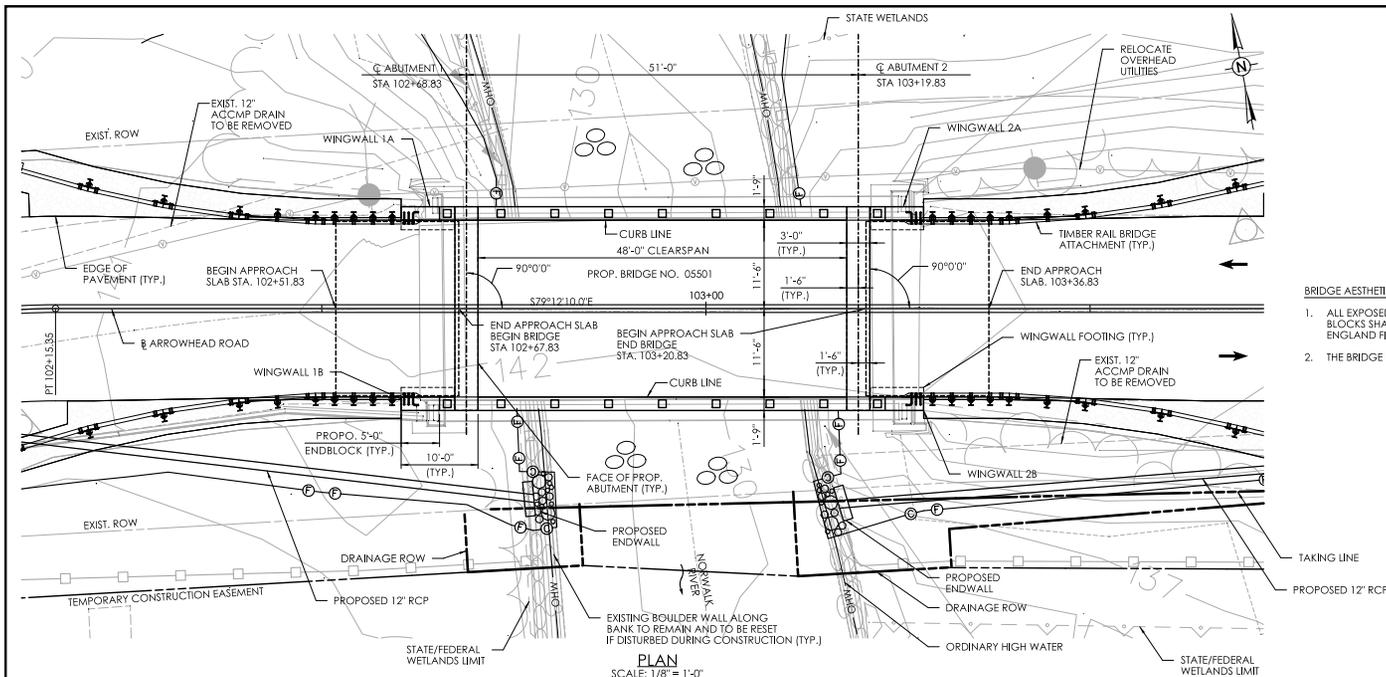
- NOTES:**
- THE CONTRACTOR SHALL NOT WORK WITHIN THE LIMITS OF THE WETLANDS AND WATERCOURSE WITH EXCEPTION OF THOSE AREAS DELINEATED AS TEMPORARY OR PERMANENT IMPACTS TO THE WETLANDS AND WATERCOURSE. ALL DISTURBED AREAS SHALL BE RESTORED.
 - ALL WATER SURFACE ELEVATIONS RELATED TO HYDRAULICS PROVIDED BY CHA COMPANIES, INC.

WETLAND IMPACT TABLE

	WETLAND IMPACTS	WATERWAY IMPACTS	TOTAL
PERMANENT IMPACTS	320 S.F. (0.007 AC.)	50 S.F. (0.001 AC.)	370 S.F. (0.009 AC.)
TEMPORARY IMPACTS	330 S.F. (0.008 AC.)	950 S.F. (0.022 AC.)	1,280 S.F. (0.029 AC.)
TOTAL IMPACTS	650 S.F. (0.015 AC.)	1,000 S.F. (0.023 AC.)	1,650 S.F. (0.038 AC.)

REV.	DATE	DESCRIPTION

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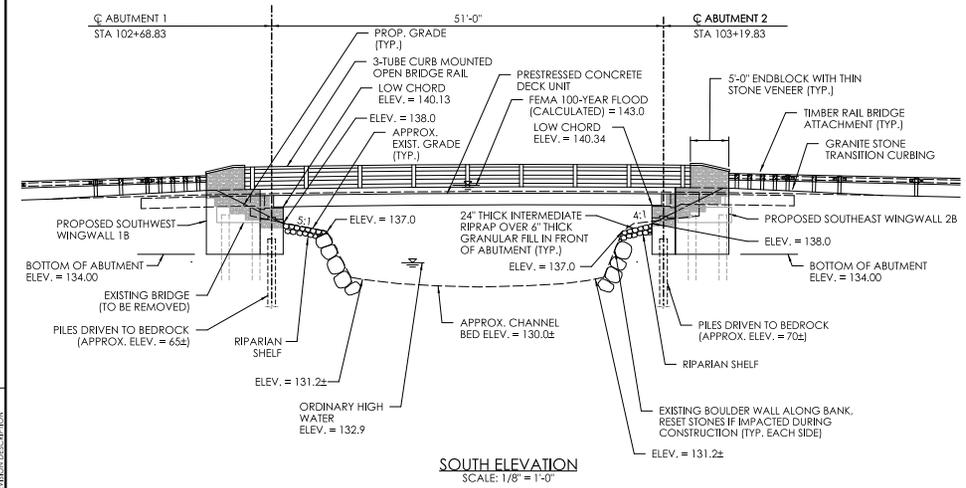
PLAN
SCALE: 1/8" = 1'-0"

HYDRAULIC SUMMARY DATA		
DRAINAGE AREA [mi ²]	29	
DESIGN FREQUENCY [YEAR]	100	
DESIGN DISCHARGE [cfs]	4,850	
AVERAGE DAILY FLOW [cfs]	55	
DESIGN WATER SURFACE ELEVATION [feet]	UPSTREAM	DOWNSTREAM
	140.1	139.6
MAXIMUM SCOUR FREQUENCY [years]	50*	
MAXIMUM SCOUR ELEVATION [feet]	122.0*	
WORST SCOUR SUBSTRUCTURE UNIT	ABUTMENT 2 (EAST)	

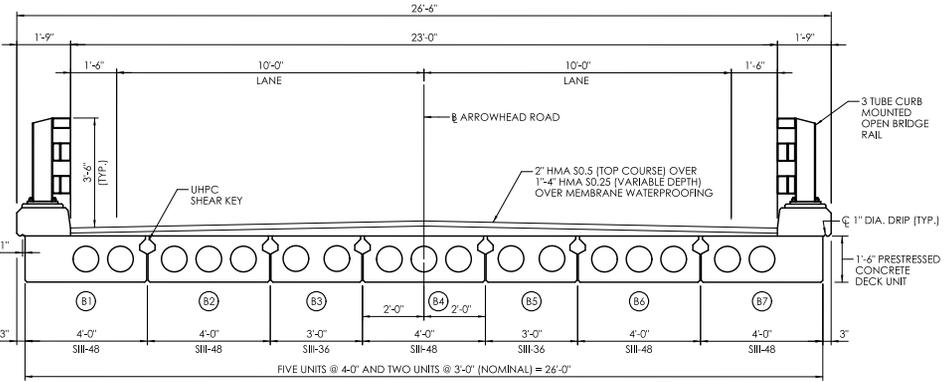
NOTE: ALL HYDRAULIC DATA PROVIDED BY CHA CONSULTING, INC. *50-YEAR STORM IS THE INCIDENT OVERTOPPING FLOW, WHICH RESULTS IN GREATER SCOUR THAN THE TYPICAL 200-YEAR DESIGN AND 500-YEAR CHECK STORMS FOR SCOUR EVALUATION.

BRIDGE AESTHETIC NOTES:

1. ALL EXPOSED CONCRETE SURFACES OF ABUTMENTS (FASCIA ONLY), WINGWALLS (FASCIA ONLY), AND END BLOCKS SHALL BE PROVIDED WITH A STONE MASONRY FACING. THE STONE PATTERN SHALL BE A "NEW ENGLAND FIELDSTONE MOSAIC" PATTERN FROM CONNECTICUT STONE PRODUCTS OR AN APPROVED EQUAL.
2. THE BRIDGE RAILS, POSTS AND HARDWARE SHALL BE METALLIZED TO A COLOR APPROVED BY THE TOWN.



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



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

NO.	DATE	REVISION/DESCRIPTION

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 ROCKY HILL, CT 06067

TOWN OF WILTON

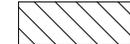
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 PROJECT DESCRIPTION: REPLACEMENT OF BRIDGE NO. 05501 ARROWHEAD ROAD OVER NORWALK RIVER
 TOWNSHIP: WILTON
 DRAWING TITLE: BRIDGE PLAN, ELEVATION, AND SECTION

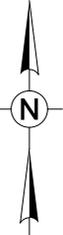
ENVIRONMENTAL PERMIT PLANS
 NOVEMBER 10, 2022

DRAWING NO: PM1-07
 SHEET NO: 07

N/F
SARAH OBLUCHOWSKI
16 ARROWHEAD ROAD

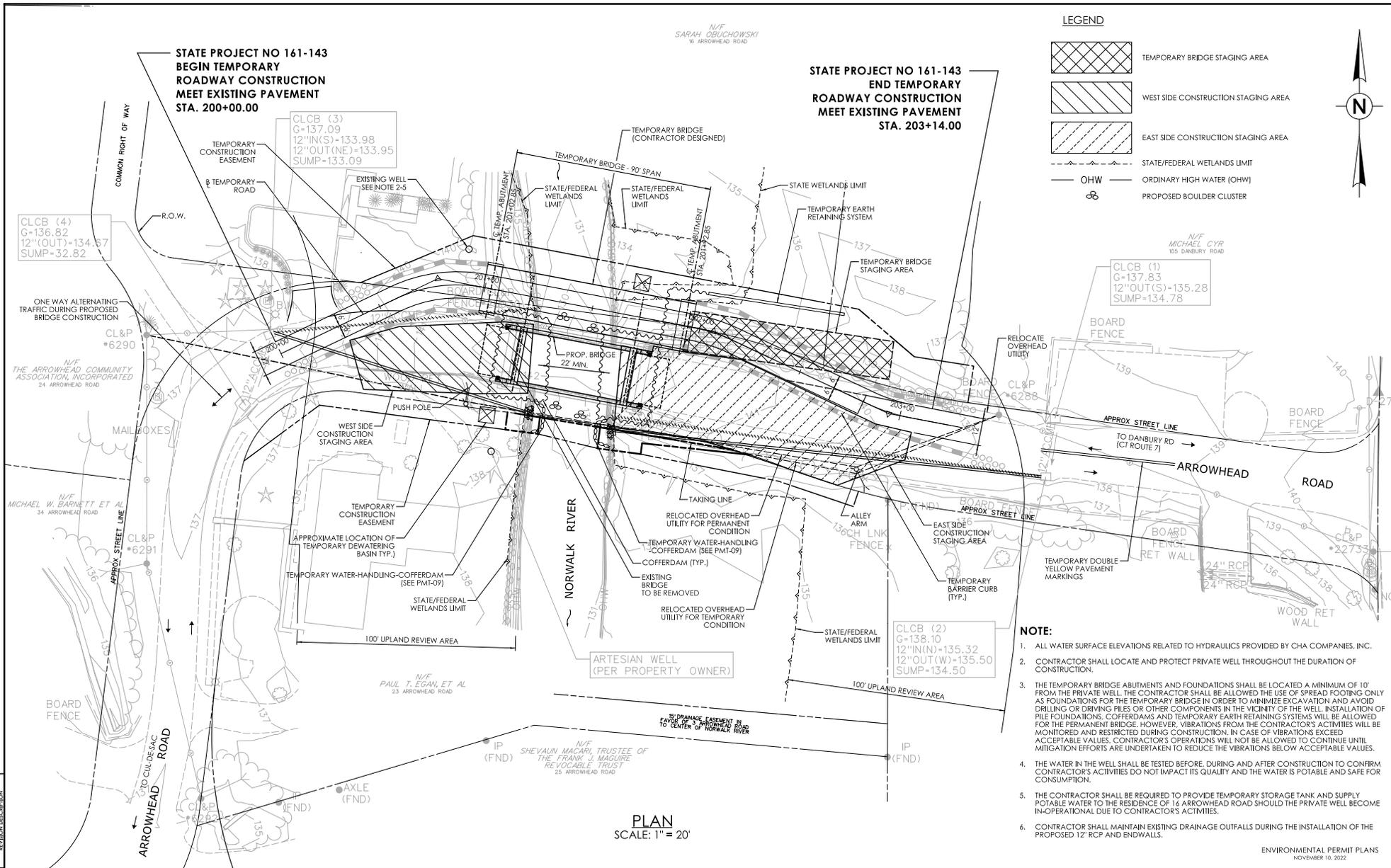
LEGEND

-  TEMPORARY BRIDGE STAGING AREA
-  WEST SIDE CONSTRUCTION STAGING AREA
-  EAST SIDE CONSTRUCTION STAGING AREA
-  STATE/FEDERAL WETLANDS LIMIT
-  OHW — ORDINARY HIGH WATER (OHW)
-  PROPOSED BOULDER CLUSTER



STATE PROJECT NO 161-143
BEGIN TEMPORARY
ROADWAY CONSTRUCTION
MEET EXISTING PAVEMENT
STA. 200+00.00

STATE PROJECT NO 161-143
END TEMPORARY
ROADWAY CONSTRUCTION
MEET EXISTING PAVEMENT
STA. 203+14.00



NOTE:

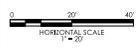
1. ALL WATER SURFACE ELEVATIONS RELATED TO HYDRAULICS PROVIDED BY CHA COMPANIES, INC.
2. CONTRACTOR SHALL LOCATE AND PROTECT PRIVATE WELL THROUGHOUT THE DURATION OF CONSTRUCTION.
3. THE TEMPORARY BRIDGE ABUTMENTS AND FOUNDATIONS SHALL BE LOCATED A MINIMUM OF 10' FROM THE PRIVATE WELL. THE CONTRACTOR SHALL BE ALLOWED THE USE OF SPREAD FOOTING UNLESS AS FOUNDATIONS FOR THE TEMPORARY BRIDGE IN ORDER TO MINIMIZE EXCAVATION AND AVOID DRILLING OR DRIVING PILES OR OTHER COMPONENTS IN THE VICINITY OF THE WELL. INSTALLATION OF PILE FOUNDATIONS, COFFERDAMS AND TEMPORARY EARTH RETAINING SYSTEMS WILL BE ALLOWED FOR THE PERMANENT BRIDGE. HOWEVER, VIBRATIONS FROM THE CONTRACTOR'S ACTIVITIES WILL BE MONITORED AND RESTRICTED DURING CONSTRUCTION. IN CASE OF VIBRATIONS EXCEED ACCEPTABLE VALUES, CONTRACTOR'S OPERATIONS WILL NOT BE ALLOWED TO CONTINUE UNTIL MITIGATION EFFORTS ARE UNDERTAKEN TO REDUCE THE VIBRATIONS BELOW ACCEPTABLE VALUES.
4. THE WATER IN THE WELL SHALL BE TESTED BEFORE, DURING AND AFTER CONSTRUCTION TO CONFIRM CONTRACTOR'S ACTIVITIES DO NOT IMPACT ITS QUALITY AND THE WATER IS POTABLE AND SAFE FOR CONSUMPTION.
5. THE CONTRACTOR SHALL BE REQUIRED TO PROVIDE TEMPORARY STORAGE TANK AND SUPPLY POTABLE WATER TO THE RESIDENCE OF 14 ARROWHEAD ROAD SHOULD THE PRIVATE WELL BECOME IN-OPERATIONAL DUE TO CONTRACTOR'S ACTIVITIES.
6. CONTRACTOR SHALL MAINTAIN EXISTING DRAINAGE OUTFALLS DURING THE INSTALLATION OF THE PROPOSED 12" RCP AND ENDWALLS.

PLAN
SCALE: 1" = 20'

ENVIRONMENTAL PERMIT PLANS
NOVEMBER 10, 2022

REV.	DATE	DESCRIPTION

DESIGNER/DRAWER: D.T.B. CHECKED BY: N.D.O.
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PLOTED DATE: 11/9/2022



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ROCKY HILL, CT 06067



PROJECT NUMBER: 0161-0143
PROJECT DESCRIPTION: REPLACEMENT OF BRIDGE NO. 05501 ARROWHEAD ROAD OVER NORWALK RIVER
TOWNSHIP: WILTON
DRAWING TITLE: WATER HANDLING AND CONSTRUCTION STAGING PLANS

DRAWING NO.: PMT-08
SHEET NO.: 08

WATER HANDLING NOTES:

- COFFERDAMS SHALL CONSIST OF ANY APPROVED SYSTEM THAT THE CONTRACTOR DESIGNS AND ELECTS TO USE WHICH WILL SAFELY CONVEY WATER FLOWS THROUGH THE CONSTRUCTION AREA. SHALL BE ABLE TO SUPPORT CONSTRUCTION ACTIVITY AND EXCAVATION, AND SHALL CONFORM TO PERMITS. COFFERDAMS ARE PAID FOR UNDER THE "COFFERDAM AND DEWATERING" ITEM #0204111.
- BEFORE INITIATING CONSTRUCTION, THE CONTRACTOR SHALL SUBMIT A PLAN FOR APPROVAL THAT DEFINES THE METHODS AND MATERIALS FOR CONTROLLING WATER, STRUCTURE EXCAVATION, AND PROTECTING THE STREAM DURING CONSTRUCTION. THE COST OF THIS WORK SHALL BE INCLUDED IN THE COST OF THE "COFFERDAM AND DEWATERING" ITEM.
- EQUIPMENT SHALL NOT BE PERMITTED IN THE RIVER WHEN COFFERDAM AND DEWATERING SYSTEM IS NOT IN PLACE WITHOUT APPROVAL FROM THE ENGINEER.
- COFFERDAMS CANNOT BE INSTALLED OR REMOVED BETWEEN APRIL 1 TO JUNE 30. WORK BEHIND COFFERDAMS CAN OCCUR AT ANY TIME OF YEAR.
- COFFERDAM AND TERS SHALL NOT EXCEED IMPACT AREAS SHOWN ON THE WETLAND AND FLOODPLAIN IMPACT SHEETS OF THE PERMIT PLANS.
- A DEWATERING BASIN SHALL BE ESTABLISHED OUTSIDE OF THE WETLAND LIMITS. THE LOCATION OF THE DEWATERING BASIN IS APPROXIMATE. THE EXACT POSITION MAY VARY BASED ON THE PUMPING DESIGN SUBMISSION APPROVED BY THE ENGINEER.
- PRESENCE OF OBSTRUCTIONS IN THE FILL AND NATURAL SOILS, AND THE PRESENCE OF FINE-GRAINED GRANULAR SOILS THAT ARE SUSCEPTIBLE TO DISTURBANCE IN THE PRESENCE OF WATER, SHALL BE CONSIDERED BY THE CONTRACTOR IN DESIGNING AND PROVIDING THE COFFERDAM AND DEWATERING SYSTEM. THE CONTRACTOR SHALL REVIEW THE BORING LOGS ON DRAWINGS 5-04, 5-05 AND IN THE FINAL GEOTECHNICAL ENGINEERING REPORT.
- COFFERDAM AND DEWATERING SYSTEM SHALL BE REMOVED IN ITS ENTIRETY AT THE END OF CONSTRUCTION.
- TEMPORARY-WATER HANDLING-COFFERDAMS SHALL CONSIST OF PLASTIC LINER, SANDBAGS OR ANY OTHER APPROVED SYSTEM THAT THE CONTRACTOR ELECTS TO USE WHICH WILL SAFELY CONVEY WATER FLOWS AROUND THE CONSTRUCTION AREA. SHALL BE ABLE TO SUPPORT CONSTRUCTION ACTIVITY AND EXCAVATION, AND SHALL CONFORM TO PERMITS. TEMPORARY-WATER-HANDLING-COFFERDAMS ARE PAID FOR UNDER "HANDLING WATER". THIS DETAIL APPLIES TO THE CONSTRUCTION OF DRAINAGE PIPE RELOCATIONS, ENDWALLS AND REBUILT STONE WALLS AT THE SOUTHWEST AND SOUTHEAST QUADRANTS OF THE BRIDGE. A 22" (MIN.) CHANNEL OPENING SHALL BE MAINTAINED. INSTALL TEMPORARY-WATER-HANDLING-COFFERDAM ON ONE SIDE OF THE RIVER AT A TIME IF THE CONFIGURATION OF THE SYSTEM DOES NOT ALLOW FOR THE MINIMUM CHANNEL OPENING TO BE MAINTAINED IF INSTALLED SIMULTANEOUSLY ON BOTH SIDES OF THE RIVER.

TIME-OF-YEAR RESTRICTIONS

ANY "UNCONFINED" INSTREAM WORK WITHIN THE RIVER SHALL BE RESTRICTED TO THE PERIOD FROM JULY 1 TO SEPTEMBER 30, INCLUSIVE. NO IN WATER WORK FROM APRIL 1 TO JUNE 30, INCLUDING THE INSTALLATION AND REMOVAL OF COFFERDAMS.

SUGGESTED SEQUENCE OF CONSTRUCTION:

- CLEAR AND GRUB THE WORK AREA, REMOVE TREES AND INSTALL SEDIMENTATION CONTROL SYSTEM (SCS), RELOCATE UTILITIES.

STAGE 1

- INSTALL TERS & COFFERDAM (BELOW PORTION OF TEMPORARY BRIDGE).
- CONSTRUCT TEMPORARY ROADWAY AND STAGING AREAS.
- CONSTRUCT TEMPORARY BRIDGE. DIVERT TRAFFIC ONTO TEMPORARY BRIDGE.

STAGE 2

- DIVERT TRAFFIC ONTO TEMPORARY BRIDGE.
- INSTALL DEBRIS SHIELD ABOVE ELEVATION 138.0 MIN. AND DEMOLISH EXISTING BRIDGE SUPERSTRUCTURE.
- INSTALL REMAINDER OF COFFERDAMS.
- DEMOLISH EXISTING SUBSTRUCTURES AND EXCAVATE FOR PROPOSED SUBSTRUCTURES. CUT OFF EXISTING PILES 2 FEET BELOW BOTTOM OF PROPOSED ABUTMENTS OR WINGWALLS (ELEV. 132.0 MIN.) REMOVE PORTIONS OF EXISTING STONE WALLS AS NEEDED.
- DRIVE PILES AND CONSTRUCT NEW SUBSTRUCTURES AND BACKFILL.
- REMOVE COFFERDAMS.
- COMPLETE CONSTRUCTION OF PROPOSED BRIDGE.

STAGE 3

- DIVERT TRAFFIC ONTO THE PROPOSED BRIDGE AND REMOVE TEMPORARY BRIDGE, TERS AND REMAINDER OF COFFERDAM.
- COMPLETE SITE RESTORATION.

NATIVE STREAMBED MATERIAL NOTE:

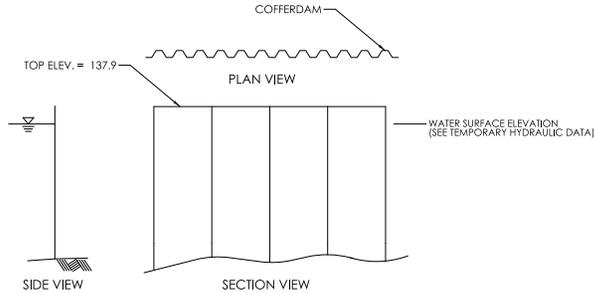
NATIVE STREAMBED MATERIAL EXCAVATED DURING THE STRUCTURE INSTALLATION SHALL BE STOCKPILED AND THEN REPLACED WITHIN THE STRUCTURE TO THE DEPTH SHOWN ON THE PLANS OR AS DIRECTED BY THE ENGINEER IN ACCORDANCE WITH THE SPECIAL PROVISION "EXCAVATION AND REUSE OF EXISTING CHANNEL BOTTOM MATERIAL."

ADDITIONAL STREAMBED MATERIAL, IF REQUESTED, SHALL BE IN ACCORDANCE WITH SPECIAL PROVISION "SUPPLEMENTAL STREAMBED CHANNEL MATERIAL."

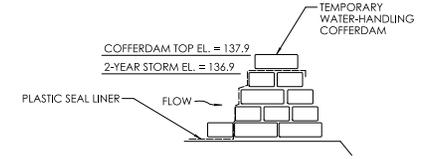
THE STOCKPILE SHALL BE LOCATED OUTSIDE THE WETLAND LIMITS AND PROTECTED WITH SEDIMENTATION CONTROL SYSTEM.

TEMPORARY HYDRAULIC DATA		
AVERAGE DAILY FLOW (ADF) [CFS]	55	
AVERAGE SPRING FLOW (AFS) [CFS]	101	
2-YEAR FREQUENCY DISCHARGE [CFS]	1,050	
TEMPORARY DESIGN DISCHARGE [CFS]	1,050	
TEMPORARY DESIGN FREQUENCY	2-YEAR	
TEMPORARY WATER SURFACE ELEVATION [FEET]	UPSTREAM	DOWNSTREAM
	136.9	135.7

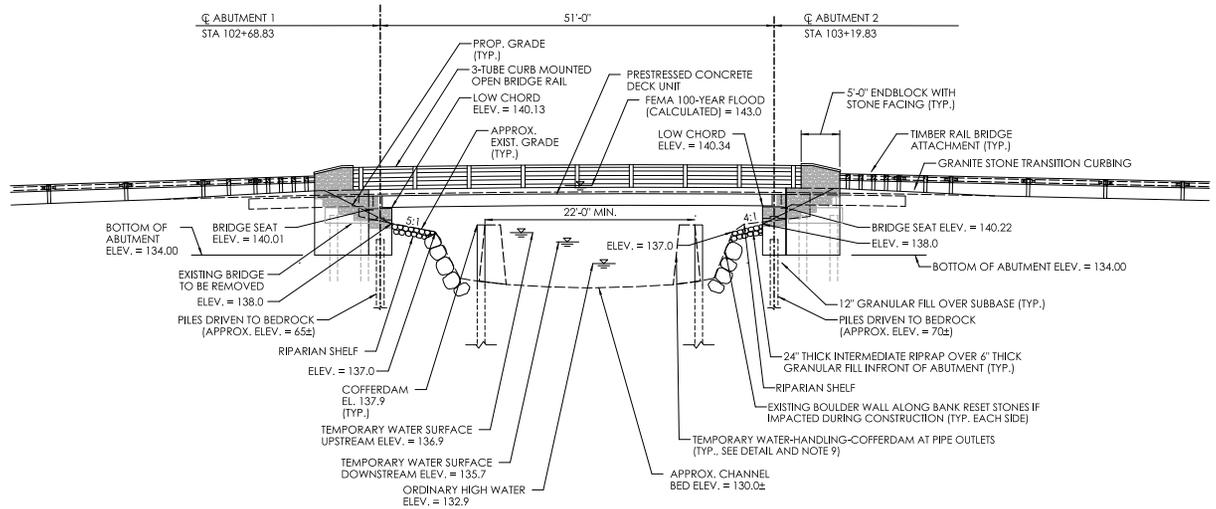
NOTE: ALL TEMPORARY HYDRAULIC DATA PROVIDED BY CHA COMPANIES, INC.



COFFERDAM
N.T.S.



WATER-HANDLING-COFFERDAM DETAIL
N.T.S.



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

ENVIRONMENTAL PERMIT PLANS
NOVEMBER 10, 2022

REV.	DATE	DESCRIPTION

DESIGNER/DRAWER: D.T.L.	CHECKED BY: D.L.
SCALE AS NOTED	

SIGNATURE BLOCK:

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Rocky Hill, CT 06067

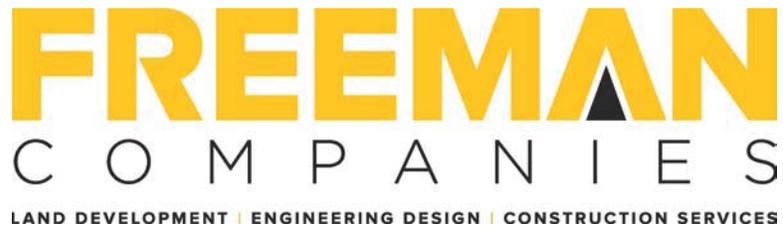
MOTT MACDONALD

175 CAPITAL BLVD
4TH FLOOR
ROCKY HILL, CT 06067

TOWN OF WILTON

PROJECT NUMBER: 0161-0143
PROJECT DESCRIPTION: REPLACEMENT OF BRIDGE NO. 05501 ARROWHEAD ROAD OVER NORWALK RIVER
TOWNSHIP: WILTON
DRAWING TITLE: WATER HANDLING NOTES AND DETAILS

DRAWING NO. PMT-09
SHEET NO. 09



Geotechnical Engineering Report
Replacement of Bridge 05501 – Arrowhead Road over Norwalk River
State Project No. 161-143
Wilton, Connecticut

September 22, 2022

Freeman Project No.: 2017-0802.7

Prepared for:

Mott MacDonald, NY, Inc.
175 Capitol Boulevard, Suite 403
Rocky Hill, Connecticut 06067

Prepared by:

Freeman Companies, LLC
36 John Street
Hartford, CT 06106



Nathan L. Whetten, D.G.E., P.E.
Vice President of Geotechnical Services

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ATTACHMENTS

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3. Subsurface Profile
- 4A. Lateral Earth Pressures – Active Earth Pressures
- 4B. Lateral Earth Pressures – At-Rest Earth Pressures

Appendices

- A. Test Boring Logs
- B. Results of Laboratory Testing

1.0 INTRODUCTION

1.1 Summary

This report presents our evaluation of the subsurface conditions and geotechnical engineering recommendations for replacement of Bridge 05501, Arrowhead Road over Norwalk River, located in Wilton, Connecticut. This evaluation is based on recent subsurface explorations and laboratory test data.

Subsurface conditions generally consist of fill, sand, gravelly sand, and glacial till overlying bedrock. We recommend that the bridge abutments and wingwalls be supported on steel H-Piles driven to end bearing on bedrock. Pre-augering or pre-excavation may be needed to clear obstructions in the fill. Pre-augering may be necessary to loosen the gravelly sand deposits above a depth of about 40 feet and to reduce driving stresses in the piles. We recommend that an allowance for preaugering be included in the project estimate, and as a line item in the Contractor's bid.

1.2 Scope of Work

Freeman Companies, LLC performed the following tasks:

- Coordinated drilling of test borings at the site;
- Provided technical monitoring of the test borings, described soil and rock materials encountered, and prepared test boring logs;
- Arranged for a testing laboratory to conduct laboratory soil and rock tests; and
- Evaluated the subsurface conditions and prepared this report containing geotechnical design recommendations and construction considerations.

1.3 Authorization

The work was completed in accordance with our consultant-subconsultant agreement and Subconsultant Notice to Proceed dated April 17, 2020.

1.4 Project Vertical Datum

Elevations in this report were taken from the topographic plan provided to Freeman Cos. and are referenced to NAVD-88.

2.0 SITE AND PROJECT DESCRIPTION

2.1 Site Description

Bridge 05501 Arrowhead Road over Norwalk River is located approximately 380 feet west of the Arrowhead Road intersection with Route 7 in Wilton, Connecticut, as shown on Figure 1, Site Location Map. It is a single-span, 65-foot-long steel truss bridge.

2.2 Project Description

We understand that a full bridge replacement is warranted due to various deficiencies with the existing bridge. The new semi-integral abutment bridge will be a 51-foot-long single-span structure with two 11-foot-wide travel lanes with shoulders. The new bridge is shown in plan on Figure 2, Subsurface Exploration Location Plan.

3.0 EXPLORATIONS

3.1 Subsurface Explorations

Four test borings (designated S-1, S-2, S-3, and S-4) were drilled by New England Boring Contractors, Inc., of Glastonbury, Connecticut, from July 20 to July 23, 2020. Test borings were drilled with 4-inch diameter flush-joint casing to depths ranging from 74.0 to 83.5 feet below ground surface. Standard Penetration Tests were conducted and soil samples were recovered semi-continuously within the top ten feet, and at maximum 5-foot intervals below that depth. Borings were terminated within bedrock following retrieval of bedrock core samples using an NX-size core barrel.

Surveyed exploration locations are shown on Figure 2, Subsurface Exploration Location Plan. A Freeman Companies geologist observed the drilling, described the soil samples, and prepared the test boring logs included in Appendix A.

3.2 Laboratory Testing

Grain size distribution analyses (ASTM D422) were performed on six representative soil samples to aid in determining engineering properties. Grain size distribution analyses were also conducted on two grab samples recovered from the streambed upstream and downstream of the bridge. Two unconfined compression tests were performed on representative bedrock core samples.

Laboratory testing was conducted by Geotesting Express, Inc., of Acton, Massachusetts. Results of laboratory testing are provided in Appendix B.

4.0 SUBSURFACE CONDITIONS

4.1 Subsurface Conditions

Subsurface conditions encountered in the explorations consist of Fill, Sand, Gravelly Sand, and Glacial Till overlying Bedrock, as described below. Subsurface soils are shown graphically on Figure 3, and data are summarized on Table I.

Generalized subsurface conditions are as follows:

Thickness, ft.	Depth to Top Of Stratum, ft.	Generalized Description
8 to 10	0	Fill – Gray to brown coarse to fine SAND and coarse to fine GRAVEL, little to trace silt, with numerous cobbles. SPT N-Values ranged from 21 blows per foot (bpf) to refusal (medium dense to very dense).
1 to 2	8 to 9	Sand – Dark gray coarse to fine SAND, or gray fine SAND, trace to some silt.
55 to 58	9 to 10	Gravelly Sand – Brown coarse to fine SAND and coarse to fine GRAVEL, trace silt. Cobbles were detected during drilling. SPT N-Values ranged from 22 to 117 bpf (medium dense to very dense).
3 to 8	65 to 68	Glacial Till – Brown coarse to fine SAND and coarse to fine GRAVEL, trace to some silt. Cobbles were detected during drilling. SPT N-Values ranged from 22 to 117 bpf (medium dense to very dense).
2 to 4	68 to 73	Weathered Bedrock – Weathered bedrock was encountered above sound bedrock. Samples of the weathered rock were not recovered, but the driller was able to penetrate the weathered rock with a roller bit. The depth to top of weathered rock ranged from 68 to 73 feet, and the depth to top of sound bedrock ranged from 72 to 75 feet.

Bedrock - Bedrock was described as GNEISS, gray, fine grained, laminated, intensely to moderately fractured, slightly weathered, and strong. Open horizontal and vertical fractures, foliation horizontal to shallow dipping, with graphite schist layers. Primary joints are low angle, planar, tight, slightly weathered. Several vertical joints were noted. Rock Quality Designation (RQD) ranged from 0 to 55 (very poor to fair quality rock). Results of laboratory unconfined compression tests conducted on core samples are provided in Appendix B.

Groundwater – Groundwater was encountered about 10 to 11 feet below existing ground surface during drilling (about El. 130.9 to 132.1). The river channel bottom is at about El. 130. Ordinary high water is reportedly El. 132.1, the 100-year storm El. 140.1, and the 500-year storm El. 141.4.

Water levels are expected to be influenced primarily by water levels within the Norwalk River, but will vary with season, precipitation, temperature, construction activity in the area and other factors.

5.0 GEOTECHNICAL ENGINEERING RECOMMENDATIONS

We recommend that the proposed abutments and wingwalls be supported on Steel H-Piles.

5.1 General

- **Foundation Depth:** Minimum of 4 feet below the lowest adjacent ground surface.
- **Subgrade Preparation:** Proposed bottom of abutment and wingwall pile cap is El. 134.0. Place pile caps directly on the existing subgrade. However, the Contractor has the option to place a 12-inch-thick layer of granular fill (Form 818 2.13) or Crushed Stone (Form 818 M.01.01 No. 6) over geotextile separation fabric over the subgrade, to facilitate construction.
- **Seismic Design:** Soils are not susceptible to liquefaction. Seismic design is not required for simple-span bridges (AASHTO Article 4.7.4.2). Soil conditions at the site are defined as AASHTO Site Class D.
- **Backfill Material:** Place Pervious Structure Backfill (CTDOT Form 818 M.02.05) behind the abutments and abutment wingwalls above a line defined by a 1V:1.5H slope extending up from the heel of the footing to grade.
- **Weep Holes:** 4-inch-dia. weep holes at max 10 foot spacing, installed according to CTDOT specifications.
- **Lateral Earth Pressures:** Assume Figure 4A-Active Earth Pressures for wingwalls which assumes wingwalls can deflect. Assume Figure 4B – At-Rest Earth Pressures for abutments which assumes abutments are restrained from movement.
- **Scour:** We understand that bridge foundations are susceptible to scour. Mott MacDonald calculated the worst scour elevation to be El. 120, and that the bridge remains stable under that condition.

5.2 Steel H-Pile Design

- **H-Pile Design:** Steel H-Piles with pile tip reinforcement (AASHTO 10.7.3.2.3) driven to end bearing on bedrock. We recommend grade 50 steel due to driving stresses.
- **Factored Bearing Resistance:**
Service Limit State: 85 kips (HP12x84 abutment piles); apply Resistance Factor of 1.0 (AASHTO 10.5.5.1); equals 85 kips service limit capacity. 110 kips (HP14x102 wingwall piles); apply Resistance Factor of 1.0 (AASHTO 10.5.5.1); equals 110 kips service limit capacity.
Strength Limit State: 195 kips (HP12x84 abutment piles); apply Resistance Factor of 0.65 (Table 10.5.5.2.3-1); equals 125 kips factored load capacity. 255 kips (HP14x102 wingwall piles); apply Resistance Factor of 0.65 (AASHTO 10.5.5.1); equals 165 kips strength limit capacity. Limit stresses to a maximum of 24 kips per square inch per the CTDOT Geotechnical Engineering Manual 6-2.2.
Ultimate Pile Capacity: 195 kips (HP12x84); 255 kips (HP14x102) for purposes of dynamic load testing;
- **Load Tests:** Minimum of 2 dynamic load tests with matching signal analysis and no less than 2% of the production piles. (AASHTO Table 10.5.5.2.3-1).
- **Test Piles:** Recommend same piles and criteria as load tests (AASHTO 10.7.9)
- **Pre-augering and Pre-excavation:** Pre-augering or pre-excavation will likely be needed to clear possible obstructions in the fill. Additionally, pre-augering will likely be necessary to loosen the Gravelly Sand deposits above a depth of about 40 feet and reduce driving stresses in the piles. We recommend that the contractor be required to include provisions for pre-augering and pre-excavation in their bid. An allowance for pre-augering should also be included in the project estimate.
- **Minimum Spacing:** Center to center spacing should be 2½ times the pile diameter (AASHTO 10.7.1.2) and at least 30 inches. Minimum 9 inches to the nearest edge of the pile cap

- **Lateral Resistance:** Abutment piles are not required to resist lateral loads since the bridge is designed as with integral abutments. Results of lateral pile analyses conducted by Mott MacDonald (MM) for the wingwalls indicate that the piles are stable under the scour event (scour to El. 120). MM calculated lateral pile resistance for wingwall piles using the computer program L-Pile at the strength limit state to be 35 kips for the scoured condition and 70 kips with no scour.

- **Bottom of Structure and Estimated Pile Length:**

Substructure	Bottom of Pile Cap Elevation	Estimated Pile Tip Elevation	Estimated Test Pile Length
Abutment 1	134	67	75
Abutment 2	134	70	75

We estimate that the production pile length is approximately 75 feet. The estimated pile lengths may be used as the pile order lengths.

6.0 CONSTRUCTION CONSIDERATIONS

6.1 Temporary Bridge

A temporary bridge is planned upstream of the existing bridge. Recommendations for the contractor's temporary bridge design are provided below:

- **Foundation Type:** The temporary bridge may be founded on spread footing foundations bearing on the naturally-deposited Gravelly Sand stratum following removal of Fill and Sand. We recommend a maximum allowable bearing pressure of 4,000 psf based on the results of the test borings. Temporary bridge foundations should bear on a 6 to 12-inch thick minimum layer of Granular Fill (Form 818 2.13) or Crushed Stone (Form 818 M.01.01 No.6) over geotextile fabric. Estimated total settlement is 1 inch.
- **Earth Embankment:** We anticipate that embankment materials for the temporary bridge approaches will consist of borrow (Form 818, 2.07).

6.2 Excavation

Proposed bottom of abutments will be within the Fill, Sand, or Gravelly Sand. The sand and portions of the fill are highly susceptible to disturbance by construction equipment, and are expected to be wet due to shallow groundwater. Excavation to footing subgrade should be made using a smooth-bladed backhoe bucket. Excavation geometries should conform to OSHA excavation regulations contained in 29 CFR 1926, latest edition.

6.3 Bearing Surface Preparation

Pile caps for abutments and wingwalls may be founded on in-situ soil. Alternatively, the Contractor may at their option elect to place Granular Fill or Crushed Stone (No. 6) over geotextile fabric to facilitate construction.

6.4 Cofferdam and Dewatering

Excavations for shallow foundations and pile caps will penetrate below groundwater. Construction should be performed in-the-dry, and cofferdam and dewatering will be required. Steel sheeting is expected to be feasible, but pre-excavation or spudding may be necessary due to the presence of cobbles and boulders.

The Gravelly Sand Deposits are highly permeable and excavation dewatering will be required. Deep wells installed within the cofferdam combined with steel sheetpiling driven into the Gravelly Sand Deposits may be needed to slow water flow into the excavation. Surface water should be diverted away from excavations.

Excavation dewatering should be designed by a qualified Professional Engineer registered in Connecticut, in accordance with all applicable regulatory requirements.

6.5 Pile Installation

The maximum hammer energy should be determined by a wave equation analysis by the contractor based on the specific hammer characteristics. Test piles and dynamic load testing should be conducted as indicated above.

Pre-augering or pre-excavation may be needed to clear possible obstructions in the fill. Additionally, cobbles and boulders were encountered within the Gravelly Sand Deposits and may cause high driving stresses. We recommend that the Contractor be required to include provisions for pre-augering in their bid, if necessary, to loosen the Gravelly Sand deposits at pile locations and reduce pile driving stresses in the piles.

Vibrations from pile driving should not affect the structural integrity of adjacent structures. However, vibration and noise will likely be noticeable inside buildings 250 feet away, or more.

6.6 Preconstruction Survey and Monitoring

Pile installation, cofferdam installation, and demolition are not expected to affect the structural integrity of nearby structures. However, vibration and noise will likely be noticeable inside nearby buildings. A preconstruction survey of structures within 250 feet should be conducted in advance of construction, and vibration monitoring should be conducted. There appear to be several structures within this distance.

6.7 Reuse of Existing Soils

The existing soils to be excavated will consist primarily of existing Fill and Sand Deposits. These soils are not expected to be suitable for reuse as Previous Structure Backfill or Granular Fill. Excavated soils may be suitable for reuse as embankment fill. However, the siltier soils may be difficult to properly compact when wet, and may need to be dried to achieve compaction. Drying the soils can be difficult and at times impractical, particularly during periods of cold and wet weather.

7.0 FUTURE SERVICES AND LIMITATIONS

7.1 Future Services

We recommend that Freeman Companies be engaged during construction to observe:

- Verify that soil conditions exposed in excavations are in general conformance with design assumption, and that the geotechnical aspects of construction are consistent with the project specifications.
- Review contractor submittals related to piles and observe installation.
- Observe preparation of bearing surfaces.

7.2 Limitations

This report was prepared for the exclusive use of Mott MacDonald CHA and the project design team. The recommendations provided herein are based on the project information provided at the time of this report and may require modification if there are any changes in the nature, design, or location of the bridge.

The recommendations in this report are based in part on the data obtained from the subsurface explorations. The nature and extent of variations between explorations may not become evident until construction. If variations from the anticipated conditions are encountered, it may be necessary to revise the recommendations in this report.

Our professional services for this project have been performed in accordance with generally accepted engineering practices; no warranty, express or implied, is made.

**Bridge 05501
Arrowhead Road over Norwalk River
Wilton, Connecticut**

**Table 1
Subsurface Data**

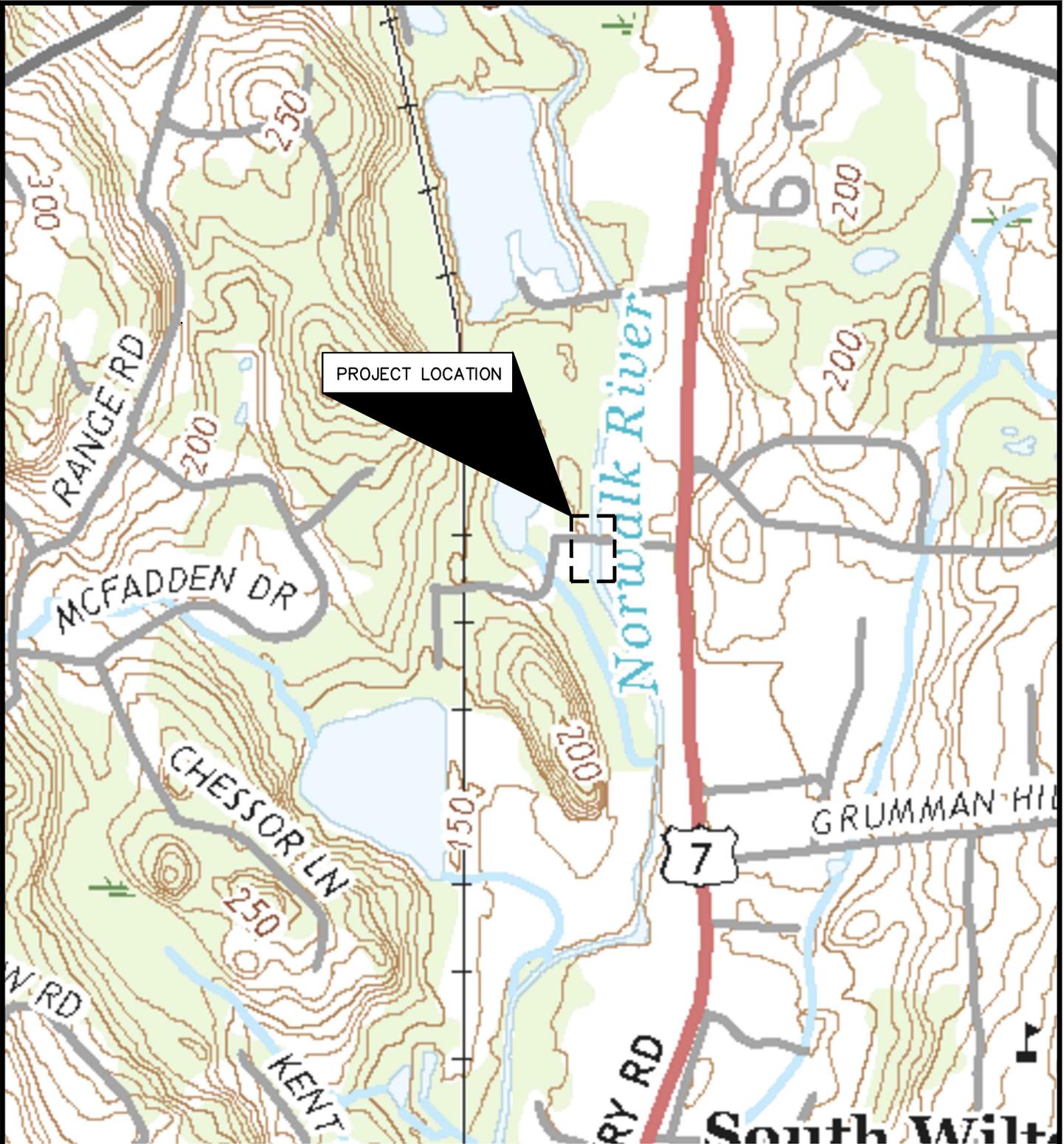
Boring No.	Ground Surface El. ¹	Depth (ft.)	Thickness (ft.)				Groundwater ²		Bedrock	
			Fill	Sand	Gravelly Sand	Glacial Till	Depth (ft.)	Elevation	Depth (ft.)	Elevation
S-1	142	78.0 (C)	9.0	NE	56.0	8.0	11.0	131	73.0	69.0
S-2	141.9	83.5 (C)	10.0	NE	57.0	4.0	11.0	130.9	71.0	70.9
S-3	142.1	82.7 (C)	8.0	2.0	58.0	4.0	10.0	132.1	68.0	74.1
S-4	142	74.0 (C)	9.0	1.0	55.0	3.0	10.0	132	68.0	74.0

Notes:

1. Ground surface elevations were estimated from topographic information shown on the site plan.
2. Groundwater levels were indicated on the test boring logs at time 0 hours.
3. ">" - Greater Than "≥" - Greater than or equal to "≤" - Less than or equal to "NE" - Stratum Not Encountered "C" - Bedrock Core Recovered
4. Depth/Elevation of bedrock is the depth/elevation of weathered rock. Depth to sound bedrock is deeper.
5. Refer to the text of the report for additional information.

FIGURES

Freeman Companies, LLC : R:\2017\2017-0802.7 Proj 161-143 Arrowhead Rd ov Norwalk R Wilton_CME\DWG\Figure 1 - Arrowhead Rd_Wilton.dwg Aug 21, 2020-11:03am Plotted By: tta



USGS QUADRANGLE MAP
NORWALK, CONNECTICUT
DATE 2018



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ELEVATE YOUR EXPECTATIONS

SITE LOCATION MAP
BRIDGE 05501 -
ARROWHEAD ROAD OVER NORWALK RIVER
STATE PROJECT No. 161-143
WILTON, CONNECTICUT

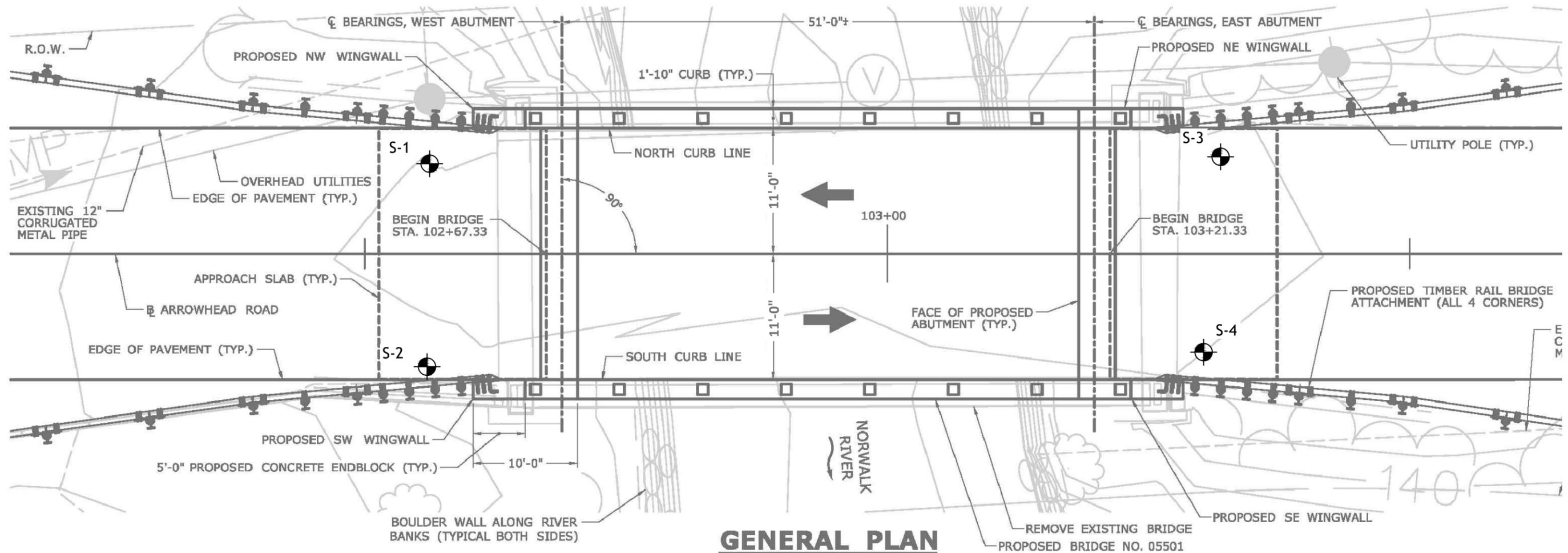
DRAFTED:
CHECKED:
APPROVED:
SCALED:
PROJECT NO.:
DATE:

T.T.
N.W.
N.W.
1"=1000'
2017-0802.7
08/18/2020

SHEET NO.

FIGURE 1

Freeman Companies, LLC - R: (2017) 2017-0802.7 Proj 161-143 Arrowhead Rd ov Norwalk R Wilton_CME\DWG\Figure 2 and 3 - Arrowhead Rd_wilton.dwg Jan 07, 2021-11:23am Plotted By: njohnson



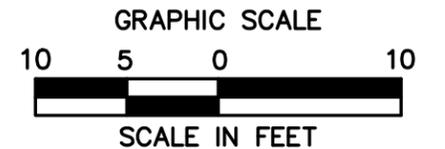
GENERAL PLAN

LEGEND:

S-1 TEST BORINGS

NOTES:

1. BASE PLAN PROVIDED BY CHA
2. EXPLORATION LOCATIONS WERE SURVEYED BY CHA
3. REFER TO THE TEXT AND APPENDICES FOR ADDITIONAL INFORMATION



SUBSURFACE EXPLORATION LOCATION PLAN
BRIDGE 05501 - ARROWHEAD ROAD OVER NORWALK RIVER
STATE PROJECT No. 161-143
WILTON, CONNECTICUT

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 TOLL FREE: (800) 604-5141
 FAX: (860) 986-7161
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No.	Date	Description

REVISIONS

DRAWN: T.T.
 CHECKED: N.W.
 APPROVED: N.W.
 SCALE: 1"=10'
 PROJECT NO.: 2017-0802.7
 DATE: 08/20/2020

SHEET NO.
FIGURE 2

Freeman Companies, LLC - R: \2017\2017-0802.7 Proj 161-143 Arrowhead Rd ov Norwalk R Wilton_CME\DWG\Figure 2 and 3 - Arrowhead Rd_wilton.dwg Aug 21, 2020-11:04am Plotted By: tta

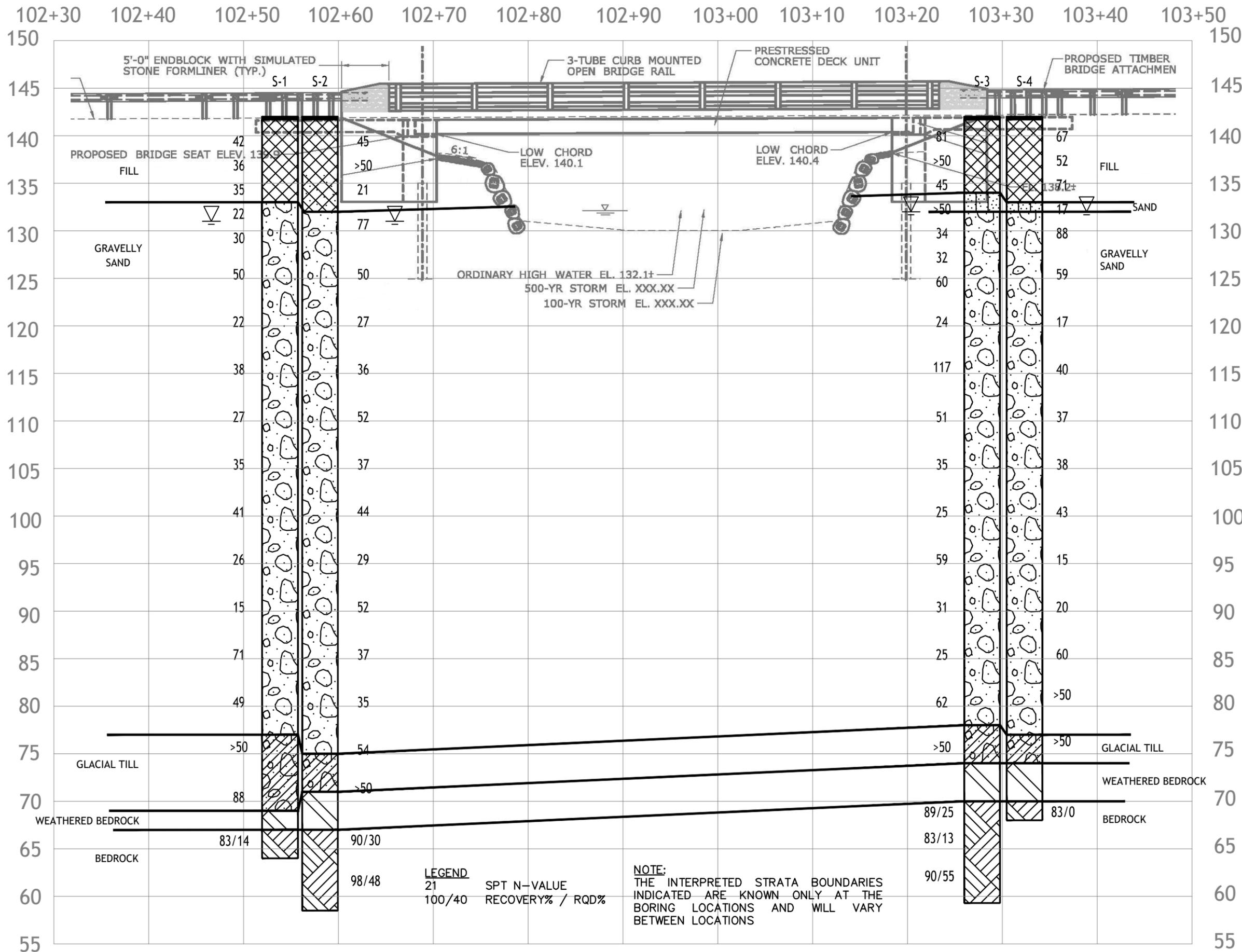


FIGURE 3	
DRAWN:	SHEET NO.
CHECKED:	T.T.
APPROVED:	N.W.
SCALE:	N.W.
PROJECT NO.:	1" = 10'
DATE:	2017-0802.7
	08/20/2020

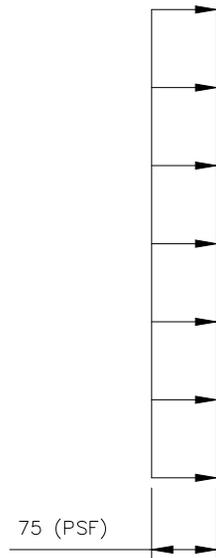
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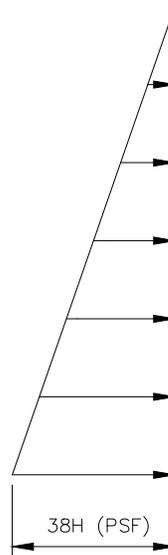
SUBSURFACE EXPLORATION
LOCATION PLAN
 BRIDGE 05501 - ARROWHEAD ROAD
 OVER NORWALK RIVER
 STATE PROJECT No. 161-143
 WILTON, CONNECTICUT

SURCHARGE

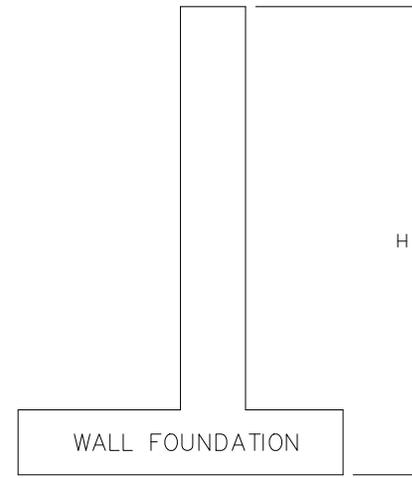


SURCHARGE LOAD

STATIC



ACTIVE EARTH PRESSURE



NOTES:

1. APPLIES TO WALLS THAT CAN DEFLECT AT THE TOP AND ASSUMES ACTIVE EARTH PRESSURES.
2. H IS MEASURED IN FEET
3. THE WALL SHOULD BE DRAINED BY PERVIOUS STRUCTURE BACKFILL (FORM 818 M.02.05) WITH A UNIT WEIGHT OF 125 PCF AND WEEPHOLES THROUGH THE WALL. THEREFORE, HYDROSTATIC PRESSURE IS NOT INCLUDED.
4. THESE PRESSURE DISTRIBUTIONS ASSUME HORIZONTAL BACKFILL BEHIND THE WALL.
5. SLIDING:
COEFFICIENT OF FRICTION BETWEEN FOOTING AND BASE= 0.55 (AASHTO TABLE 3.11.5.3-1) RESISTANCE FACTOR= 1.0 (AASHTO TABLE 11.5.7-1).
6. IGNORE PASSIVE RESISTANCE IN FRONT OF FOOTING.
7. SEISMIC LATERAL EARTH PRESSURES ARE NOT REQUIRED FOR SINGLE SPAN BRIDGES (AASHTO 4.7.4.2).

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ELEVATE YOUR EXPECTATIONS

LATERAL EARTH PRESSURES
ACTIVE EARTH PRESSURES

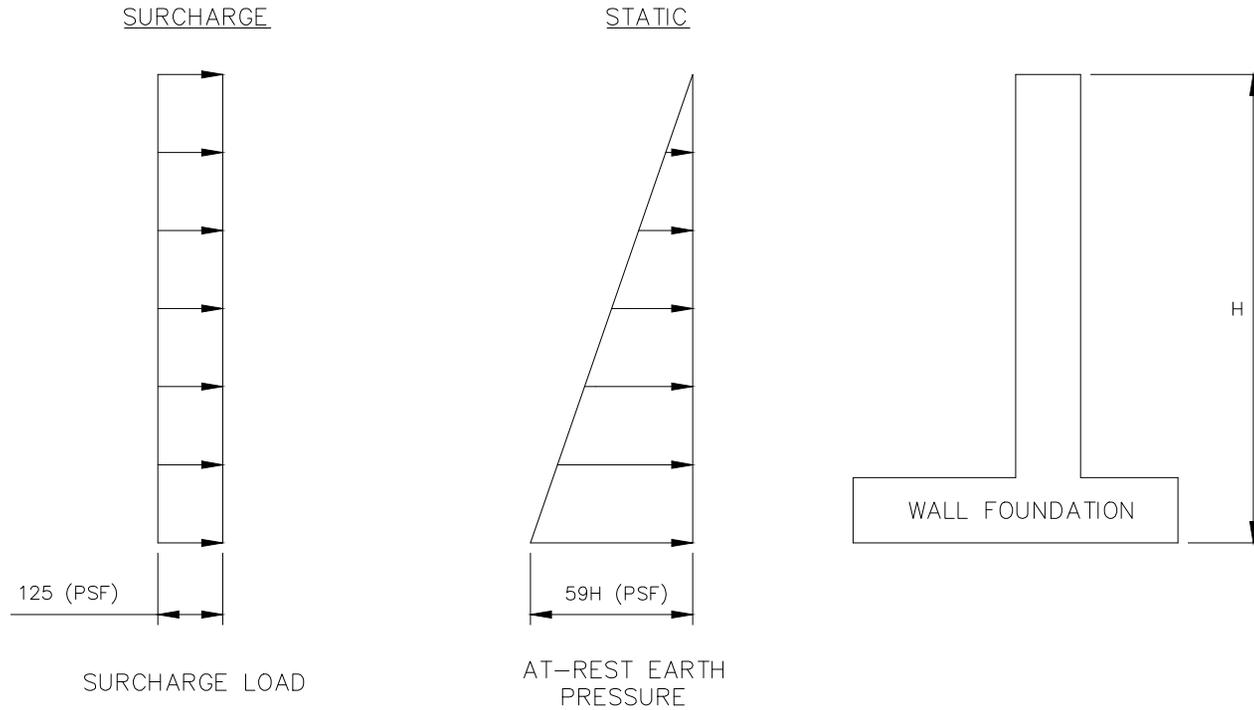
BRIDGE 05501 -
ARROWHEAD ROAD OVER NORWALK RIVER
STATE PROJECT No. 161-143
WILTON, CONNECTICUT

DRAFTED:	T.T.
CHECKED:	N.W.
APPROVED:	N.W.
SCALED:	N.T.S.
PROJECT NO.:	2017-0802.7
DATE:	08/18/2020

FIG.

FIGURE 4A

Freeman Companies, LLC . R. \2017\2017-0802.7 Proj 161-143 Arrowhead Rd ov Norwalk R Wilton_CME\DWG\Figure 4 - Arrowhead Rd_Wilton - Active.dwg Sep 22, 2022-11:46am Plotted By: tto



NOTES:

1. APPLIES TO WALLS THAT ARE RESTRAINED FROM MOVEMENT AND ASSUMES AT-REST EARTH PRESSURES.
2. H IS MEASURED IN FEET.
3. THE WALL SHOULD BE DRAINED BY PERVIOUS STRUCTURE BACKFILL (FORM 818 M.02.05) WITH A UNIT WEIGHT OF 125 PCF AND WEEPHOLES THROUGH THE WALL. THEREFORE, HYDROSTATIC PRESSURE IS NOT INCLUDED.
4. THESE PRESSURE DISTRIBUTIONS ASSUME HORIZONTAL BACKFILL BEHIND THE WALL.
5. SLIDING:
COEFFICIENT OF FRICTION BETWEEN FOOTING AND BASE= 0.55 (AASHTO TABLE 3.11.5.3-1) RESISTANCE FACTOR= 1.0 (AASHTO TABLE 11.5.7-1).
6. IGNORE PASSIVE RESISTANCE IN FRONT OF FOOTING.
7. SEISMIC LATERAL EARTH PRESSURES ARE NOT REQUIRED FOR SINGLE SPAN BRIDGES (AASHTO 4.7.4.2).

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ELEVATE YOUR EXPECTATIONS

**LATERAL EARTH PRESSURES
AT-REST EARTH PRESSURES**

BRIDGE 05501 -
ARROWHEAD ROAD OVER NORWALK RIVER
STATE PROJECT No. 161-143
WILTON, CONNECTICUT

DRAFTED:	T.T.
CHECKED:	N.W.
APPROVED:	N.W.
SCALED:	N.T.S.
PROJECT NO.:	2017-0802.7
DATE:	9/22/2022

FIG.

FIGURE 4B

APPENDIX A
TEST BORING LOGS

Driller: A. MacKernon	Connecticut DOT Boring Report Format	Hole No.: S-1
Inspector: G. Jacobsen	Town: Wilton	Stat./Offset: 102+56/8.6 ft L
Engineer: Nathan Whetten	Project No.: 161-143	Northing: 624931.74
Start Date: 7-20-20	Route No.: Arrowhead Road	Easting: 816048.56
Finish Date: 7-21-20	Bridge No.: 05501	Surface Elevation: 142

Project Description: Reconstruction of Arrowhead Road over Norwalk River

Casing Size/Type: 4-in. Casing	Sampler Type/Size: 1-3/8 inch ID	Core Barrel Type: NX
Hammer Wt.: 300lb Fall: 30in.	Hammer Wt.: 140lb Fall: 30in.	

Groundwater Observations: 11 0 hrs

Depth (ft)	SAMPLES					Generalized Strata Description	Material Description and Notes	Elevation (ft)	
	Sample Type/No.	Blows on Sampler per 6 inches							Pen. (in.)
0							Pavement Structure Misc. Fill	Asphalt Pavement 4"	
	S-1	12	25	17	11	24	8	Gray c-f SAND, some c-f gravel, little silt	140
	S-2	13	12	24	13	24	10	Gray-brown c-f SAND, some c-f gravel, little silt	
5	S-3	11	20	15	10	24	10	Brown c-f SAND, some m-f gravel, trace silt	
	S-4	13	11	11	14	24	6	Brown c-f SAND, little m-f gravel, trace silt	135
10	S-5	15	15	15	15	24	14	Gravelly Sand Brown c-f SAND and m-f gravel, trace silt	130
15	S-6	11	21	29	23	24	9	Brown c-f GRAVEL, little c-f sand, some silt	125
20	S-7	10	11	11	14	24	7	Brown c-f SAND, little c-f gravel, trace silt	120
25									

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: 75ft Rock: 3ft	NOTES: Driller notes cobbles from 1 to 9 ft, 25 to 35 ft, 40 ft, and 55 to 60 ft. Roller bit through probable weathered rock from 73 to 76 ft. Required 3 attempts to recover rock core, broken casing caused core barrel to clog easily	Sheet 1 of 4
No. of Soil Samples: 17	No. of Core Runs: 1	SM-001-M REV. 1/02

Driller: A. MacKernon	Connecticut DOT Boring Report Format		Hole No.: S-1
Inspector: G. Jacobsen	Town: Wilton	Stat./Offset: 102+56/8.6 ft L	
Engineer: Nathan Whetten	Project No.: 161-143	Northing: 624931.74	
Start Date: 7-20-20	Route No.: Arrowhead Road	Easting: 816048.56	
Finish Date: 7-21-20	Bridge No.: 05501	Surface Elevation: 142	

Project Description: Reconstruction of Arrowhead Road over Norwalk River

Casing Size/Type: 4-in. Casing	Sampler Type/Size: 1-3/8 inch ID	Core Barrel Type: NX
Hammer Wt.: 300lb Fall: 30in.	Hammer Wt.: 140lb Fall: 30in.	

Groundwater Observations: 11 0 hrs

Depth (ft)	SAMPLES					Generalized Strata Description	Material Description and Notes	Elevation (ft)									
	Sample Type/No.	Blows on Sampler per 6 inches							Pen. (in.)	Rec. (in.)	RQD %						
25	S-8	18	18	20	17	24	6		Gravelly Sand (cont)	Brown c-f GRAVEL, little c-f sand, trace silt	115						
30	S-9	13	15	12	12	24	8					Brown c-f GRAVEL, little c-f SAND, trace silt	110				
35	S-10	13	16	19	30	24	5							Brown c-f GRAVEL, little c-f sand, trace silt	105		
40	S-11	12	15	26	11	24	1									Brown c-f GRAVEL, trace silt	100
45	S-12	17	12	14	17	24	3										
50																	

Sample Type: S = Split Spoon C = Core UP = Undisturbed Piston V = Vane Shear Test
Proportions Used: Trace = 1 - 10%, Little = 10 - 20%, Some = 20 - 35%, And = 35 - 50%

Total Penetration in Earth: 75ft Rock: 3ft	NOTES: Driller notes cobbles from 1 to 9 ft, 25 to 35 ft, 40 ft, and 55 to 60 ft. Roller bit through probable weathered rock from 73 to 76 ft. Required 3 attempts to recover rock core, broken casing caused core barrel to clog easily	Sheet 2 of 4
No. of Soil Samples: 17 No. of Core Runs: 1		SM-001-M REV. 1/02

Driller: A. MacKernon	Connecticut DOT Boring Report Format		Hole No.: S-1
Inspector: G. Jacobsen	Town: Wilton	Stat./Offset: 102+56/8.6 ft L	
Engineer: Nathan Whetten	Project No.: 161-143	Northing: 624931.74	
Start Date: 7-20-20	Route No.: Arrowhead Road	Easting: 816048.56	
Finish Date: 7-21-20	Bridge No.: 05501	Surface Elevation: 142	

Project Description: Reconstruction of Arrowhead Road over Norwalk River

Casing Size/Type: 4-in. Casing	Sampler Type/Size: 1-3/8 inch ID	Core Barrel Type: NX
Hammer Wt.: 300lb Fall: 30in.	Hammer Wt.: 140lb Fall: 30in.	

Groundwater Observations: 11 0 hrs

Depth (ft)	SAMPLES					Generalized Strata Description	Material Description and Notes	Elevation (ft)			
	Sample Type/No.	Blows on Sampler per 6 inches							Pen. (in.)	Rec. (in.)	RQD %
50	S-13	8	8	7	4	24	5		Gravelly Sand (cont)	Brown c-f SAND and c-f GRAVEL, trace silt	90
55	S-14	39	40	31	19	24	10				
60	S-15	30	18	31	36	24	7			Brown c-f GRAVEL, little c-f sand, trace silt	80
65	S-16	31	46	50/5"		17	14		Glacial Till	Gray-brown c-f SAND and c-f GRAVEL, little silt	75
70	S-17	49	38	50	39	24	10			Gray-brown c-m GRAVEL, some c-f sand, some silt	70
75									Weathered Bedrock		

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: 75ft Rock: 3ft	NOTES: Driller notes cobbles from 1 to 9 ft, 25 to 35 ft, 40 ft, and 55 to 60 ft. Roller bit through probable weathered rock from 73 to 76 ft. Required 3 attempts to recover rock core, broken casing caused core barrel to clog easily	Sheet 3 of 4
No. of Soil Samples: 17 No. of Core Runs: 1		SM-001-M REV. 1/02

Driller: A. MacKernon	Connecticut DOT Boring Report Format		Hole No.: S-1
Inspector: G. Jacobsen	Town: Wilton	Stat./Offset: 102+56/8.6 ft L	
Engineer: Nathan Whetten	Project No.: 161-143	Northing: 624931.74	
Start Date: 7-20-20	Route No.: Arrowhead Road	Easting: 816048.56	
Finish Date: 7-21-20	Bridge No.: 05501	Surface Elevation: 142	

Project Description: Reconstruction of Arrowhead Road over Norwalk River

Casing Size/Type: 4-in. Casing	Sampler Type/Size: 1-3/8 inch ID	Core Barrel Type: NX
Hammer Wt.: 300lb Fall: 30in.	Hammer Wt.: 140lb Fall: 30in.	

Groundwater Observations: 11 0 hrs

Depth (ft)	SAMPLES					Generalized Strata Description	Material Description and Notes	Elevation (ft)
	Sample Type/No.	Blows on Sampler per 6 inches	Pen. (in.)	Rec. (in.)	RQD %			
75	C-1		36	30	14	Bedrock	GNEISS, gray, fine grained, laminated, highly fractured, slightly weathered, strong. Primary joints 1-6" spacing, shallow dipping, tight, planar, slightly weathered, parallel to foliation. Secondary joints steeply dipping 4-12" spacing C-1 coring times: 6, 6, 6 min per ft.	65
80							END OF BORING 78ft	60
85								55
90								50
95								45
100								

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: 75ft Rock: 3ft	NOTES: Driller notes cobbles from 1 to 9 ft, 25 to 35 ft, 40 ft, and 55 to 60 ft. Roller bit through probable weathered rock from 73 to 76 ft. Required 3 attempts to recover rock core, broken casing caused core barrel to clog easily	Sheet 4 of 4
No. of Soil Samples: 17	No. of Core Runs: 1	SM-001-M REV. 1/02

Driller: A. MacKernon	Connecticut DOT Boring Report Format		Hole No.: S-2
Inspector: G. Jacobsen	Town: Wilton	Stat./Offset: 102+56/10.8 ft R	
Engineer: Nathan Whetten	Project No.: 161-143	Northing: 624921.35	
Start Date: 7-22-20	Route No.: Arrowhead Road	Easting: 816037.26	
Finish Date: 7-23-20	Bridge No.: 05501	Surface Elevation: 141.9	

Project Description: Reconstruction of Arrowhead Road over Norwalk River

Casing Size/Type: 4-in. Casing	Sampler Type/Size: 1-3/8 inch ID	Core Barrel Type: NX
Hammer Wt.: 300lb Fall: 30in.	Hammer Wt.: 140lb Fall: 30in.	

Groundwater Observations: 11 0 hrs

Depth (ft)	SAMPLES					Generalized Strata Description	Material Description and Notes	Elevation (ft)		
	Sample Type/No.	Blows on Sampler per 6 inches							Pen. (in.)	Rec. (in.)
0							Pavement Structure Misc. Fill	Asphalt Pavement 4"		
	S-1	13	23	22	18	24	8	Gray c-f SAND and c-f GRAVEL, little silt	140	
	S-2	6	8	30/2"		14	10	Gray c-f SAND and c-f GRAVEL, little silt		
5										
	S-3	8	10	11	12	24	10	Gray c-f SAND and c-f GRAVEL, little silt	135	
10										
	S-4	20	33	44		18	14	Gravelly Sand	Brown c-f SAND and c-f GRAVEL, trace silt	130
15										
	S-5	30	24	26	28	24	10	Brown c-f SAND and c-f GRAVEL, trace silt	125	
20										
	S-6	18	15	12	13	24	10	Brown c-f SAND, some c-f gravel, trace silt	120	
25										

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: 75ft Rock: 8.5ft	NOTES: Driller notes cobbles 4 to 5 ft, 7 to 9 ft Drove 4" casing to 71 ft, hole stayed open from 71 to 75 ft. Roller bit hard and steady through probable weathered rock from 71 to 75 ft.	Sheet 1 of 4
No. of Soil Samples: 16	No. of Core Runs: 2	SM-001-M REV. 1/02

Driller: A. MacKernon	Connecticut DOT Boring Report Format		Hole No.: S-2
Inspector: G. Jacobsen	Town: Wilton	Stat./Offset: 102+56/10.8 ft R	
Engineer: Nathan Whetten	Project No.: 161-143	Northing: 624921.35	
Start Date: 7-22-20	Route No.: Arrowhead Road	Easting: 816037.26	
Finish Date: 7-23-20	Bridge No.: 05501	Surface Elevation: 141.9	

Project Description: Reconstruction of Arrowhead Road over Norwalk River

Casing Size/Type: 4-in. Casing	Sampler Type/Size: 1-3/8 inch ID	Core Barrel Type: NX
Hammer Wt.: 300lb Fall: 30in.	Hammer Wt.: 140lb Fall: 30in.	

Groundwater Observations: 11 0 hrs

Depth (ft)	SAMPLES					Generalized Strata Description	Material Description and Notes	Elevation (ft)									
	Sample Type/No.	Blows on Sampler per 6 inches							Pen. (in.)	Rec. (in.)	RQD %						
25	S-7	20	15	21	18	24	4		Gravelly Sand (cont)	Brown c-f SAND and c-f GRAVEL, trace silt	115						
30	S-8	13	29	23	12	24	6					Brown c-f SAND and c-f GRAVEL, trace silt	110				
35	S-9	19	18	19	12	24	1							Brown c-f SAND and c-f GRAVEL, trace silt	105		
40	S-10	13	19	25	50/4"	22	4									Brown c-f SAND and c-f GRAVEL, trace silt	100
45	S-11	15	14	15	12	24	8										
50																	

Sample Type: S = Split Spoon C = Core UP = Undisturbed Piston V = Vane Shear Test
Proportions Used: Trace = 1 - 10%, Little = 10 - 20%, Some = 20 - 35%, And = 35 - 50%

Total Penetration in Earth: 75ft Rock: 8.5ft	NOTES: Driller notes cobbles 4 to 5 ft, 7 to 9 ft Drove 4" casing to 71 ft, hole stayed open from 71 to 75 ft. Roller bit hard and steady through probable weathered rock from 71 to 75 ft.	Sheet 2 of 4
No. of Soil Samples: 16	No. of Core Runs: 2	SM-001-M REV. 1/02

Driller: A. MacKernon	Connecticut DOT Boring Report Format		Hole No.: S-2
Inspector: G. Jacobsen	Town: Wilton	Stat./Offset: 102+56/10.8 ft R	
Engineer: Nathan Whetten	Project No.: 161-143	Northing: 624921.35	
Start Date: 7-22-20	Route No.: Arrowhead Road	Easting: 816037.26	
Finish Date: 7-23-20	Bridge No.: 05501	Surface Elevation: 141.9	

Project Description: Reconstruction of Arrowhead Road over Norwalk River

Casing Size/Type: 4-in. Casing	Sampler Type/Size: 1-3/8 inch ID	Core Barrel Type: NX
Hammer Wt.: 300lb Fall: 30in.	Hammer Wt.: 140lb Fall: 30in.	

Groundwater Observations: 11 0 hrs

Depth (ft)	SAMPLES					Generalized Strata Description	Material Description and Notes	Elevation (ft)				
	Sample Type/No.	Blows on Sampler per 6 inches							Pen. (in.)	Rec. (in.)	RQD %	
50	S-12	22	24	28	27	24	8		Gravelly Sand (cont)	Brown c-f SAND and c-f GRAVEL, trace silt	90	
55	S-13	30	22	15	18	24	8					Brown c-f SAND and c-f GRAVEL, trace silt
60	S-14	12	10	15	16	24	2			Brown c-f SAND and c-f GRAVEL, trace silt	80	
65	S-15	27	27	27	27	24	6			Brown c-f SAND and c-f GRAVEL, trace silt	75	
70	S-16	50/1"				1	1			Glacial Till	Brown c-f SAND and c-f GRAVEL, little silt	70
75									Weathered Bedrock			

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: 75ft Rock: 8.5ft	NOTES: Driller notes cobbles 4 to 5 ft, 7 to 9 ft Drove 4" casing to 71 ft, hole stayed open from 71 to 75 ft. Roller bit hard and steady through probable weathered rock from 71 to 75 ft.	Sheet 3 of 4
No. of Soil Samples: 16 No. of Core Runs: 2		SM-001-M REV. 1/02

Driller: A. MacKernon	Connecticut DOT Boring Report Format		Hole No.: S-2
Inspector: G. Jacobsen	Town: Wilton	Stat./Offset: 102+56/10.8 ft R	
Engineer: Nathan Whetten	Project No.: 161-143	Northing: 624921.35	
Start Date: 7-22-20	Route No.: Arrowhead Road	Easting: 816037.26	
Finish Date: 7-23-20	Bridge No.: 05501	Surface Elevation: 141.9	

Project Description: Reconstruction of Arrowhead Road over Norwalk River

Casing Size/Type: 4-in. Casing	Sampler Type/Size: 1-3/8 inch ID	Core Barrel Type: NX
Hammer Wt.: 300lb Fall: 30in.	Hammer Wt.: 140lb Fall: 30in.	

Groundwater Observations: 11 0 hrs

Depth (ft)	SAMPLES					Generalized Strata Description	Material Description and Notes	Elevation (ft)
	Sample Type/No.	Blows on Sampler per 6 inches	Pen. (in.)	Rec. (in.)	RQD %			
75	C-1		60	54	30	Bedrock	GNEISS, gray, fine grained, laminated, highly fractured, slightly weathered, strong. Primary joints horizontal, moderately weathered, several high angle joints. C-1 coring times: 9, 9, 9, 9, 9 per ft.	65
80								C-2
85							END OF BORING 83.5ft	55
90								50
95								45
100								

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: 75ft Rock: 8.5ft	NOTES: Driller notes cobbles 4 to 5 ft, 7 to 9 ft Drove 4" casing to 71 ft, hole stayed open from 71 to 75 ft. Roller bit hard and steady through probable weathered rock from 71 to 75 ft.	Sheet 4 of 4
No. of Soil Samples: 16	No. of Core Runs: 2	SM-001-M REV. 1/02

Driller: R. Posa	Connecticut DOT Boring Report Format		Hole No.: S-3
Inspector: G. Jacobsen	Town: Wilton	Stat./Offset: 103+32/9.2 ft L	
Engineer: Nathan Whetten	Project No.: 161-143	Northing: 624917.73	
Start Date: 7-20-20	Route No.: Arrowhead Road	Easting: 816125.91	
Finish Date: 7-21-20	Bridge No.: 05501	Surface Elevation: 142.1	

Project Description: Reconstruction of Arrowhead Road over Norwalk River

Casing Size/Type: 4-in. Casing	Sampler Type/Size: 1-3/8 inch ID	Core Barrel Type: NX
Hammer Wt.: 300lb Fall: 30in.	Hammer Wt.: 140lb Fall: 30in.	

Groundwater Observations: 10 0 hrs

Depth (ft)	SAMPLES					Generalized Strata Description	Material Description and Notes	Elevation (ft)			
	Sample Type/No.	Blows on Sampler per 6 inches							Pen. (in.)	Rec. (in.)	RQD %
0							Pavement Structure Misc. Fill	Asphalt Pavement 4"			
	S-1	32	44	37	29	24	14				
	S-2	22	37	50/1"		13	10				
5											
	S-3	17	21	24	30	24	16				
	S-4	50/3"				3	3				
								Sand			
10	S-5	5	6	28	32	24	14				
	S-6	22	15	17	33	24	10				
								Gravelly Sand	S5 top 12 in: Gray f SAND, some silt S5 bottom 2 in: Brown c-f SAND, and c-f GRAVEL, trace silt		
15	S-7	39	40	20	8	24	10				
									Top 6 in.: Brown c-f SAND and c-f GRAVEL, trace silt; Bottom 4 in.: SILT, some f sand		
20	S-8	20	13	11	19	24	12				
									Brown c-f SAND and c-f GRAVEL, little silt		
25											

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: 72ft Rock: 10.7ft	NOTES: Driller notes cobbles from 3.5 to 5 ft, 7 to 8 ft Used Solid auger to 9 ft, then drove 4" casing. Roller-bitted hard and steady 68 to 70 ft. Drove 4 inch casng to 68 ft. Roller bit to 72 ft Core barrel damaged during C-2, core damaged, recovery and RQD reduced. Lost some water during coring.	Sheet 1 of 4
No. of Soil Samples: 17	No. of Core Runs: 3	SM-001-M REV. 1/02

Driller: R. Posa	Connecticut DOT Boring Report Format		Hole No.: S-3
Inspector: G. Jacobsen	Town: Wilton	Stat./Offset: 103+32/9.2 ft L	
Engineer: Nathan Whetten	Project No.: 161-143	Northing: 624917.73	
Start Date: 7-20-20	Route No.: Arrowhead Road	Easting: 816125.91	
Finish Date: 7-21-20	Bridge No.: 05501	Surface Elevation: 142.1	

Project Description: Reconstruction of Arrowhead Road over Norwalk River

Casing Size/Type: 4-in. Casing	Sampler Type/Size: 1-3/8 inch ID	Core Barrel Type: NX
Hammer Wt.: 300lb Fall: 30in.	Hammer Wt.: 140lb Fall: 30in.	

Groundwater Observations: 10 0 hrs

Depth (ft)	SAMPLES					Generalized Strata Description	Material Description and Notes	Elevation (ft)
	Sample Type/No.	Blows on Sampler per 6 inches			Pen. (in.)			
25	S-9	18	51	66	18	8	Gravelly Sand (cont)	Brown c-f SAND and c-f GRAVEL, trace silt 115
30	S-10	20	23	28 21	24	8		
35	S-11	13	17	18 21	24	8	Top 4 in: Brown c-f SAND and c-f GRAVEL, trace silt; Bottom 4 in: Brown SILT	105
40	S-12	15	16	9 9	24	8		
45	S-13	15	29	30 18	24	6	Brown c-f SAND and c-f GRAVEL, trace silt	95
50								

Sample Type: S = Split Spoon C = Core UP = Undisturbed Piston V = Vane Shear Test
Proportions Used: Trace = 1 - 10%, Little = 10 - 20%, Some = 20 - 35%, And = 35 - 50%

Total Penetration in Earth: 72ft Rock: 10.7ft	NOTES: Driller notes cobbles from 3.5 to 5 ft, 7 to 8 ft Used Solid auger to 9 ft, then drove 4" casing. Roller-bitted hard and steady 68 to 70 ft. Drove 4 inch casng to 68 ft. Roller bit to 72 ft Core barrel damaged during C-2, core damaged, recovery and RQD reduced. Lost some water during coring.	Sheet 2 of 4 SM-001-M REV. 1/02
No. of Soil Samples: 17	No. of Core Runs: 3	

Driller: R. Posa	Connecticut DOT Boring Report Format	Hole No.: S-3
Inspector: G. Jacobsen	Town: Wilton	Stat./Offset: 103+32/9.2 ft L
Engineer: Nathan Whetten	Project No.: 161-143	Northing: 624917.73
Start Date: 7-20-20	Route No.: Arrowhead Road	Easting: 816125.91
Finish Date: 7-21-20	Bridge No.: 05501	Surface Elevation: 142.1

Project Description: Reconstruction of Arrowhead Road over Norwalk River

Casing Size/Type: 4-in. Casing	Sampler Type/Size: 1-3/8 inch ID	Core Barrel Type: NX
Hammer Wt.: 300lb Fall: 30in.	Hammer Wt.: 140lb Fall: 30in.	

Groundwater Observations: 10 0 hrs

Depth (ft)	SAMPLES					Generalized Strata Description	Material Description and Notes	Elevation (ft)			
	Sample Type/No.	Blows on Sampler per 6 inches							Pen. (in.)	Rec. (in.)	RQD %
50	S-14	13	17	14	9	24	6		Gravelly Sand (cont)	Brown c-f SAND and c-f GRAVEL, trace silt	90
55	S-15	6	9	16	16	24	4				
60	S-16	14	23	39	21	24	10		Glacial Till	Brown c-f SAND and c-f GRAVEL, trace silt	80
65	S-17	18	42	50/5"		17	13				
70									Bedrock	GNEISS, gray, fine grained, laminated, highly fractured, slightly weathered, strong. Primary joints 1-8" spacing, shallow dipping, tight, planar, slightly weathered, parallel to foliation. Secondary joints steeply dipping 12-24" spacing, open,	70
75	C-1					38	34	25			

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: 72ft Rock: 10.7ft	NOTES: Driller notes cobbles from 3.5 to 5 ft, 7 to 8 ft Used Solid auger to 9 ft, then drove 4" casing. Roller-bitted hard and steady 68 to 70 ft. Drove 4 inch casng to 68 ft. Roller bit to 72 ft Core barrel damaged during C-2, core damaged, recovery and RQD reduced. Lost some water during coring.	Sheet 3 of 4
No. of Soil Samples: 17 No. of Core Runs: 3		SM-001-M REV. 1/02

Driller: R. Posa	Connecticut DOT Boring Report Format		Hole No.: S-3
Inspector: G. Jacobsen	Town: Wilton	Stat./Offset: 103+32/9.2 ft L	
Engineer: Nathan Whetten	Project No.: 161-143	Northing: 624917.73	
Start Date: 7-20-20	Route No.: Arrowhead Road	Easting: 816125.91	
Finish Date: 7-21-20	Bridge No.: 05501	Surface Elevation: 142.1	

Project Description: Reconstruction of Arrowhead Road over Norwalk River

Casing Size/Type: 4-in. Casing	Sampler Type/Size: 1-3/8 inch ID	Core Barrel Type: NX
Hammer Wt.: 300lb Fall: 30in.	Hammer Wt.: 140lb Fall: 30in.	

Groundwater Observations: 10 0 hrs

Depth (ft)	SAMPLES					Generalized Strata Description	Material Description and Notes	Elevation (ft)
	Sample Type/No.	Blows on Sampler per 6 inches	Pen. (in.)	Rec. (in.)	RQD %			
75						Bedrock (cont)	weathered C-1 coring times: 5, 6, 6 min per ft. GNEISS, gray, fine grained, laminated, moderately fractured, slightly weathered, strong. Primary joints 1-8" spacing, shallow dipping, tight, planar, slightly weathered, parallel to foliation. Secondary joints steeply dipping 12-24" spacing, open, weathered. C-2 coring times: 6, 6, 6 min per ft. GNEISS, gray, fine grained, laminated, moderately fractured, slightly weathered, strong. Primary joints 3-8" spacing, shallow dipping, tight, planar, slightly weathered, parallel to foliation. Secondary joints steeply dipping 12-24" spacing, open, weathered. C-3 coring times: 6, 6, 6, 6, 6 min per ft.	65
	C-2		30	25	13			60
80	C-3		60	54	55			
85							END OF BORING 82.7ft	55
90								50
95								45
100								

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: 72ft Rock: 10.7ft	NOTES: Driller notes cobbles from 3.5 to 5 ft, 7 to 8 ft Used Solid auger to 9 ft, then drove 4" casing. Roller-bitted hard and steady 68 to 70 ft. Drove 4 inch casing to 68 ft. Roller bit to 72 ft Core barrel damaged during C-2, core damaged, recovery and RQD reduced. Lost some water during coring.	Sheet 4 of 4
No. of Soil Samples: 17	No. of Core Runs: 3	SM-001-M REV. 1/02

Driller: R. Posa	Connecticut DOT Boring Report Format		Hole No.: S-4
Inspector: G. Jacobsen	Town: Wilton	Stat./Offset: 103+30/9.4 ft R	
Engineer: Nathan Whetten	Project No.: 161-143	Northing: 624904.82	
Start Date: 7-22-20	Route No.: Arrowhead Road	Easting: 816123.28	
Finish Date: 7-23-20	Bridge No.: 05501	Surface Elevation: 142	

Project Description: Reconstruction of Arrowhead Road over Norwalk River

Casing Size/Type: 4-in. Casing	Sampler Type/Size: 1-3/8 inch ID	Core Barrel Type: NX
Hammer Wt.: 300lb Fall: 30in.	Hammer Wt.: 140lb Fall: 30in.	

Groundwater Observations: 10 0 hrs

Depth (ft)	SAMPLES					Generalized Strata Description	Material Description and Notes	Elevation (ft)	
	Sample Type/No.	Blows on Sampler per 6 inches							Pen. (in.)
0							Pavement Structure Asphalt Pavement 4"		
	S-1	10	36	31	33	24	3	Misc. Fill Gray c-f SAND and c-f GRAVEL, trace silt	140
	S-2	27	21	31	33	24	4	Gray c-f SAND and c-f GRAVEL, trace silt	
5									
	S-3	11	21	50	50/1"	19	3	Dark gray c-f SAND and c-f GRAVEL, trace silt	135
	S-4	14	13	4	5	24	14	8 to 9 ft: Brown c-f SAND, some c-f gravel, trace silt	
10								Sand 9 to 9.2 ft: Dark gray c-f SAND, trace silt	
	S-5	6	48	40	40	24	6	Gravelly Sand Brown c-f SAND and c-f GRAVEL, trace silt	130
15									
	S-6	18	26	33	38	24	4	Brown c-f SAND, some c-f gravel, trace silt	125
20									
	S-7	16	8	9	15	24	5	Brown c-f GRAVEL and c-f SAND, trace silt	120
25									

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: 68ft Rock: 6ft	NOTES: Driller notes increase in drilling resistance at 54 ft. At 65 ft roller-bitted through probable cobbles, probable glacial till Roller-bitted hard and steady from 68 to 70 ft., Drove 4" casing to 69 ft. Roller bitted hard and steady to 72 ft.	Sheet 1 of 4
No. of Soil Samples: 16	No. of Core Runs: 1	SM-001-M REV. 1/02

Driller: R. Posa	Connecticut DOT Boring Report Format		Hole No.: S-4
Inspector: G. Jacobsen	Town: Wilton	Stat./Offset: 103+30/9.4 ft R	
Engineer: Nathan Whetten	Project No.: 161-143	Northing: 624904.82	
Start Date: 7-22-20	Route No.: Arrowhead Road	Easting: 816123.28	
Finish Date: 7-23-20	Bridge No.: 05501	Surface Elevation: 142	

Project Description: Reconstruction of Arrowhead Road over Norwalk River

Casing Size/Type: 4-in. Casing	Sampler Type/Size: 1-3/8 inch ID	Core Barrel Type: NX
Hammer Wt.: 300lb Fall: 30in.	Hammer Wt.: 140lb Fall: 30in.	

Groundwater Observations: 10 0 hrs

Depth (ft)	SAMPLES					Generalized Strata Description	Material Description and Notes	Elevation (ft)			
	Sample Type/No.	Blows on Sampler per 6 inches							Pen. (in.)	Rec. (in.)	RQD %
25	S-8	5	14	26	26	24	4		Gravelly Sand (cont)	Brown c-f SAND, some c-f gravel, trace silt	115
30	S-9	19	16	21	21	24	2				
35	S-10	13	17	21	21	24	3		Brown c-f SAND and c-f GRAVEL, trace silt	105	
40	S-11	20	28	15	15	24	1				Brown c-f GRAVEL, trace silt
45	S-12	8	8	7	8	24	5		Brown c-f GRAVEL, little c-f sand, trace silt	95	
50											

Sample Type: S = Split Spoon C = Core UP = Undisturbed Piston V = Vane Shear Test
Proportions Used: Trace = 1 - 10%, Little = 10 - 20%, Some = 20 - 35%, And = 35 - 50%

Total Penetration in Earth: 68ft Rock: 6ft	NOTES: Driller notes increase in drilling resistance at 54 ft. At 65 ft roller-bitted through probable cobbles, probable glacial till Roller-bitted hard and steady from 68 to 70 ft., Drove 4" casing to 69 ft. Roller bitted hard and steady to 72 ft.	Sheet 2 of 4
No. of Soil Samples: 16 No. of Core Runs: 1		SM-001-M REV. 1/02

Driller: R. Posa	Connecticut DOT Boring Report Format		Hole No.: S-4
Inspector: G. Jacobsen	Town: Wilton	Stat./Offset: 103+30/9.4 ft R	
Engineer: Nathan Whetten	Project No.: 161-143	Northing: 624904.82	
Start Date: 7-22-20	Route No.: Arrowhead Road	Easting: 816123.28	
Finish Date: 7-23-20	Bridge No.: 05501	Surface Elevation: 142	

Project Description: Reconstruction of Arrowhead Road over Norwalk River

Casing Size/Type: 4-in. Casing	Sampler Type/Size: 1-3/8 inch ID	Core Barrel Type: NX
Hammer Wt.: 300lb Fall: 30in.	Hammer Wt.: 140lb Fall: 30in.	

Groundwater Observations: 10 0 hrs

Depth (ft)	SAMPLES					Generalized Strata Description	Material Description and Notes	Elevation (ft)				
	Sample Type/No.	Blows on Sampler per 6 inches							Pen. (in.)	Rec. (in.)	RQD %	
50	S-13	11	10	10	11	24	5		Gravelly Sand (cont)	Brown c-f GRAVEL, little c-f sand, trace silt	90	
55	S-14	36	30	30	50/5"	23	4			S14 top 2in: Brown c-f GRAVEL, some c-f sand, trace silt S14 bottom 2 in: Brown c-f SAND, little c-f gravel, little silt	85	
60	S-15	50/5"				5	2				Brown gravelly c-f SAND, some c-f gravel, trace silt	80
65	S-16	50/2"				2	0			Glacial Till	No recovery: Probable Brown c-f SAND and c-f GRAVEL, little silt (based on other similar samples for this project)	75
70										Weathered Bedrock		
75	C-1					24	20	0		Bedrock	GNEISS, gray, fine grained, laminated, intensely fractured, slightly weathered, strong. Numerous open horizontal and vertical fractures. Foliation horizontal C-1 coring times: 9, 9 min per ft.	70

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: 68ft Rock: 6ft	NOTES: Driller notes increase in drilling resistance at 54 ft. At 65 ft roller-bitted through probable cobbles, probable glacial till Roller-bitted hard and steady from 68 to 70 ft., Drove 4" casing to 69 ft. Roller bitted hard and steady to 72 ft.	Sheet 3 of 4
No. of Soil Samples: 16	No. of Core Runs: 1	SM-001-M REV. 1/02

Driller: R. Posa	Connecticut DOT Boring Report Format		Hole No.: S-4
Inspector: G. Jacobsen	Town: Wilton	Stat./Offset: 103+30/9.4 ft R	
Engineer: Nathan Whetten	Project No.: 161-143	Northing: 624904.82	
Start Date: 7-22-20	Route No.: Arrowhead Road	Easting: 816123.28	
Finish Date: 7-23-20	Bridge No.: 05501	Surface Elevation: 142	

Project Description: Reconstruction of Arrowhead Road over Norwalk River

Casing Size/Type: 4-in. Casing	Sampler Type/Size: 1-3/8 inch ID	Core Barrel Type: NX
Hammer Wt.: 300lb Fall: 30in.	Hammer Wt.: 140lb Fall: 30in.	

Groundwater Observations: 10 0 hrs

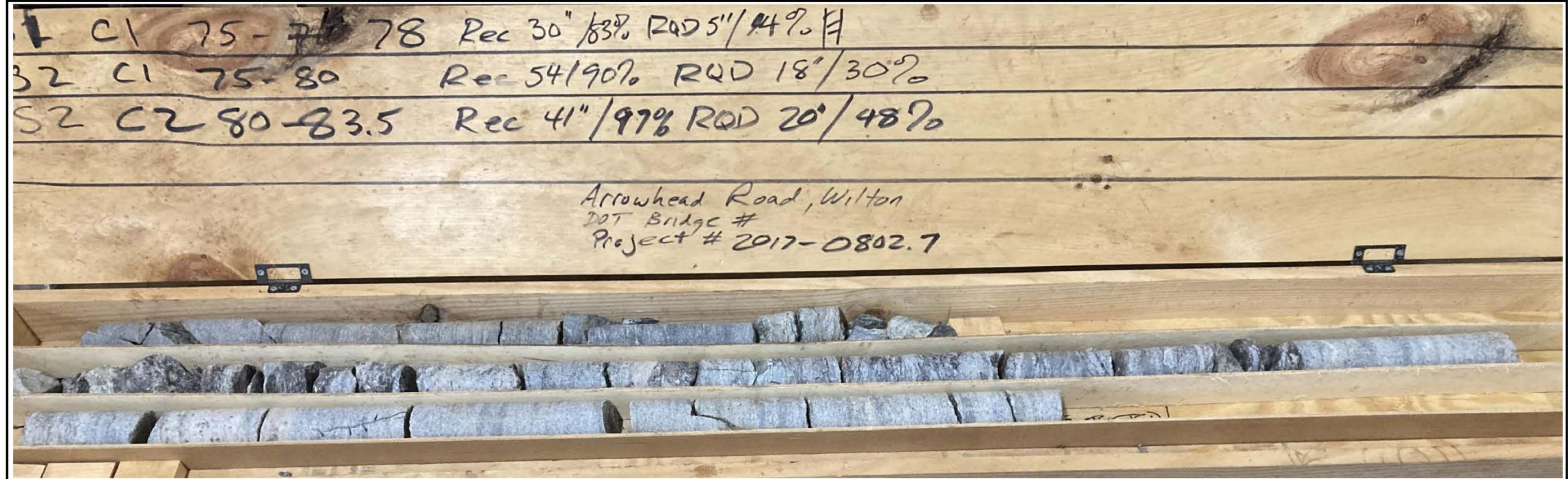
Depth (ft)	SAMPLES					Generalized Strata Description	Material Description and Notes	Elevation (ft)
	Sample Type/No.	Blows on Sampler per 6 inches	Pen. (in.)	Rec. (in.)	RQD %			
75							END OF BORING 74ft	65
80								60
85								55
90								50
95								45
100								

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: 68ft Rock: 6ft	NOTES: Driller notes increase in drilling resistance at 54 ft. At 65 ft roller-bitted through probable cobbles, probable glacial till Roller-bitted hard and steady from 68 to 70 ft., Drove 4" casing to 69 ft. Roller bitted hard and steady to 72 ft.	Sheet 4 of 4
No. of Soil Samples: 16	No. of Core Runs: 1	SM-001-M REV. 1/02

Rock Core Data Sheet

Project No.	Project Description	Town	Route No.	Bridge No.	Driller	Inspector	Engineer	Start Date	End Date
SPN: 161-143 FPN: 2021-0802.7	Replacement of Bridge 05501, Arrowhead Road over Norwalk River	Wilton, CT	Arrowhead Rd	05501	A. MacKernon	G. Jacobsen	N. Whetten	7/20/2020	7/23/2020



Boring No.	Sample No.	Sample Depth (ft.)	Rock Type	Color	Grain Size	Bedding	Fracturing	Weathering	Strength	Drill Rates (min/ft)					Pen. (in)	Rec. (in)	Rec. (%)	RQD (%)
S-1	C1	75-78	GNEISS	Gray	Fine Grained	Laminated	Highly Fractured	Slightly Weathered	Strong	6	6	6			36	30	83%	14%
S-2	C1	75-80	GNEISS	Gray	Fine Grained	Laminated	Highly Fractured	Slightly Weathered	Strong	9	9	9	9	9	60	54	90%	30%
S-2	C2	80-83.5	GNEISS	Gray	Fine Grained	Laminated	Moderately Fractured	Slightly Weathered	Strong	10	10	10			42	41	98%	48%

	NOTES:	Casing Type/Size:	4in Driven Casing
		Hammer Weight:	300 lbs
		Hammer Fall:	30 in
		Core Barrel Type:	NX

Rock Core Data Sheet

Project No.	Project Description	Town	Route No.	Bridge No.	Driller	Inspector	Engineer	Start Date	End Date
SPN: 161-143 FPN: 2021-0802.7	Replacement of Bridge 05501, Arrowhead Road over Norwalk River	Wilton, CT	Arrowhead Rd	05501	R. Posa	G. Jacobsen	N. Whetten	7/20/2020	7/23/2020



Boring No.	Sample No.	Sample Depth (ft.)	Rock Type	Color	Grain Size	Bedding	Fracturing	Weathering	Strength	Drill Rates (min/ft)					Pen. (in)	Rec. (in)	Rec. (%)	RQD (%)
S-3	C1	72-75.2	GNEISS	Gray	Fine Grained	Laminated	Highly Fractured	Slightly Weathered	Strong	5	6	6			38	34	89%	25%
S-3	C3	77.7-82.7	GNEISS	Gray	Fine Grained	Laminated	Moderately Fractured	Slightly Weathered	Strong	6	6	6	6	6	60	54	90%	55%
S-4	C1	72-74	GNEISS	Gray	Fine Grained	Laminated	Intensely Fractured	Slightly Weathered	Strong	9	9				24	20	83%	0%

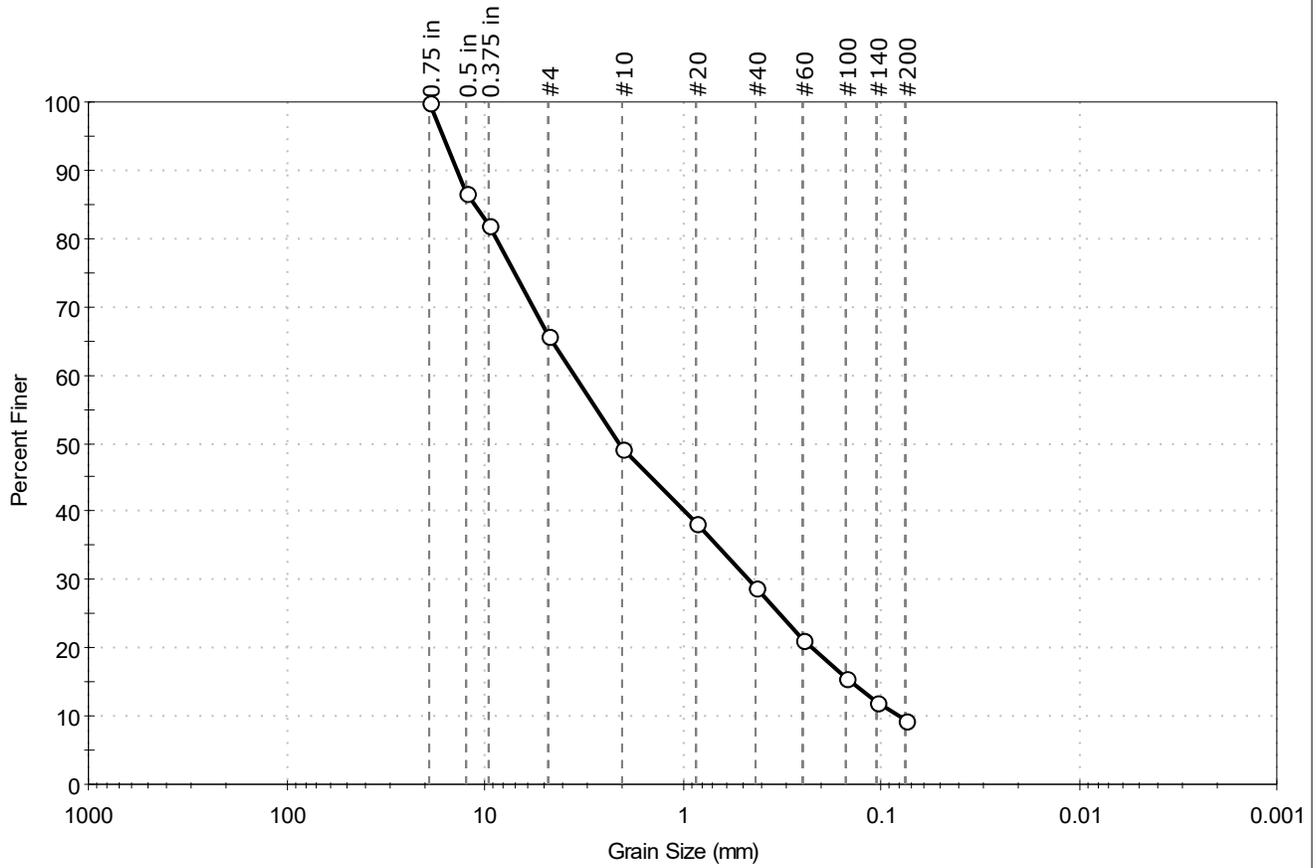
	NOTES:	Casing Type/Size:	4in Driven Casing
		Hammer Weight:	300 lbs
		Hammer Fall:	30 in
		Core Barrel Type:	NX

APPENDIX B
RESULTS OF LABORATORY TESTING



Client: Freeman Companies, LLC	Project No: GTX-312208
Project: Bridge 05501 Arrowhead Rd Norwalk River	
Location: Wilton, CT	
Boring ID: S-1	Sample Type: bag
Sample ID: S-3	Test Date: 08/25/20
Depth: 5-7	Test Id: 569831
Test Comment: ---	Tested By: GA
Visual Description: Moist, olive sand with silt and gravel	Checked By: emm
Sample Comment: ---	

Particle Size Analysis - ASTM D422



% Cobble	% Gravel	% Sand	% Silt & Clay Size
—	34.3	56.1	9.6

Sieve Name	Sieve Size, mm	Percent Finer	Spec. Percent	Complies
0.75 in	19.00	100		
0.5 in	12.50	87		
0.375 in	9.50	82		
#4	4.75	66		
#10	2.00	49		
#20	0.85	38		
#40	0.42	29		
#60	0.25	21		
#100	0.15	16		
#140	0.11	12		
#200	0.075	9.6		

<u>Coefficients</u>	
D ₈₅ = 11.2455 mm	D ₃₀ = 0.4566 mm
D ₆₀ = 3.5201 mm	D ₁₅ = 0.1423 mm
D ₅₀ = 2.0795 mm	D ₁₀ = 0.0795 mm
C _u = 44.278	C _c = 0.745

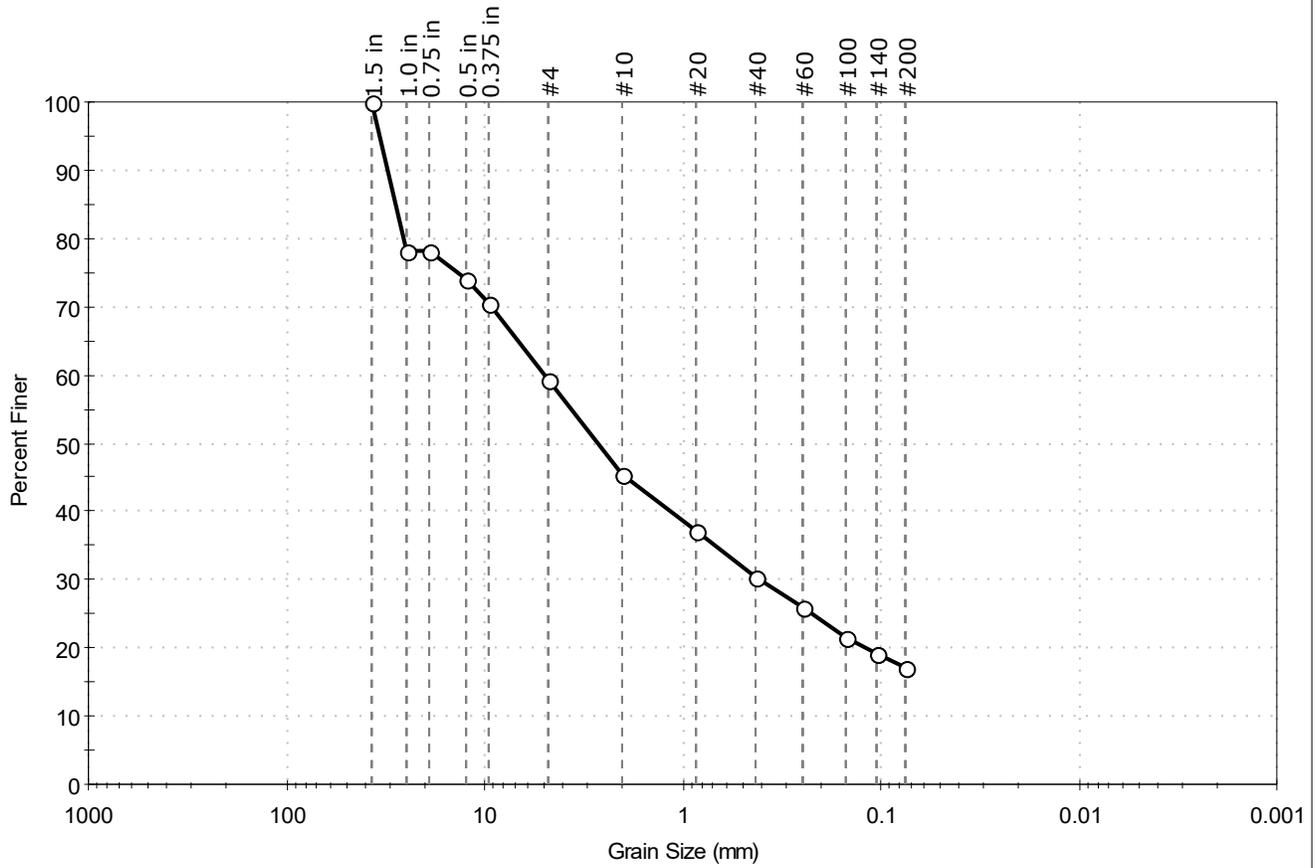
<u>Classification</u>	
ASTM	N/A
AASHTO	Stone Fragments, Gravel and Sand (A-1-a (1))

<u>Sample/Test Description</u>
Sand/Gravel Particle Shape : ANGULAR
Sand/Gravel Hardness : HARD



Client:	Freeman Companies, LLC		
Project:	Bridge 05501 Arrowhead Rd Norwalk River		
Location:	Wilton, CT	Project No:	GTX-312208
Boring ID:	S-2	Sample Type:	bag
Sample ID:	S-3	Test Date:	08/25/20
Depth :	5-7	Test Id:	569832
Test Comment:	---		
Visual Description:	Moist, dark olive gray silty sand with gravel		
Sample Comment:	---		

Particle Size Analysis - ASTM D422



% Cobble	% Gravel	% Sand	% Silt & Clay Size
—	40.6	42.2	17.2

Sieve Name	Sieve Size, mm	Percent Finer	Spec. Percent	Complies
1.5 in	37.50	100		
1.0 in	25.00	78		
0.75 in	19.00	78		
0.5 in	12.50	74		
0.375 in	9.50	70		
#4	4.75	59		
#10	2.00	46		
#20	0.85	37		
#40	0.42	30		
#60	0.25	26		
#100	0.15	22		
#140	0.11	19		
#200	0.075	17		

<u>Coefficients</u>	
D ₈₅ = 28.4036 mm	D ₃₀ = 0.4056 mm
D ₆₀ = 4.9262 mm	D ₁₅ = N/A
D ₅₀ = 2.6449 mm	D ₁₀ = N/A
C _u = N/A	C _c = N/A

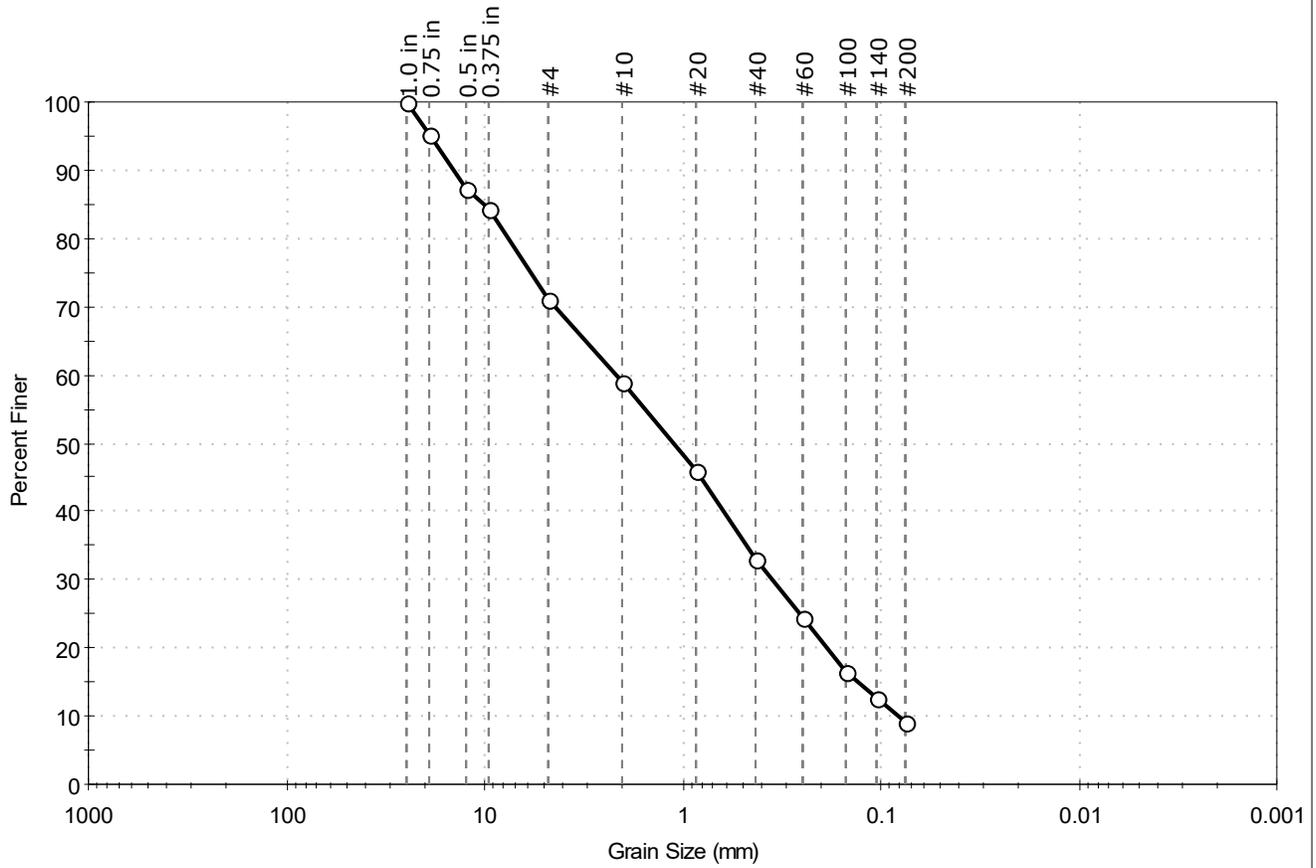
<u>Classification</u>	
ASTM	N/A
AASHTO	Stone Fragments, Gravel and Sand (A-1-b (0))

<u>Sample/Test Description</u>
Sand/Gravel Particle Shape : ANGULAR
Sand/Gravel Hardness : HARD



Client: Freeman Companies, LLC	Project No: GTX-312208
Project: Bridge 05501 Arrowhead Rd Norwalk River	
Location: Wilton, CT	
Boring ID: S-2	Sample Type: bag
Sample ID: S-6	Test Date: 08/25/20
Depth: 20-22	Test Id: 569833
Test Comment: ---	Tested By: GA
Visual Description: Moist, dark brown sand with silt and gravel	Checked By: emm
Sample Comment: ---	

Particle Size Analysis - ASTM D422



% Cobble	% Gravel	% Sand	% Silt & Clay Size
—	28.8	62.0	9.2

Sieve Name	Sieve Size, mm	Percent Finer	Spec. Percent	Complies
1.0 in	25.00	100		
0.75 in	19.00	95		
0.5 in	12.50	87		
0.375 in	9.50	84		
#4	4.75	71		
#10	2.00	59		
#20	0.85	46		
#40	0.42	33		
#60	0.25	24		
#100	0.15	17		
#140	0.11	13		
#200	0.075	9.2		

<u>Coefficients</u>	
D ₈₅ = 10.0863 mm	D ₃₀ = 0.3520 mm
D ₆₀ = 2.1343 mm	D ₁₅ = 0.1307 mm
D ₅₀ = 1.1052 mm	D ₁₀ = 0.0813 mm
C _u = 26.252	C _c = 0.714

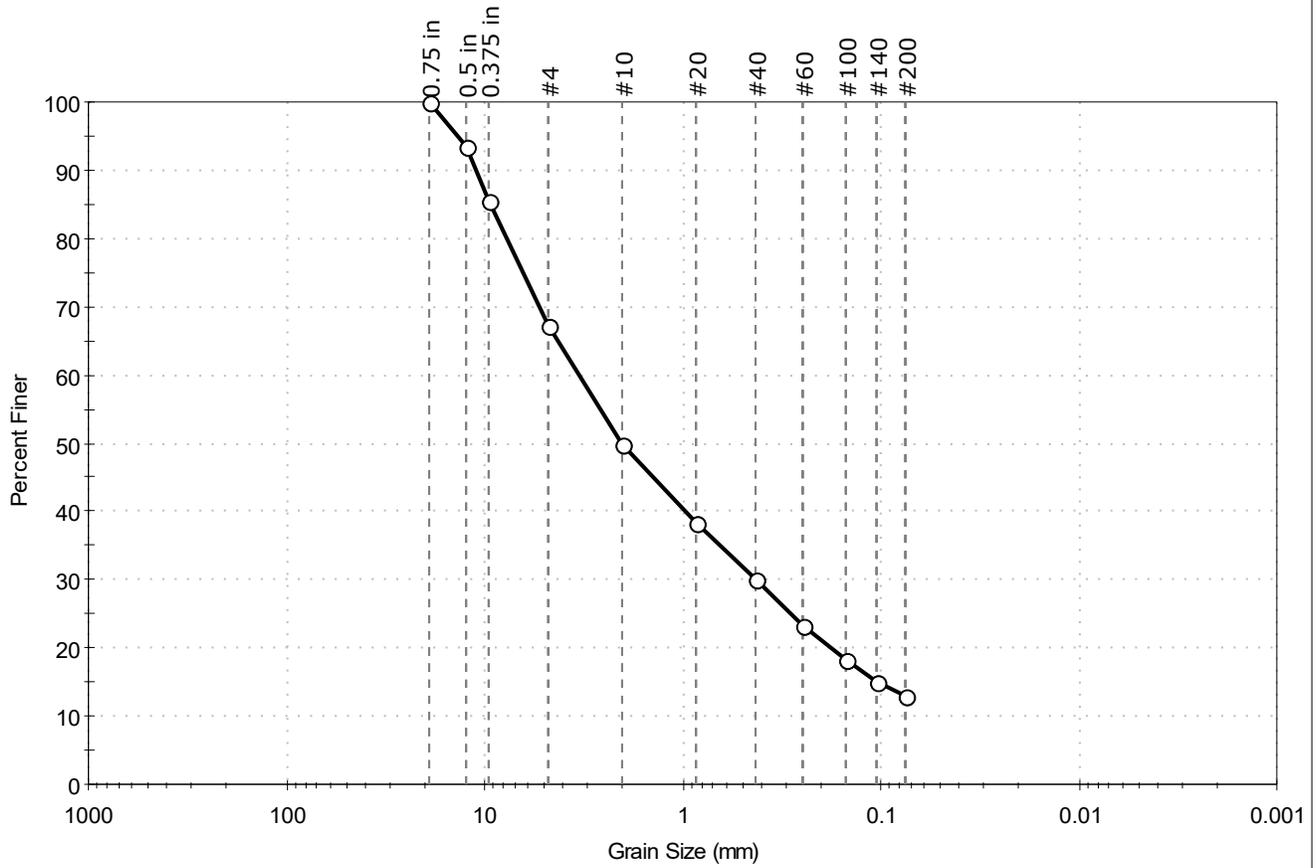
<u>Classification</u>	
ASTM	N/A
AASHTO	Stone Fragments, Gravel and Sand (A-1-b (1))

<u>Sample/Test Description</u>
Sand/Gravel Particle Shape : ANGULAR
Sand/Gravel Hardness : HARD



Client:	Freeman Companies, LLC		
Project:	Bridge 05501 Arrowhead Rd Norwalk River		
Location:	Wilton, CT	Project No:	GTX-312208
Boring ID:	S-3	Sample Type:	bag
Sample ID:	S-3	Test Date:	08/25/20
Depth :	5-7	Test Id:	569834
Test Comment:	---		
Visual Description:	Moist, dark olive brown silty sand with gravel		
Sample Comment:	---		

Particle Size Analysis - ASTM D422



% Cobble	% Gravel	% Sand	% Silt & Clay Size
—	32.9	54.2	12.9

Sieve Name	Sieve Size, mm	Percent Finer	Spec. Percent	Complies
0.75 in	19.00	100		
0.5 in	12.50	94		
0.375 in	9.50	86		
#4	4.75	67		
#10	2.00	50		
#20	0.85	38		
#40	0.42	30		
#60	0.25	23		
#100	0.15	18		
#140	0.11	15		
#200	0.075	13		

<u>Coefficients</u>	
D ₈₅ = 9.2715 mm	D ₃₀ = 0.4268 mm
D ₆₀ = 3.3310 mm	D ₁₅ = 0.1053 mm
D ₅₀ = 2.0266 mm	D ₁₀ = N/A
C _u = N/A	C _c = N/A

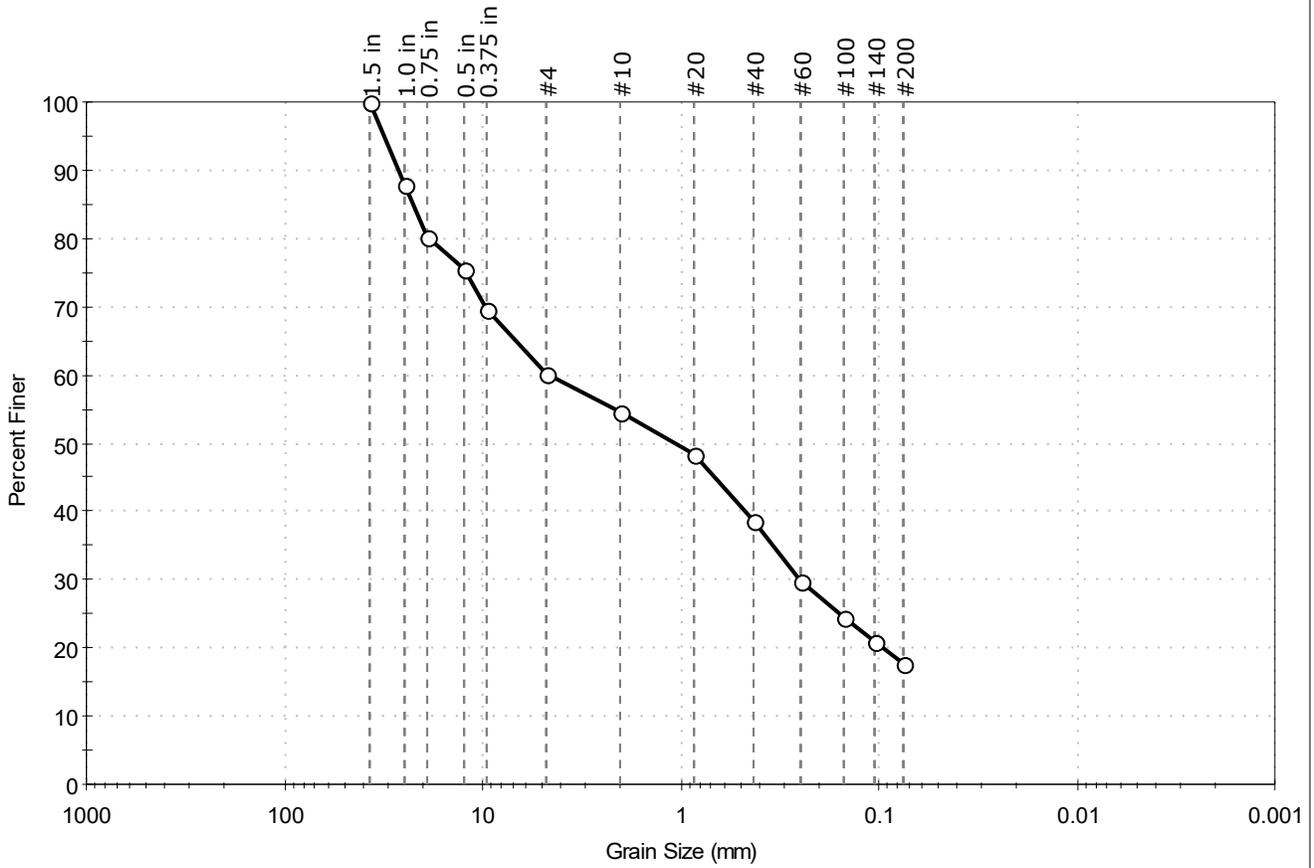
<u>Classification</u>	
ASTM	N/A
AASHTO	Stone Fragments, Gravel and Sand (A-1-a (0))

<u>Sample/Test Description</u>
Sand/Gravel Particle Shape : ANGULAR
Sand/Gravel Hardness : HARD



Client: Freeman Companies, LLC	Project No: GTX-312208
Project: Bridge 05501 Arrowhead Rd Norwalk River	
Location: Wilton, CT	
Boring ID: S-3	Sample Type: bag
Sample ID: S-8	Test Date: 08/25/20
Depth: 20-22	Test Id: 569835
Test Comment: ---	Tested By: GA
Visual Description: Moist, olive silty sand with gravel	Checked By: emm
Sample Comment: ---	

Particle Size Analysis - ASTM D422



% Cobble	% Gravel	% Sand	% Silt & Clay Size
—	39.9	42.5	17.6

Sieve Name	Sieve Size, mm	Percent Finer	Spec. Percent	Complies
1.5 in	37.50	100		
1.0 in	25.00	88		
0.75 in	19.00	80		
0.5 in	12.50	75		
0.375 in	9.50	70		
#4	4.75	60		
#10	2.00	54		
#20	0.85	48		
#40	0.42	39		
#60	0.25	30		
#100	0.15	25		
#140	0.11	21		
#200	0.075	18		

<u>Coefficients</u>	
D ₈₅ = 22.5489 mm	D ₃₀ = 0.2514 mm
D ₆₀ = 4.6909 mm	D ₁₅ = N/A
D ₅₀ = 1.0700 mm	D ₁₀ = N/A
C _u = N/A	C _c = N/A

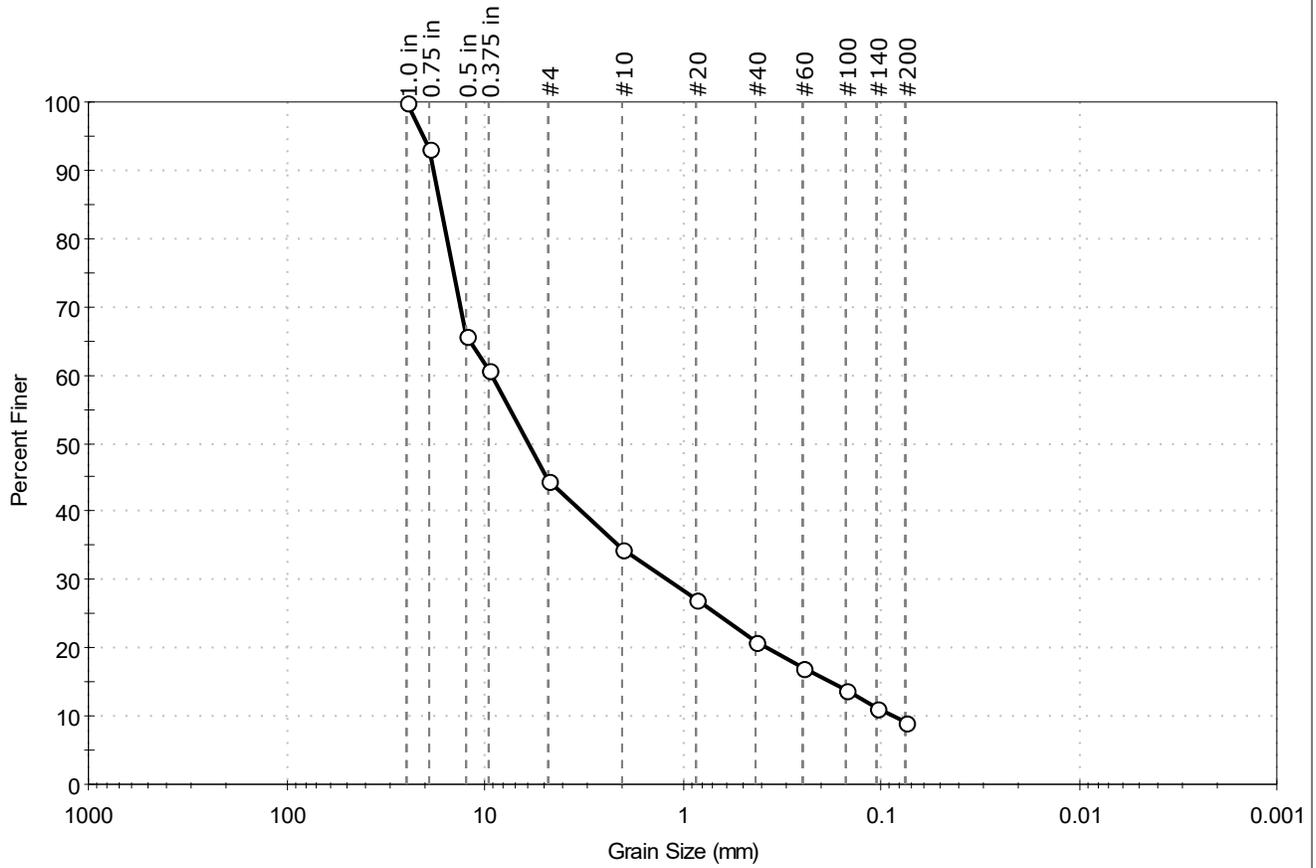
<u>Classification</u>	
ASTM	N/A
AASHTO	Stone Fragments, Gravel and Sand (A-1-b (0))

<u>Sample/Test Description</u>
Sand/Gravel Particle Shape : ANGULAR
Sand/Gravel Hardness : HARD



Client:	Freeman Companies, LLC		
Project:	Bridge 05501 Arrowhead Rd Norwalk River		
Location:	Wilton, CT	Project No:	GTX-312208
Boring ID:	S-4	Sample Type:	bag
Sample ID:	S-7	Test Date:	08/25/20
Depth :	20-22	Test Id:	569836
Test Comment:	---		
Visual Description:	Moist, olive gravel with silt and sand		
Sample Comment:	---		

Particle Size Analysis - ASTM D422



% Cobble	% Gravel	% Sand	% Silt & Clay Size
—	55.4	35.4	9.2

Sieve Name	Sieve Size, mm	Percent Finer	Spec. Percent	Complies
1.0 in	25.00	100		
0.75 in	19.00	93		
0.5 in	12.50	66		
0.375 in	9.50	61		
#4	4.75	45		
#10	2.00	34		
#20	0.85	27		
#40	0.42	21		
#60	0.25	17		
#100	0.15	14		
#140	0.11	11		
#200	0.075	9.2		

<u>Coefficients</u>	
D ₈₅ = 16.7772 mm	D ₃₀ = 1.1882 mm
D ₆₀ = 9.1942 mm	D ₁₅ = 0.1798 mm
D ₅₀ = 5.9973 mm	D ₁₀ = 0.0861 mm
C _u = 106.785	C _c = 1.783

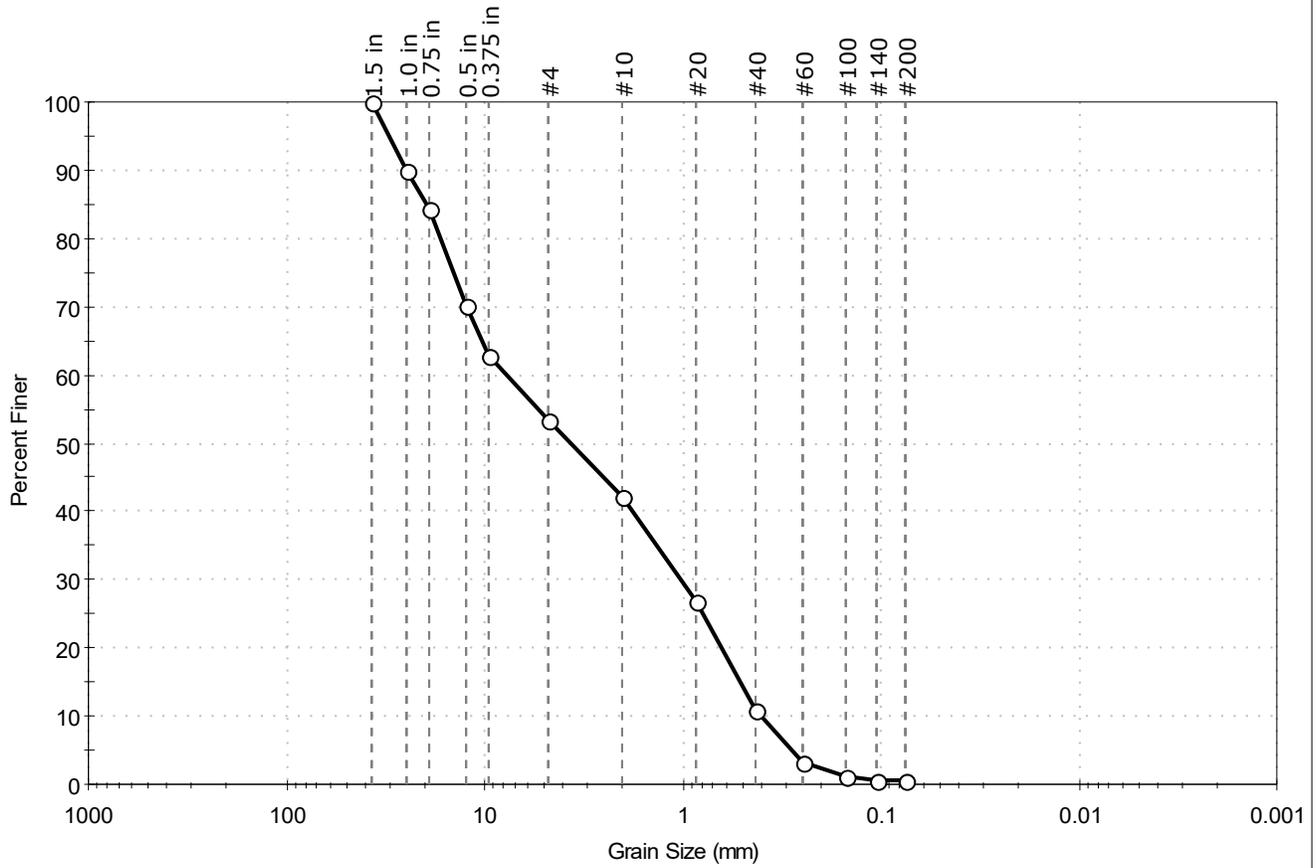
<u>Classification</u>	
ASTM	N/A
AASHTO	Stone Fragments, Gravel and Sand (A-1-a (1))

<u>Sample/Test Description</u>
Sand/Gravel Particle Shape : ANGULAR
Sand/Gravel Hardness : HARD



Client: Freeman Companies, LLC	Project No: GTX-312208
Project: Bridge 05501 Arrowhead Rd Norwalk River	
Location: Wilton, CT	
Boring ID: ---	Sample Type: bag
Sample ID: Sed-1	Test Date: 08/25/20
Depth: SW	Test Id: 569837
Test Comment: ---	Tested By: GA
Visual Description: Moist, dark grayish brown sand with gravel	Checked By: emm
Sample Comment: ---	

Particle Size Analysis - ASTM D422



% Cobble	% Gravel	% Sand	% Silt & Clay Size
—	46.6	52.9	0.5

Sieve Name	Sieve Size, mm	Percent Finer	Spec. Percent	Complies
1.5 in	37.50	100		
1.0 in	25.00	90		
0.75 in	19.00	84		
0.5 in	12.50	70		
0.375 in	9.50	63		
#4	4.75	53		
#10	2.00	42		
#20	0.85	27		
#40	0.42	11		
#60	0.25	3		
#100	0.15	1		
#140	0.11	1		
#200	0.075	0.5		

<u>Coefficients</u>	
D ₈₅ = 19.7169 mm	D ₃₀ = 1.0168 mm
D ₆₀ = 7.7173 mm	D ₁₅ = 0.5088 mm
D ₅₀ = 3.6479 mm	D ₁₀ = 0.3998 mm
C _u = 19.303	C _c = 0.335

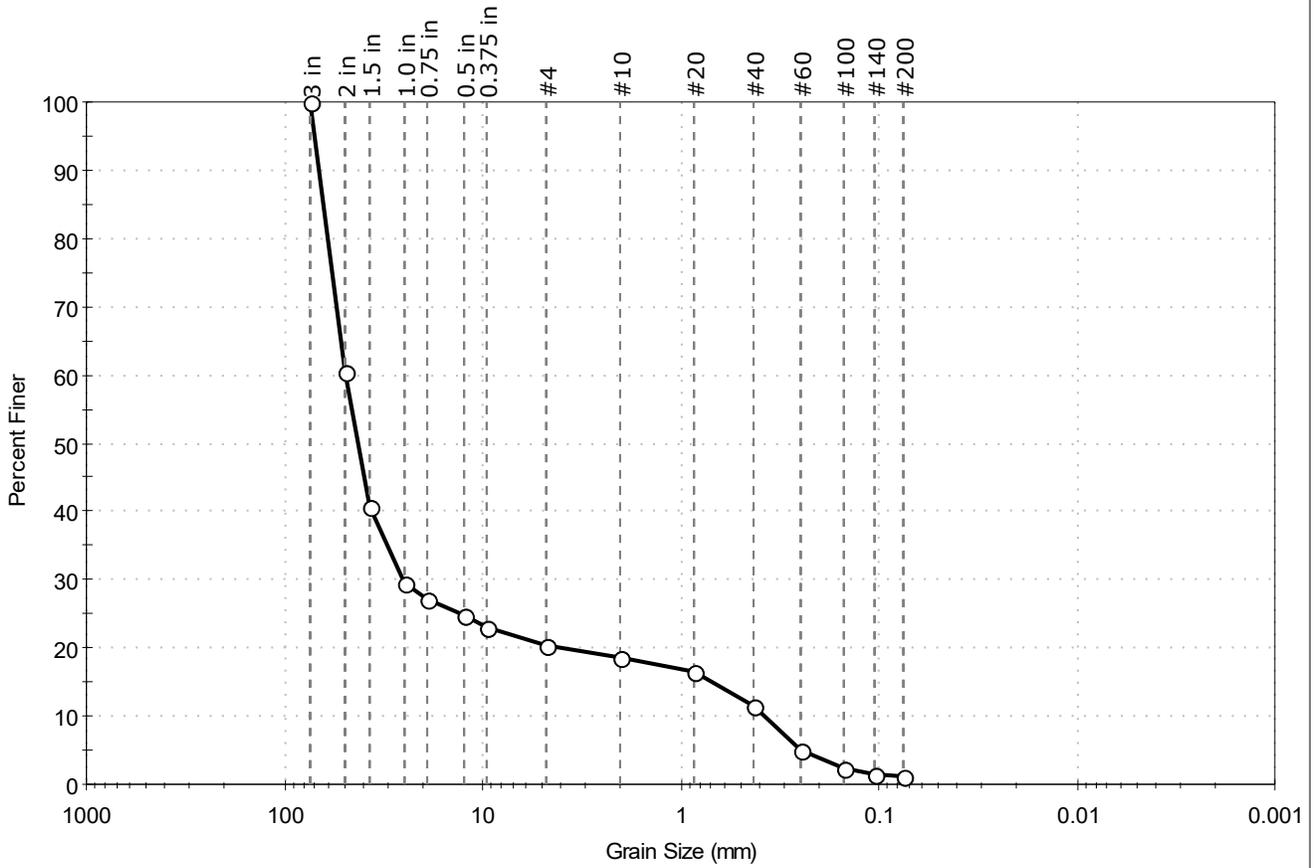
<u>Classification</u>	
<u>ASTM</u>	Poorly graded SAND with Gravel (SP)
<u>AASHTO</u>	Stone Fragments, Gravel and Sand (A-1-a (1))

<u>Sample/Test Description</u>	
Sand/Gravel Particle Shape : ANGULAR	
Sand/Gravel Hardness : HARD	



Client:	Freeman Companies, LLC		
Project:	Bridge 05501 Arrowhead Rd Norwalk River		
Location:	Wilton, CT	Project No:	GTX-312208
Boring ID:	---	Sample Type:	bag
Sample ID:	Sed-2	Test Date:	08/26/20
Depth:	NW	Test Id:	569838
Test Comment:	---		
Visual Description:	Moist, dark grayish brown gravel with sand		
Sample Comment:	---		

Particle Size Analysis - ASTM D422



% Cobble	% Gravel	% Sand	% Silt & Clay Size
—	79.7	19.0	1.3

Sieve Name	Sieve Size, mm	Percent Finer	Spec. Percent	Complies
3 in	75.00	100		
2 in	50.00	61		
1.5 in	37.50	41		
1.0 in	25.00	30		
0.75 in	19.00	27		
0.5 in	12.50	25		
0.375 in	9.50	23		
#4	4.75	20		
#10	2.00	19		
#20	0.85	17		
#40	0.42	12		
#60	0.25	5		
#100	0.15	2		
#140	0.11	2		
#200	0.075	1.3		

<u>Coefficients</u>	
D ₈₅ = 64.2931 mm	D ₃₀ = 25.3683 mm
D ₆₀ = 49.6270 mm	D ₁₅ = 0.6799 mm
D ₅₀ = 42.9208 mm	D ₁₀ = 0.3723 mm
C _u = 133.298	C _c = 34.831

<u>Classification</u>	
<u>ASTM</u>	Poorly graded GRAVEL with Sand (GP)
<u>AASHTO</u>	Stone Fragments, Gravel and Sand (A-1-a (1))

<u>Sample/Test Description</u>	
Sand/Gravel Particle Shape : ROUNDED	
Sand/Gravel Hardness : HARD	



Client:	Freeman Companies, LLC		Project No:	GTX-312208	
Project:	Bridge 05501 Arrowhead Rd Norwalk River				
Location:	Wilton, CT				
Boring ID:	---	Sample Type:	---	Tested By:	tlm
Sample ID:	---	Test Date:	08/21/20	Checked By:	smd
Depth :	---	Test Id:	569840		

**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)
S-2	C-2	83.06-83.43 ft	163	16436	1	Yes	---
S-3	C-3	78-78.5 ft	164	12899	1	No	2,*

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)

- 1: Best effort end preparation. See Tolerance report for details.
- 2: The as-received core did not meet the ASTM side straightness tolerance due to irregularities in the sample as cored.
- 3: Specimen L/D < 2.
- 4: The as-received core did not meet the ASTM minimum diameter tolerance of 1.875 inches.
- 5: Specimen diameter is less than 10 times maximum particle size.
- 6: Specimen diameter is less than 6 times maximum particle size.

*Because the indicated tested specimens did not meet the ASTM D4543 standard tolerances, the results reported here may differ from those for a test specimen within tolerances.



Client:	Freeman Companies, LLC	Test Date:	8/20/2020
Project Name:	Bridge 05501 Arrowhead Rd Norwalk River	Tested By:	cmh
Project Location:	Wilton, CT	Checked By:	smd
GTX #:	312208		
Boring ID:	S-2		
Sample ID:	C-2		
Depth:	83.06-83.43 ft		
Visual Description:	See photographs		

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

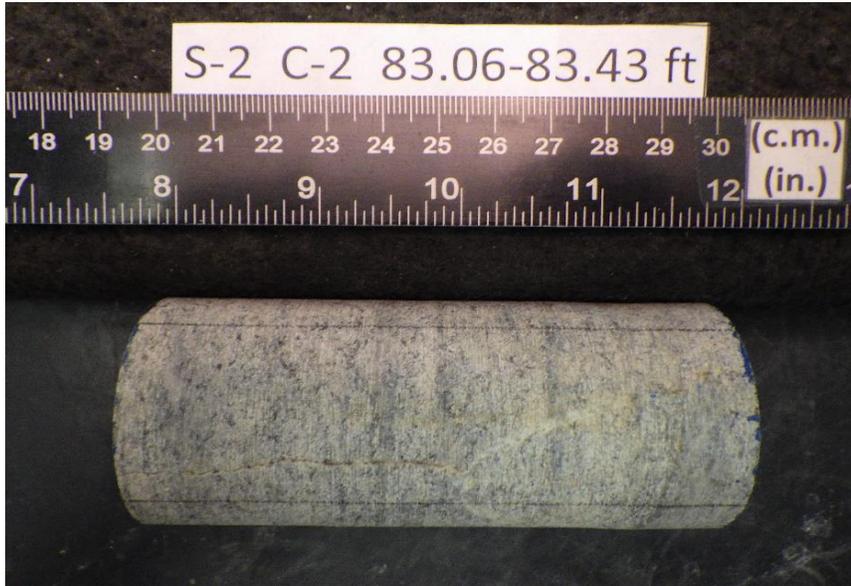
BULK DENSITY				DEVIATION FROM STRAIGHTNESS (Procedure S1)			
	1	2	Average	Maximum gap between side of core and reference surface plate: Is the maximum gap \leq 0.02 in.? YES			
Specimen Length, in:	4.45	4.45	4.45	Maximum difference must be < 0.020 in. Straightness Tolerance Met? YES			
Specimen Diameter, in:	1.99	1.99	1.99				
Specimen Mass, g:	594.6						
Bulk Density, lb/ft ³ :	163						
Length to Diameter Ratio:	2.2						
		Minimum Diameter Tolerance Met?	YES				
		Length to Diameter Ratio 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	0.00050	0.00050	0.00040	0.00030	0.00020	0.00010	-0.00010	0.00000	0.00000	-0.00010	-0.00020	-0.00030	-0.00040	-0.00050	-0.00070
Diameter 2, in (rotated 90°)	-0.00010	-0.00010	-0.00010	-0.00010	-0.00010	-0.00010	-0.00010	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	-0.00010	-0.00010
	Difference between max and min readings, in: 0° = 0.00120 90° = 0.00010														
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	0.00050	0.00050	0.00050	0.00050	0.00040	0.00030	0.00020	0.00000	0.00000	-0.00010	-0.00010	-0.00020	-0.00030	-0.00050	-0.00060
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	-0.00010	-0.00010	-0.00010	-0.00010
	Difference between max and min readings, in: 0° = 0.0011 90° = 0.0001 Maximum difference must be < 0.0020 in. Difference = \pm 0.00060 Flatness Tolerance Met? YES														

	<p>DIAMETER 1</p> <p>End 1: Slope of Best Fit Line: 0.00064 Angle of Best Fit Line: 0.03651</p> <p>End 2: Slope of Best Fit Line: 0.00066 Angle of Best Fit Line: 0.03765</p> <p>Maximum Angular Difference: 0.00115</p> <p>Parallelism Tolerance Met? YES Spherically Seated</p> <hr/> <p>DIAMETER 2</p> <p>End 1: Slope of Best Fit Line: 0.00004 Angle of Best Fit Line: 0.00246</p> <p>End 2: Slope of Best Fit Line: 0.00006 Angle of Best Fit Line: 0.00360</p> <p>Maximum Angular Difference: 0.00115</p> <p>Parallelism Tolerance Met? YES Spherically Seated</p>
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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	0.00120	1.990	0.00060	0.035	YES
Diameter 2, in (rotated 90°)	0.00010	1.990	0.00005	0.003	YES
	Perpendicularity Tolerance Met? YES				
END 2					
Diameter 1, in	0.00110	1.990	0.00055	0.032	YES
Diameter 2, in (rotated 90°)	0.00010	1.990	0.00005	0.003	YES

Client:	Freeman Companies, LLC
Project Name:	Bridge 05501 Arrowhead Rd Norwalk River
Project Location:	Wilton, CT
GTX #:	312208
Test Date:	8/21/2020
Tested By:	cmh
Checked By:	smd
Boring ID:	S-2
Sample ID:	C-2
Depth, ft:	83.06-83.43



After cutting and grinding



After break



Client:	Freeman Companies, LLC	Test Date:	8/20/2020
Project Name:	Bridge 05501 Arrowhead Rd Norwalk River	Tested By:	cmh
Project Location:	Wilton, CT	Checked By:	smd
GTX #:	312208		
Boring ID:	S-3		
Sample ID:	C-3		
Depth:	78-78.5 ft		
Visual Description:	See photographs		

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

BULK DENSITY				DEVIATION FROM STRAIGHTNESS (Procedure S1)			
	1	2	Average	Maximum gap between side of core and reference surface plate: Is the maximum gap \leq 0.02 in.? NO			
Specimen Length, in:	4.35	4.35	4.35	Maximum difference must be < 0.020 in.			
Specimen Diameter, in:	1.95	1.95	1.95	Straightness Tolerance Met? NO			
Specimen Mass, g:	561.21						
Bulk Density, lb/ft ³ :	164						
Length to Diameter Ratio:	2.2						
		Minimum Diameter Tolerance Met?	YES				
		Length to Diameter Ratio 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	-0.00070	-0.00070	-0.00060	-0.00050	-0.00040	-0.00020	-0.00010	0.00000	0.00020	0.00020	0.00030	0.00040	0.00050	0.00070	0.00070
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	0.00000	0.00000	0.00000
	Difference between max and min readings, in: 0° = 0.00140 90° = 0.00000														
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	-0.00070	-0.00070	-0.00070	-0.00060	-0.00040	-0.00020	-0.00010	0.00000	0.00000	0.00010	0.00020	0.00030	0.00040	0.00050	0.00060
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	0.00000	0.00000	0.00000
	Difference between max and min readings, in: 0° = 0.0013 90° = 0														
	Maximum difference must be < 0.0020 in. Difference = \pm 0.00070														
	Flatness Tolerance Met? YES														

		<p>DIAMETER 1</p> <p>End 1: Slope of Best Fit Line: 0.00087 Angle of Best Fit Line: 0.04993</p> <p>End 2: Slope of Best Fit Line: 0.00080 Angle of Best Fit Line: 0.04567</p> <p>Maximum Angular Difference: 0.00426</p> <p>Parallelism Tolerance Met? YES Spherically Seated</p>

PERPENDICULARITY (Procedure P1) (Calculated from End Flatness and Parallelism measurements above)						Maximum angle of departure must be \leq 0.25°	
END 1	Difference, Maximum and Minimum (in.)	Diameter (in.)	Slope	Angle°	Perpendicularity Tolerance Met?		
Diameter 1, in	0.00140	1.950	0.00072	0.041	YES		
Diameter 2, in (rotated 90°)	0.00000	1.950	0.00000	0.000	YES	Perpendicularity Tolerance Met? YES	
END 2							
Diameter 1, in	0.00130	1.950	0.00067	0.038	YES		
Diameter 2, in (rotated 90°)	0.00000	1.950	0.00000	0.000	YES		

Client:	Freeman Companies, LLC
Project Name:	Bridge 05501 Arrowhead Rd Norwalk River
Project Location:	Wilton, CT
GTX #:	312208
Test Date:	8/21/2020
Tested By:	cmh
Checked By:	smd
Boring ID:	S-3
Sample ID:	C-3
Depth, ft:	78-78.5



After cutting and grinding



After break

Minimum Rates and Classifications for Heavy/Highway Construction

ID#: 22-42307

**Connecticut Department of Labor
Wage and Workplace Standards**

By virtue of the authority vested in the Labor Commissioner under provisions of Section 31-53 of the General Statutes of Connecticut, as amended, the following are declared to be the prevailing rates and welfare payments and will apply only where the contract is advertised for bid within 20 days of the date on which the rates are established. Any contractor or subcontractor not obligated by agreement to pay to the welfare and pension fund shall pay this amount to each employee as part of his/her hourly wages.

Project Number: 161-143

Project Town: Wilton

State#:

FAP#:

Project: Replacement of Bridge No. 05501 Arrowhead Road Over Norwalk River

CLASSIFICATION	Hourly Rate	Benefits
1) Boilermaker	44.46	28.51
1a) Bricklayer, Cement Masons, Cement Finishers, Plasterers, Stone Masons	38.27	34.47
2) Carpenters, Piledrivermen	36.07	26.15
2a) Diver Tenders	36.07	26.15
3) Divers	44.53	26.15
03a) Millwrights	36.32	26.81
4) Painters: (Bridge Construction) Brush, Roller, Blasting (Sand, Water, etc.), Spray	55.0	23.75
4a) Painters: Brush and Roller	37.22	23.40
4b) Painters: Spray Only	39.42	22.90

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4c) Painters: Steel Only	38.42	22.90
4d) Painters: Blast and Spray	40.22	23.40
4e) Painters: Tanks, Tower and Swing	39.22	23.40
4f) Elevated Tanks (60 feet and above)	46.22	23.40
5) Electrician (Trade License required: E-1,2 L-5,6 C-5,6 T-1,2 L-1,2 V-1,2,7,8,9)	41.4	31.07+3% of gross wage
6) Ironworkers: Ornamental, Reinforcing, Structural, and Precast Concrete Erection	39.7	38.77 + a
7) Plumbers (Trade License required: (P-1,2,6,7,8,9 J-1,2,3,4 SP-1,2) and Pipefitters (Including HVAC Work) (Trade License required: S-1,2,3,4,5,6,7,8 B-1,2,3,4 D-1,2,3,4 G-1, G-2, G-8, G-9)	47.03	34.05
----LABORERS----		
8) Group 1: Laborer (Unskilled), Common or General, acetylene burner, concrete specialist	32.0	24.40
9) Group 2: Chain saw operators, fence and guard rail erectors, pneumatic tool operators, powdermen	32.25	24.40
10) Group 3: Pipelayers	32.5	24.40
11) Group 4: Jackhammer/Pavement breaker (handheld); mason tenders (cement/concrete), catch basin builders, asphalt rakers, air track operators, block paver, curb setter and forklift operators	32.5	24.40

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12) Group 5: Toxic waste removal (non-mechanical systems)	34.0	24.40
13) Group 6: Blasters	33.75	24.40
Group 7: Asbestos/lead removal, non-mechanical systems (does not include leaded joint pipe)	33.0	24.40
Group 8: Traffic control signalmen	18.0	24.40
Group 9: Hydraulic Drills	32.75	24.40
----LABORERS (TUNNEL CONSTRUCTION, FREE AIR). Shield Drive and Liner Plate Tunnels in Free Air.----		
13a) Miners, Motormen, Mucking Machine Operators, Nozzle Men, Grout Men, Shaft & Tunnel Steel & Rodmen, Shield & Erector, Arm Operator, Cable Tenders	34.23	24.40 + a
13b) Brakemen, Trackmen, Miners' Helpers and all other men	33.26	24.40 + a
----CLEANING, CONCRETE AND CAULKING TUNNEL----		
14) Concrete Workers, Form Movers, and Strippers	33.26	24.40 + a
15) Form Erectors	33.59	24.40 + a
----ROCK SHAFT LINING, CONCRETE, LINING OF SAME AND TUNNEL IN FREE AIR:----		
16) Brakemen, Trackmen, Tunnel Laborers, Shaft Laborers, Miners Helpers	33.26	24.40 + a
17) Laborers Topside, Cage Tenders, Bellman	33.15	24.40 + a

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18) Miners	34.23	24.40 + a
----TUNNELS, CAISSON AND CYLINDER WORK IN COMPRESSED AIR: ----		
18a) Blaster	40.72	24.40 + a
19) Brakemen, Trackmen, Groutman, Laborers, Outside Lock Tender, Gauge Tenders	40.52	24.40 + a
20) Change House Attendants, Powder Watchmen, Top on Iron Bolts	38.54	24.40 + a
21) Mucking Machine Operator, Grout Boss, Track Boss	41.31	24.40 + a
----TRUCK DRIVERS----(*see note below)		
Two Axle Trucks, Helpers	31.16	28.78 + a
Three Axle Trucks; Two Axle Ready Mix	31.27	28.78 + a
Three Axle Ready Mix	31.33	28.78 + a
Four Axle Trucks	31.39	28.78 + a
Four Axle Ready-Mix	31.44	28.78 + a
Heavy Duty Trailer (40 tons and over)	33.66	28.78 + a
Specialized earth moving equipment other than conventional type on-the road trucks and semi-trailer (including Euclids)	31.44	28.78 + a

As of: November 28, 2022

Heavy Duty Trailer (up to 40 tons)	32.39	28.78 + a
Snorkle Truck	31.54	28.78 + a
----POWER EQUIPMENT OPERATORS----		
Group 1: Crane Handling or Erecting Structural Steel or Stone, Hoisting Engineer (2 drums or over). (Trade License Required)	50.27	26.80 + a
Group 1a: Front End Loader (7 cubic yards or over); Work Boat 26 ft. and over.	46.07	26.80 + a
Group 2: Cranes (100 ton rate capacity and over); Bauer Drill/Caisson. (Trade License Required)	49.91	26.80 + a
Group 2a: Cranes (under 100 ton rated capacity).	49.06	26.80 + a
Group 2b: Excavator over 2 cubic yards; Pile Driver (\$3.00 premium when operator controls hammer).	45.71	26.80 + a
Group 3: Excavator; Gradall; Master Mechanic; Hoisting Engineer (all types of equipment where a drum and cable are used to hoist or drag material regardless of motive power of operation), Rubber Tire Excavator (Drott-1085 or similar); Grader Operator; Bulldozer Fine Grade (slopes, shaping, laser or GPS, etc.). (Trade License Required)	44.86	26.80 + a
Group 4: Trenching Machines; Lighter Derrick; CMI Machine or Similar; Koehring Loader (Skooper).	44.42	26.80 + a
Group 5: Specialty Railroad Equipment; Asphalt Paver; Asphalt Spreader; Asphalt Reclaiming Machine; Line Grinder; Concrete Pumps; Drills with Self Contained Power Units; Boring Machine; Post Hole Digger; Auger; Pounder; Well Digger; Milling Machine (over 24" mandrel)	43.73	26.80 + a

Group 5 continued: Side Boom; Combination Hoe and Loader; Directional Driller.	43.73	26.80 + a
Group 6: Front End Loader (3 up to 7 cubic yards); Bulldozer (rough grade dozer).	43.38	26.80 + a
Group 7: Asphalt Roller; Concrete Saws and Cutters (ride on types); Vermeer Concrete Cutter; Stump Grinder; Scraper; Snooper; Skidder; Milling Machine (24" and under Mandrel)	42.99	26.80 + a
Group 8: Mechanic, Grease Truck Operator, Hydroblaster, Barrier Mover, Power Stone Spreader; Welder; Work Boat under 26 ft.; Transfer Machine.	42.54	26.80 + a
Group 9: Front End Loader (under 3 cubic yards), Skid Steer Loader regardless of attachments (Bobcat or Similar); Fork Lift, Power Chipper; Landscape Equipment (including hydroseeder), Vacuum Excavation Truck and Hydrovac Excavation Truck (27 HG pressure or greater).	42.04	26.80 + a
Group 10: Vibratory Hammer, Ice Machine, Diesel and Air Hammer, etc.	39.7	26.80 + a
Group 11: Conveyor, Earth Roller; Power Pavement Breaker (whiphammer), Robot Demolition Equipment.	39.7	26.80 + a
Group 12: Wellpoint Operator.	39.63	26.80 + a
Group 13: Compressor Battery Operator.	38.97	26.80 + a
Group 14: Elevator Operator; Tow Motor Operator (Solid Tire No Rough Terrain).	37.66	26.80 + a
Group 15: Generator Operator; Compressor Operator; Pump Operator; Welding Machine Operator; Heater Operator.	37.2	26.80 + a
Group 16: Maintenance Engineer.	36.46	26.80 + a

As of: November 28, 2022

Group 17: Portable Asphalt Plant Operator; Portable Crusher Plant Operator; Portable Concrete Plant Operator., Portable Grout Plant Operator, Portable Water Filtration Plant Operator.	41.39	26.80 + a
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Group 18: Power Safety Boat; Vacuum Truck; Zim Mixer; Sweeper; (minimum for any job requiring CDL license).	38.61	26.80 + a
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**NOTE: SEE BELOW

----LINE CONSTRUCTION----(Railroad Construction and Maintenance)----

20) Lineman, Cable Splicer, Technician	48.19	6.5% + 22.00
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21) Heavy Equipment Operator	42.26	6.5% + 19.88
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22) Equipment Operator, Tractor Trailer Driver, Material Men	40.96	6.5% + 19.21
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23) Driver Groundmen	26.5	6.5% + 9.00
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23a) Truck Driver	40.96	6.5% + 17.76
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----LINE CONSTRUCTION----

24) Driver Groundmen	30.92	6.5% + 9.70
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25) Groundmen	22.67	6.5% + 6.20
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26) Heavy Equipment Operators	37.1	6.5% + 10.70
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27) Linemen, Cable Splicers, Dynamite Men 41.22 6.5% + 12.20

28) Material Men, Tractor Trailer Drivers, Equipment Operators 35.04 6.5% + 10.45

Welders: Rate for craft to which welding is incidental.

**Note: Hazardous waste removal work receives additional \$1.25 per hour for truck drivers.*

***Note: Hazardous waste premium \$3.00 per hour over classified rate*

Crane with 150 ft. boom (including jib) - \$1.50 extra

Crane with 200 ft. boom (including jib) - \$2.50 extra

Crane with 250 ft. boom (including jib) - \$5.00 extra

Crane with 300 ft. boom (including jib) - \$7.00 extra

Crane with 400 ft. boom (including jib) - \$10.00 extra

All classifications that indicate a percentage of the fringe benefits must be calculated at the percentage rate times the "base hourly rate".

Apprentices duly registered under the Commissioner of Labor's regulations on "Work Training Standards for Apprenticeship and Training Programs" Section 31-51-d-1 to 12, are allowed to be paid the appropriate percentage of the prevailing journeymen hourly base and the full fringe benefit rate, providing the work site ratio shall not be less than one full-time journeyman instructing and supervising the work of each apprentice in a specific trade.

--Connecticut General Statute Section 31-55a: Annual Adjustments to wage rates by contractors doing state work
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The Prevailing wage rates applicable to this project are subject to annual adjustments each July 1st for the duration of the project.

Each contractor shall pay the annual adjusted prevailing wage rate that is in effect each July 1st, as posted by the Department of Labor.

It is the contractor's responsibility to obtain the annual adjusted prevailing wage rate increases directly from the Department of Labor's website.

The annual adjustments will be posted on the Department of Labor's Web page:

www.ct.gov/dol. For those without internet access, please contact the division listed below.

The Department of Labor will continue to issue the initial prevailing wage rate schedule to the Contracting Agency for the project.

All subsequent annual adjustments will be posted on our Web Site for contractor access.

Contracting Agencies are under no obligation pursuant to State labor law to pay any increase due to the annual adjustment provision.

Effective October 1, 2005 - Public Act 05-50: any person performing the work of any mechanic, laborer, or worker shall be paid prevailing wage

All Person who perform work ON SITE must be paid prevailing wage for the appropriate mechanic, laborer, or worker classification.

All certified payrolls must list the hours worked and wages paid to All Persons who perform work ON SITE regardless of their ownership i.e.: (Owners, Corporate Officers, LLC Members, Independent Contractors, et. al)

Reporting and payment of wages is required regardless of any contractual relationship alleged to exist between the contractor and such person.

As of: November 28, 2022

--Unlisted classifications needed for work not included within the scope of the classifications listed may be added after award only as provided in the labor standards contract clause (29 CFR 5.5 (a) (1) (ii)).

Please direct any questions which you may have pertaining to classification of work and payment of prevailing wages to the Wage and Workplace Standards Division, telephone (860)263-6790.

ITEM #0406194A – JOINT AND CRACK SEALING OF BITUMINOUS CONCRETE PAVEMENT

Description: This work consists of furnishing and applying hot-applied asphalt crack sealer to bituminous concrete pavement joints and cracks. It shall be constructed in close conformity with the lines, grades, thicknesses, and typical cross sections shown on the plans or established by the Engineer. Joint and Crack Sealing of Bituminous Concrete Pavement may be used in conjunction with other repair treatments including joint and crack filling or patching, in which case the sequence of treatments will be provided in the Plans or directed by the Engineer.

For the purposes of this document, the word “crack” includes all longitudinal (along the direction of travel) and transverse (perpendicular to the direction of travel) cracks and joints. All work specified for “crack(s)” herein shall apply to all types of cracks and joints unless otherwise specified.

Materials:

1. Crack Seal: The crack seal material shall be composed of a hot-applied asphalt meeting ASTM D6690 Type II requirements. The Contractor must submit to the Engineer all Material Safety Data Sheet documents from the material manufacturer prior to the commencement of work. During work progress, the Contractor must submit to the Engineer the manufacturer’s Material Certificate for compliance to ASTM D6690 Type II requirements for each batch or lot of material utilized on the Contract.
2. Optional Barrier Material – Backer Rod: The backer rod shall be a heat resistant material compatible with the crack sealant and acceptable to the manufacturer of the sealant. No bond or reaction shall occur between the sealant and the rod. It shall be of a non-water absorbent material and shall not melt or shrink when hot sealant is poured on it.

The backer rod shall have a maximum of 5% absorption when immersed in water for 24 hours with the ends sealed. The backer rod shall be of such a size that compression is required for installation in the crack, so that it maintains its position during the sealing operation. Backer rod shall be dry.

3. Optional Barrier Material – Hot Mix Asphalt (HMA): Any HMA placed in the bottom of a crack between 1.5 and 2 inches wide shall be HMA S0.25 Traffic Level 2 and shall meet all requirements of Section 4.06 - Bituminous Concrete.

The Contractor must submit to the Engineer all Material Safety Data Sheet documents from the material manufacturer(s) prior to the commencement of work. During work progress, the Contractor must submit to the Engineer the manufacturer’s Material Certificate for compliance to applicable specifications for each batch or lot of material utilized on the Contract.

Construction Methods: The crack sealing operation shall proceed in accordance with the requirements of the “Maintenance and Protection of Traffic” and “Prosecution and Progress” specifications.

1. Equipment: The equipment used by the Contractor shall include, but not be limited to, the following:
 - a. **Melter Applicator:** The unit shall consist of a boiler kettle equipped with pressure pump, hose, and applicator wand; the boiler kettle may be a combination melter and pressurized applicator of a double-boiler type with space between the inner and outer shells filled with heat transfer oil. Heat transfer oil shall have a flash point of not less than 600°F. The kettle shall include a temperature control indicator. The kettle shall be capable of maintaining the crack seal material at the manufacturer’s specified application temperature range. The kettle shall include an insulated applicator hose and application wand. The hose shall be equipped with a shutoff control. The kettle shall include a mechanical full sweep agitator to provide continuous blending. The unit shall be equipped with thermometers to monitor the material temperature and the heating oil temperature. The unit shall be equipped with thermostatic controls that allow the operator to regulate material temperature up to at least 425°F.
 - b. **Application Wand and Squeegee Applicator:** The material shall be applied with a wand followed by a squeegee applicator. The squeegee applicator shall be of commercial/industrial quality designed with a “U” shaped configuration. It shall be of a size adequate to strike off, flush with the surrounding pavement surface and without overflow around the sides, all crack seal material placed. This tool shall be either attached to the applicator wand or used separately as its own long handled tool.
 - c. **Hot Air Lance:** The unit shall be designed for cleaning and drying the pavement surface cracks. Minimum compressed air capacity shall be 100 psi. The compressed air emitted from the tip of the lance shall be capable of achieving a temperature of at least 1500°F.
 - d. **Vertically Mounted Power Driven Wire Brush:** This tool shall be used to remove any dirt, debris, or vegetation to the depths specified that cannot be removed by the hot air lance. It shall be of adequate size and power to remove all material from cracks as specified.
2. Weather Requirements: Work shall not be performed unless the pavement is dry. No frost, snow, ice, or standing water may be present on the roadway surface or within the cracks. The ambient temperature must be 40°F and rising during the field application operations for work to proceed.
3. Material Mixing Procedure: The prepackaged material shall be added to the melter applicator in the presence of the Engineer. It shall then be mixed and heated to the recommended application temperature. The crack seal material shall never exceed 400°F.

4. Determination of Cracks to be Sealed: The width and depth requirements for cracks to be sealed are as follows:

All crack width determinations shall be made by measuring the crack width flush at the surface of the pavement prior to being sealed. A straightedge shall be used whenever necessary to establish the location or limits of the flush surface of the pavement.

All cracks from $\frac{1}{8}$ inch up to 1.5 inches wide shall be prepared and sealed as stated below. Cracks that are between $\frac{1}{8}$ inch and 1.5 inches wide, but eventually taper in width below the minimum $\frac{1}{8}$ inch, shall also be prepared and sealed as stated below. Only cracks that are less than $\frac{1}{8}$ inch wide throughout their entire length shall be excluded.

Transverse cracks, where a portion of the crack (50% or less) exceeds a width of 1.5 inches, up to 2 inches, shall also be prepared and sealed as stated below.

All joints to be sealed that are raveled (loss of the pavement surface material) shall be at least $\frac{1}{2}$ inch in depth at the joint's deepest point. The minimum width of a raveled joint must be $\frac{1}{2}$ inch. The maximum width of a raveled joint to be sealed is 3 inches.

Any cracks exceeding the width and depth requirements specified above shall be repaired using separate items.

5. Crack Preparation: Cracks to be sealed shall be treated with a hot air lance prior to application of the crack seal material. Two (2) passes minimum shall be made with the hot air lance. The hot air lance operation shall proceed at a rate no greater than 120 feet per minute. There shall be no more than 10 minutes between the second hot air lance treatment and the material application.

The use of the hot air lance is not intended to heat the crack. It is to be used to blow all debris from the crack to the depths specified below and to remove any latent moisture from the crack until the inside of the crack is completely dry as determined by the Engineer. "Moisture" does not include standing water. The hot air lance is not to be used to boil off or blow standing water from the bottom of a crack. If standing water is present in the bottom of any crack, the sealing operation shall be postponed until such time that the standing water evaporates naturally. The Contractor may use compressed, oil-free air (not heated) to blow standing water from a crack to help accelerate the natural evaporation process. If standing water remains after using compressed air, the crack shall be allowed to dry naturally until remaining standing water evaporates. The hot air lance shall be used after visible water has evaporated. If a crack is already completely dry as determined by the Engineer, the hot air lance shall be operated at its lowest temperature possible.

The hot air lance is to be used to blow all debris from cracks (not including raveled joints) to a depth of at least $\frac{3}{4}$ inch for cracks between $\frac{1}{8}$ inch and $\frac{3}{4}$ inch wide, and to a depth of 1.25 inches for cracks between $\frac{3}{4}$ inch and 2 inches wide. The hot air lance shall be used to blow

all debris from raveled joints to a depth of 1 inch or the full depth of the joint, whichever is smaller.

In the event that cracks are packed tightly with debris, dirt, vegetation, or other material, except previously placed sealant or filler, the Contractor shall use a vertically mounted power driven wire brush to remove all material and burnish the sides of the crack to the depths specified above. Cracks treated with the power driven wire brush shall subsequently be treated with a hot air lance as described in this section. The use of both the power driven wire brush and the hot air lance shall result in the complete removal of all material in the crack (except previously placed sealant or filler) to the depths specified above such that the sides of the crack are completely free and clean of any debris and moisture.

In the event that cracks have depths greater than 2 inches below the pavement surface, the Contractor may place a barrier composed of backer rod as specified herein. The backer rod shall be placed in a manner leaving 1.25 inches below the elevation of the pavement surface for crack seal material. Use of backer rod will not be allowed for cracks wider than 1.5 inches or less than ½ inch wide. For cracks between 1.5 and 2 inches wide, HMA S0.25 Traffic Level 2 may be placed in the bottom of the prepared crack. HMA shall be placed and compacted with a steel T-bar approved by the Engineer in a manner leaving 1.25 inches below the elevation of the pavement surface for crack seal material.

6. Crack Sealing: As soon as cracks have been prepared, they shall be filled to refusal along their entire length with the crack sealant material. The treatment material shall be maintained at the manufacturer's specified/recommended application temperature range at all times. The sealing operation shall be suspended if the temperature of the crack seal material falls outside the specified temperature range and shall remain suspended until the crack seal material is brought within the specified temperature range. Sealed cracks are to be squeegeed immediately following application of the crack seal material, striking excess sealer flat to the adjacent pavement surface. There shall be no build-up of treatment material above or adjacent to the crack at any time. If the initial application of crack sealant material fails to fill the crack or shrinks upon cooling such that there is a depression formed of at least ¼ inch or greater, a second application of sealant shall be placed over the first application.
7. Protection of Sealed Cracks: Traffic shall not be permitted on the pavement until the crack seal material is set so that the material does not track and is not deformed or pulled out by tires. If the work under this item is being performed prior to placing a hot mix overlay or other surface treatment, a detackifier or blotting agent will not be allowed. If work under this item is not followed by placement of an overlay of any kind, a detackifier or blotting agent may be used. If a detackifier or blotting agent is used, it shall be one recommended by the supplier of the crack seal material and shall be used as recommended by the supplier, except that no paper, cotton, or other organic materials shall be allowed. Information on the type and usage of a detackifier or blotting agent shall be presented to the Engineer for their written acceptance prior to use.

8. Removal and Disposal of Material: All debris generated from the operations described above shall be removed from the roadway by the Contractor.

Treatment material remaining in the Contractor's kettle at the close of the daily work session shall be discarded. At no time shall treatment material be re-heated for use in subsequent crack sealing applications unless permitted by the Engineer following a review of specific circumstances.

All debris and surplus treatment material shall be properly disposed in accordance with Article 1.10.03 and State of Connecticut law.

9. Acceptance of Work: When work is complete, an inspection shall be scheduled with the Engineer. The Engineer will note all deficiencies including, but not limited to, areas exhibiting adhesion failure, cohesion failure, tracking of sealant material, and missed cracks. Work identified by the Engineer as not acceptable shall be repaired at the Contractor's expense. The Contractor shall notify the Engineer upon completion of any corrective work performed.

Method of Measurement: This work will be measured by the total number of linear feet of cracks sealed as indicated in the Contract plans and as measured, verified, and accepted by the Engineer.

Basis of Payment: This work will be paid for at the Contract unit price per linear foot for "Joint and Crack Sealing of Bituminous Concrete Pavement" complete and accepted in place. The price shall include all submittals, materials, equipment, tools, and labor incidental thereto. No payment will be made to the Contractor prior to submittal of required documents.

Pay Item	Pay Unit
Joint and Crack Sealing of Bituminous Concrete Pavement	l.f.

**TOWN OF WILTON, CT
SCHEDULE OF PRICES
FOR THE CONSTRUCTION OF
STATE PROJECT NO. 0161-0143, FAP #6161(011)CN
REPLACEMENT OF BRIDGE NO. 05501
ARROWHEAD ROAD OVER NORWALK RIVER
IN THE TOWN OF WILTON**

DATE OF
BID OPENING **December 21, 2022**

TIME: **10:00 A.M. NO BIDS WILL BE ACCEPTED AFTER 10:00 A.M. "NO EXCEPTIONS"**

Note: The bidder shall fill in, under the column "Unit Prices Bid," the unit prices, written in words and in numbers, for which he proposes to perform the various items of work called for, and under the column headed "Amount," the amount of each of the items at the unit price bid. After the proposal is opened and read, the quantities will be extended and totaled in accordance with the written bid prices and the bid will be verified or corrected.

Item Number	Items	Unit	Approximate Quantities	Unit Prices Bid		Amount (Figures)
				Figures	Writing	
0201001A	CLEARING AND GRUBBING	L.S.	1			
0202000	EARTH EXCAVATION	C.Y.	314			
0202216A	EXCAVATION AND REUSE OF EXISTING CHANNEL BOTTOM MATERIAL	C.Y.	2			
0202529	CUT BITUMINOUS CONCRETE PAVEMENT	L.F.	258			
0202639A	MONITORING WELL	EA.	1			
0203202	STRUCTURE EXCAVATION - EARTH (EXCLUDING COFFERDAM AND DEWATERING)	C.Y.	241			
0204001	COFFERDAM AND DEWATERING	L.F.	325			
0204151A	HANDLING WATER	L.S.	1			
0207000	BORROW	C.Y.	165			
0209001	FORMATION OF SUBGRADE	S.Y.	2,005			
0212000	SUBBASE	C.Y.	50			
0213100	GRANULAR FILL	C.Y.	19			
0216000	PERVIOUS STRUCTURE BACKFILL	C.Y.	184			
0219001	SEDIMENTATION CONTROL SYSTEM	L.F.	781			
0219011A	SEDIMENT CONTROL SYSTEM AT CATCH BASIN	EA.	4			
0304002	PROCESSED AGGREGATE BASE	C.Y.	140			
0305001	PROCESSED AGGREGATE	C.Y.	75			
0402401A	SAWING AND SEALING JOINTS IN BITUMINOUS CONCRETE PAVEMENT	L.F.	46			
0406002A	TEMPORARY PAVEMENT	S.Y.	354			
0406171	HMA S0.5	TON	95			
0406172	HMA S0.375	TON	123			
0406173	HMA S0.25	TON	35			
0406194A	JOINT AND CRACK SEALING OF BITUMINOUS CONCRETE PAVEMENT	L.F.	108			
0406236	MATERIAL FOR TACK COAT	GAL	101			
0406999A	ASPHALT ADJUSTMENT COST (ESTIMATED COST)	EST	1	\$7,700.00	Seven Thousand Seven Hundred Dollars and Zero Cents	\$7,700.00
0409001	FINE MILLING OF BITUMINOUS CONCRETE (0"-4")	S.Y.	94			
0502195A	TEMPORARY BRIDGE	L.S.	1			
0503001	REMOVAL OF SUPERSTRUCTURE	L.S.	1			
0507500	TYPE "D-G" ENDWALL	EA.	2			
0507554	RESET FRAME AND GRATE FOR CATCH BASIN	EA.	2			
0514203A	PRESTRESSED DECK UNITS (3'-0" X 1'-6")	L.F.	101			
0514223A	PRESTRESSED DECK UNITS (4'-0" X 1'-6")	L.F.	253			
0520036A	ASPHALTIC PLUG EXPANSION JOINT SYSTEM	C.F.	34			
0520041A	PREFORMED JOINT SEAL	L.F.	102			
0521001	ELASTOMERIC BEARING PADS	C.I.	9,144			
0601054A	ULTRA HIGH PERFORMANCE CONCRETE	C.Y.	3			
0601064	ABUTMENT AND WALL CONCRETE	C.Y.	65			
0601121	PARAPET CONCRETE	L.F.	136			

Kindly insert here the total amount of your Bid \$ _____
It is understood that the unit prices shall govern in case of discrepancy between the unit-prices and this amount.
This bid includes addenda no.: 1

TOWN OF WILTON, CT
STATE PROJECT NO. 0161-0143, FAP #6161(011)CN
FOR THE CONSTRUCTION OF
STATE PROJECT NO. 0161-0143, FAP #6161(011)CN
REPLACEMENT OF BRIDGE NO. 05501
ARROWHEAD ROAD OVER NORWALK RIVER
IN THE TOWN OF WILTON

DATE OF
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Item Number	Items	Unit	Approximate Quantities	Unit Prices Bid		Amount (Figures)
				Figures	Writing	
0601123	APPROACH SLAB CONCRETE	C.Y.	34			
0601504	1" PREFORMED EXPANSION JOINT FILLER FOR BRIDGES	S.F.	121			
0601640	1" CLOSED CELL ELASTOMER	C.I.	15,840			
0602030	DEFORMED STEEL BARS - GALVANIZED	LB.	18,736			
0603474A	METALLIZING STRUCTURAL STEEL (SITE NO. 1)	L.S.	1			
0605003A	MASONRY FACING	S.F.	327			
0651011	12" R.C. PIPE	L.F.	322			
0653001	CLEAN EXISTING CATCH BASIN	EA.	3			
0653002A	CLEAN DRAINAGE SYSTEM	L.S.	1			
0686950.10	REMOVE EXISTING PIPE - 0' - 10' DEEP	L.F.	322			
0702101	FURNISHING STEEL PILES	LB.	132,240			
0702109	PRE-AUGERING OF PILES	L.F.	400			
0702111	DRIVING STEEL PILES	L.F.	1,450			
0702115	SPLICING STEEL PILES	EA.	20			
0702120	POINT REINFORCEMENT FOR STEEL PILES	EA.	20			
0702820	DYNAMIC PILE DRIVING ANALYSIS (P.D.A.) TEST	EA.	3			
0703011	INTERMEDIATE RIPRAP	C.Y.	29			
0703030A	PLACEMENT OF CHANNEL BOULDER	EA.	12			
0707009A	MEMBRANE WATERPROOFING (COLD LIQUID ELASTOMERIC)	S.Y.	238			
0708001	DAMPPROOFING	S.Y.	60			
0714999A	MONITORING STRUCTURES	L.S.	1			
0716000	TEMPORARY EARTH RETAINING SYSTEM	S.F.	630			
0755009	GEOTEXTILE	S.Y.	79			
0813451	GRANITE STONE TRANSITION CURBING	L.F.	80			
0819002A	PENETRATING SEALER PROTECTIVE COMPOUND	S.Y.	69			
0822100.01	TEMPORARY TRAFFIC BARRIER	L.F.	280			
0822100.02	TEMPORARY TRAFFIC BARRIER (PINNED)	L.F.	80			
0822101.01	RELOCATED TEMPORARY TRAFFIC BARRIER	L.F.	540			
0822101.02	RELOCATED TEMPORARY TRAFFIC BARRIER (PINNED)	L.F.	80			
0904051A	3 TUBE CURB MOUNTED BRIDGE RAIL	L.F.	109			
0905002A	REBUILD STONE WALL	L.F.	100			
0910090A	STEEL-BACKED TIMBER GUIDERAIL - TYPE A	L.F.	100			
0910091A	STEEL-BACKED TIMBER GUIDERAIL - TERMINAL SECTION	EA.	4			
0910092A	STEEL-BACKED TIMBER GUIDERAIL - BRIDGE ATTACHMENT	EA.	4			
0912496A	REMOVE WOOD RAIL	L.F.	97			
0913310A	REMOVE AND RESET DECORATIVE FENCE	L.F.	42			
0922501	BITUMINOUS CONCRETE DRIVEWAY	S.Y.	27			
0939001	SWEEPING FOR DUST CONTROL	HR.	209			

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**TOWN OF WILTON, CT
SCHEDULE OF PRICES
FOR THE CONSTRUCTION OF**

**STATE PROJECT NO. 0161-0143, FAP #6161(011)CN
REPLACEMENT OF BRIDGE NO. 05501
ARROWHEAD ROAD OVER NORWALK RIVER
IN THE TOWN OF WILTON**

DATE OF
BID OPENING **December 21, 2022**

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Item Number	Items	Unit	Approximate Quantities	Unit Prices Bid		Amount (Figures)
				Figures	Writing	
0942001	CALCIUM CHLORIDE FOR DUST CONTROL	TON	1			
0943001	WATER FOR DUST CONTROL	M.GA	141			
0944000	FURNISHING AND PLACING TOPSOIL	S.Y.	1,276			
0949000	WOOD CHIP MULCH	S.Y.	802			
0949086	CLETHRA ALNIFOLIA SUMMERSWEET 2'-3' HT. B.B.	EA.	27			
0949153	THUJA PLICATA, WESTERN ARBORVITAE, 6' - 8' HT. B.B.	EA.	33			
0949832	ACER RUBRUM RED MAPLE 2"- 2 1/2" CAL. B.B.	EA.	11			
0949915	RHODODENDRON VISCOSUM, SWAMP AZALEA 24in - 36in HT. B.B.	EA.	12			
0950019A	TURF ESTABLISHMENT - LAWN	S.Y.	192			
0950040A	CONSERVATION SEEDING FOR SLOPES	S.Y.	374			
0950043A	WETLAND GRASS ESTABLISHMENT	S.F.	69			
0952051A	CONTROL AND REMOVAL OF INVASIVE VEGETATION	S.Y.	1,570			
0969060A	CONSTRUCTION FIELD OFFICE, SMALL	MO.	16			
0970006	TRAFFICPERSON (MUNICIPAL POLICE OFFICER) (ESTIMATED COST)	EST.	1	\$10,400.00	Ten Thousand Four Hundred Dollars and Zero Cents	\$10,400.00
0970007	TRAFFICPERSON (UNIFORMED FLAGGER)	HR.	192			
0971001A	MAINTENANCE AND PROTECTION OF TRAFFIC	L.S.	1			
0974001A	REMOVAL OF EXISTING MASONRY	C.Y.	47			
0974005A	REMOVAL OF EXISTING RETAINING WALL	L.S.	1			
0975004	MOBILIZATION AND PROJECT CLOSEOUT	L.S.	1			
0976002	BARRICADE WARNING LIGHTS - HIGH INTENSITY	DAY	1,804			
0978002	TRAFFIC DRUM	EA.	20			
0979003	CONSTRUCTION BARRICADE TYPE III	EA.	4			
0980020	CONSTRUCTION SURVEYING	L.S.	1			
0981100	42" TRAFFIC CONE	EA.	12			
1118051A	TEMPORARY SIGNALIZATION (SITE NO. 1)	L.S.	1			
1205217	TYPE DE-7D DELINEATOR	EA.	14			
1208931	SIGN FACE - SHEET ALUMINUM (TYPE IX RETROREFLECTIVE SHEETING)	S.F.	2			
1208937	SIGN FACE - SHEET ALUMINUM (TYPE XI RETROREFLECTIVE SHEETING)	S.F.	1			
1210102	4" YELLOW EPOXY RESIN PAVEMENT MARKINGS	L.F.	740			
1212001	TEMPORARY PLASTIC PAVEMENT MARKING TAPE - 4" YELLOW	L.F.	210			
1212002	TEMPORARY PLASTIC PAVEMENT MARKING TAPE - 4" WHITE	L.F.	2,060			
1212010	TEMPORARY PLASTIC PAVEMENT MARKING TAPE - 12" WHITE	L.F.	65			
1220027	CONSTRUCTION SIGNS	S.F.	85			
1303215A	ABOVE GROUND WATER STORAGE TANK	EA.	1			
1802210.04	TEMPORARY SAND BARREL (400 lb.)	EA.	4			
1802210.07	TEMPORARY SAND BARREL (700 lb.)	EA.	4			
1802210.14	TEMPORARY SAND BARREL (1400 lb.)	EA.	16			

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