

OCTOBER 16, 2020
REPLACEMENT OF BRIDGE NOS. 01140 & 05401
ROUTE 82 OVER EAST BRANCH EIGHTMILE RIVER AND SWAMP BROOK
FEDERAL AID PROJECT NO. 0082(138)
STATE PROJECT NO. 120-090
TOWN OF SALEM
ADDENDUM NO. 1

This Addendum addresses the following questions and answers contained on the “CT DOT QUESTIONS AND ANSWERS WEBSITE FOR ADVERTISED CONSTRUCTION PROJECTS”:

Question and Answer Nos. 1, 2, 3, 6, 9, 10, 12, 14, 16, 18, 19, 21, 22, 23, 24 and 26.

SPECIAL PROVISIONS
NEW SPECIAL PROVISION

The following Special Provision is hereby added to the Contract:

- ITEM NO. 0603474A – METALLIZING STRUCTURAL STEEL (SITE NO. 1)
ITEM NO. 0603473A – METALLIZING STRUCTURAL STEEL (SITE NO. 2)

REVISED SPECIAL PROVISIONS

The following Special Provisions are hereby deleted in their entirety and replaced with the attached like-named Special Provisions:

- SECTION 1.08 – PROSECUTION AND PROGRESS
- ITEM NO. 0506040A – PRECAST CONCRETE HEADWALL
ITEM NO. 0601185A – PRECAST CONCRETE WINGWALLS
ITEM NO. 0601276A – PRECAST SUBSTRUCTURE ELEMENTS
- ITEM NO. 0601107A – HIGH EARLY STRENGTH CONCRETE

DELETED SPECIAL PROVISIONS

The following Special Provision is hereby deleted in its entirety:

- ITEM NO. 0603233A – GALVANIZING STRUCTURAL STEEL (SITE NO. 1)
ITEM NO. 0603239A – GALVANIZING STRUCTURAL STEEL (SITE NO. 2)

CONTRACT ITEMS**NEW CONTRACT ITEMS**

<u>ITEM NO.</u>	<u>DESCRIPTION</u>	<u>UNIT</u>	<u>QUANTITY</u>
0603474A	METALLIZING STRUCTURAL STEEL (SITE NO. 1)	L.S.	L.S.
0603473A	METALLIZING STRUCTURAL STEEL (SITE NO. 2)	L.S.	L.S.
0202000	EARTH EXCAVATION	C.Y.	630

REVISED CONTRACT ITEMS

<u>ITEM NO.</u>	<u>DESCRIPTION</u>	<u>ORIGINAL QUANTITY</u>	<u>REVISED QUANTITY</u>
0204001	COFFERDAM AND DEWATERING	1355 L.F.	1560 L.F.
0406600	MATERIAL TRANSFER VEHICLE	1550 TON	438 TON
0514271A	PRECAST CONCRETE/STEEL COMPOSITE SUPERSTRUCTURE	3444 S.F.	2232 S.F.
0702111A	DRIVING STEEL PILES	2160 L.F.	1414 L.F.

DELETED CONTRACT ITEMS

<u>ITEM NO.</u>	<u>DESCRIPTION</u>	<u>ORIGINAL QUANTITY</u>	<u>REVISED QUANTITY</u>
0602889	DOWEL BAR SPLICER SYSTEM – GALVANIZED	3456 EA	0
0603233A	GALVANIZING STRUCTURAL	L.S.	0
0603239A	STEEL (SITE NO. 1) GALVANIZING STRUCTURAL STEEL (SITE NO. 2)	L.S.	0

PLANS**REVISED PLANS**

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

02.01.A1	04.30.A1
03.02.A1	04.33.A1
04.02.A1	04.41.A1
04.04.A1	04.42.A1
04.05.A1	04.44.A1
04.13.A1	04.45.A1
04.21.A1	04.46.A1
04.22.A1	04.49.A1
04.24.A1	04.50.A1
04.25.A1	05.07.A1
04.26.A1	05.08.A1
04.29.A1	

PERMIT

The following attached Permit is hereby added to the Contract:

- CTDEEP General Permit for the Discharge of Stormwater and Dewatering Wastewaters from Construction Activities

The Bid Proposal Form 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.

ITEM #0603474A – METALLIZING STRUCTURAL STEEL (SITE NO. 1)

ITEM #0603473A – METALLIZING STRUCTURAL STEEL (SITE NO. 2)

Description: Work under this item shall consist of the surface preparation, shop application of a thermal spray (metallizing) coating, shop application of a sealer and topcoat, and field painting and touch-up painting operations of new structural steel, as shown on the plans, or as directed by the Engineer.

Materials: Only one metallizing supplier and one sealer and topcoat manufacturer may be used for the Project including material supplied for field painting and touch-up painting operations.

Abrasives:

Abrasives shall conform to the following:

1. SSPC AB 1 for mineral slag abrasives
2. SSPC AB 2 for recycled ferrous metal abrasives
3. SSPC AB 3 for new steel abrasives

Thermal Spray Coating (TSC) Materials: The thermal spray coating (TSC) wire feedstock material used for metallizing must be 85%/15% (Zn/Al alloy) and meet the Chemical Composition requirements stated in Table 2 of AWS C2.25, classification W-ZnAl-2. The Contractor shall provide a Certified Test Report (CTR) in accordance with 1.06.07 for the feedstock from the feedstock supplier.

Sealer and Topcoat: The Contractor shall select one of the following semi-gloss topcoats of the color shown on the plans from the list below:

- AkzoNobel: *International Interthane 870UHS*
- Carboline: *Carbothane 133 LV*
- Sherwin Williams: *Hi-Solids Polyurethane 250*
or approved equal

The Contractor shall select a sealer compatible with the topcoat chosen. The sealer shall be capable of penetrating into the body of the TSC to seal the interconnected surface porosity as defined in AWS C2.18-93R.

The sealer and topcoats shall be packaged and sealed, in the original container with labeling bearing the manufacturer's name, type of material, brand name, shelf life, batch number, and instructions for mixing and thinning. The topcoat shall meet the color and gloss retention performance criteria of SSPC Paint 36, Level 3, for accelerated weathering. The Contractor shall provide Materials Certificates in accordance with 1.06.07.

Caulking Materials: Caulking shall be as recommended by the coating manufacturer.

Construction Methods: The Contractor shall implement procedures that comply with this specification. If a state or local regulation is more restrictive than the requirements of this specification, the more restrictive requirements shall prevail. The Contractor must comply with

all local OSHA and EPA standards and regulations, even if the regulation or standard is not specifically referenced herein.

The complete coating system shall be shop-applied except for surfaces that are otherwise listed on the plans or otherwise noted in this specification. Such surfaces shall be coated only after all members are erected, bolts are fully tensioned, and temporary deck formwork is removed. The tops of bridge girder top flanges shall be primer coated only and shall not be metallized or sealed.

Metallizing Contractor Worker Qualifications: The Metallizing Contractor shall be certified by the SSPC Painting Contractor Certification Program QP-6, entitled "Thermal Spray (Metallizing) Contractor Certification Program" in the *enclosed shop* category or be certified in the American Institute of Steel Construction (AISC) Sophisticated Paint Endorsement (SPE) category – *enclosed shop* P1 or *covered shop* P2. A list of approved contractors can be found on the AISC website at www.AISC.org.

The Metallizing Contractor shall be fully certified, including endorsements, for the duration of the time they are doing the surface preparation and coating application. The certification(s) must be kept current for the duration of the Project work. If a Contractor's, subcontractor's or any craft-worker's certification expires, the firm will not be allowed to do any work on this item until the certification is reissued. Requests for extension of time for any delay to the completion of the Project due to an inactive certification will not be considered, and liquidated damages will apply.

Each person applying a metallized coating shall be qualified according to ANSI/AWS C2.18-93R.

The Metallizing Contractor shall have a certified NACE Coatings Inspector Program (CIP) Level 3 inspector, or approved equal, on staff for the duration of the project and actively engaged in the metallizing activities before during and after the coating application.

The Metallizing Contractor and subcontractors are required to have at least one (1) **Coating Application Specialist (CAS) (SSPC ACS/NACE No. 13)** – certified (Level II-Interim Status Minimal) craft-worker. CAS-certified (Level II-Interim Status-Minimal) craft-worker(s) are required for all crews/craft-workers up to four (4) crew members. For each crew larger than four (4), an additional CAS-certified (Level II-Interim Status-Minimal) craft-worker shall be present on each painting/blasting crew during blast cleaning and spray application (Atmospheric and Immersion Service) operations. A crew-member is a person who is on the job performing hand-held nozzle blast cleaning and/or spray application of protective coatings on a steel structure. The certification(s) must be kept current for the duration of the Project work. If a Contractor's, subcontractor's or any craft-worker's certification expires, the firm will not be allowed to do any work on this item until the certification is reissued.

Submittals: The Contractor shall submit the following to the Division of Materials Testing, the Designer of Record and the Project Engineer, for review a minimum of thirty (30) days prior to metallizing.

Metallizing Quality Control (QC) Plan, including:

- A. Written procedures for the preparation of surfaces and the application of the metallizing, the sealer, and topcoat in the shop; and procedures for the repair and touch up of any damage that occurs to the newly applied metallizing or coatings. Shop and field repair procedures must be clearly identified.
- B. Hold points for surface preparation, metallizing application, adhesion testing of metallizing application and top coating thickness measurements.
- C. Identification of the metallizing and coating materials to be applied, including manufacturer's name, product names, and product numbers.
- D. Product Data Sheets, VOC levels for liquid coatings, MSD sheets, and written application instructions including mixing requirements, proposed thinners, and manufacturer's recommended thinner amounts for liquid coatings.
- E. Identification of the type and brand name of the abrasive proposed for use.
- F. Metallizing Manufacturer's Slip Critical Class B Certificate of Compliance.
- G. Copies of qualification records along with continuity logs for all thermal spray operators.
- H. Copies of NACE CIP Level 3 certifications, or approved equal, for all staff required to possess same. Copies of CAS (SSPC ACS/NACE No. 13) certifications, for all staff required to possess same.
- I. Identification of the thermal spray equipment.
- J. A work schedule that includes timelines for surface preparation, metallizing, sealing and topcoating.

Notification: Contact the Division of Materials Testing at DOT.Steel@ct.gov a minimum of two (2) weeks prior to the start of work.

Surface Preparation:

- A. Weld Spatter, Sharp Edges, and Holes: All slag, flux deposits, and weld spatter and steel irregularities such as fins, tears and slivers shall be removed from the surfaces to be metallized. Any resulting burrs from such removal shall be ground smooth, including burrs around holes. All corners and edges shall be rounded to a 0.0625 inch radius or chamfered to a 0.0625 inch chamfer.
- B. Cleaning of Steel: All visible contaminants shall be removed from surfaces in accordance with SSPC-SP 1 using only solvents or detergents.
- C. Compressed Air Cleanliness: The cleanliness of the compressed air shall be confirmed in accordance with ASTM D4285 at least once per shift for each compressor system.
- D. Surface Requirements: The required surface preparation shall meet SSPC SP 5. Surface preparation shall not be performed under damp environmental conditions or when the surface temperature of the steel is less than 5°F above the dewpoint temperature as determined by a surface thermometer and an electric or sling psychrometer.
- E. Abrasives/Profile:
 - 1. The Contractor shall use abrasives that are free of oil, soluble salts and other similar substances that could contaminate the surface.
 - 2. A uniform sharp angular profile with a profile of 3.0 to 6.0 mils shall be provided in accordance with ASTM D4417, Method B or C.

- F. Acceptance Prior to Metallizing: The cleaned surface shall be accepted by the Engineer before application of metallizing. Failure of the Contractor to prepare and clean the surfaces to be metallized in accordance with these specifications shall be cause for rejection by the Engineer. All surfaces that are rejected shall be re-cleaned to the satisfaction of the Engineer at no additional cost to the State.
- G. Pre-Production Test Section and Bend Tests:
1. The Contractor shall blast clean and metallize at least 9 square feet of steel surface prior to initiating the full-scale metallizing operation using the same metallizing equipment, set up, materials, and calibration and operating procedures in the test section(s) that shall be used for the production operations.
 2. Spray parameters shall be validated by passing a bend test as follows:
 - a. Five (5) steel coupons $2 \times 8 \times 0.05$ inches shall be fabricated of the same steel grade proposed as the member being coated.
 - b. The coupons shall receive the same surface preparation, and metallizing as the actual member.
 - c. The coupons may be fastened to larger pieces of stock during the blast cleaning and metallizing operations.
 - d. Bend coupons 180 degrees around a 0.5 inch diameter mandrel.
 - e. The bend test passes if there is no cracking or only minor cracking visually observed on the bend radius.
 - f. The bend test fails if the coating cracks and lifts from the substrate.
 3. Additional coupons and testing may be required by the Engineer to establish the suitability of the surface preparation and the thermal spray coating. Full-scale metallizing shall not commence until the Engineer has inspected and approved the Test Section and coupons.

Metallizing Application:

- A. Quality of Surface Preparation: The Contractor shall verify that the surface meets the specified SSPC-SP 5 surface requirements immediately prior to application of the metallized coating.
- B. Surface Cleanliness: Subsequent coats shall not be applied until overspray, spent abrasive, dirt, dust, and other contaminants have been removed in accordance with SSPC-SP 1.
- C. Ambient Conditions: Metallizing shall be applied when the relative humidity is less than 80%. Metallizing shall not be applied under damp environmental conditions or when the surface temperature of the steel is less than 5°F above the dewpoint temperature as determined by a surface thermometer and an electric or sling psychrometer.
- D. Metallizing: The coating shall be applied by thermal spray employing multiple passes to achieve a uniform thickness of 0.008 to 0.012 inches (8-12 mils) unless otherwise specified. No single pass shall deposit more than 0.004 inches.
- E. Metallizing Adhesion: Adhesion strength of the metallizing shall be 700 psi minimum as measured with approved equipment per ASTM D4541, Annex A4. Measurements shall be taken on companion coupons $4 \times 6 \times 0.25$ inches of the same steel grade as the member being coated and processed concurrently. If adhesion is less than 700 psi but greater than 560 psi, four (4) additional adhesion tests shall be made. If any of the additional adhesion

tests are less than 700 psi, the coating shall be removed and re-applied. Any single adhesion test result less than 560 psi, will be justification for the Engineer to have the Contractor remove the entire coating. All corrective action will be at the Contractor's expense.

F. Quality Control of Metallizing Operation:

1. The Metallizing Contractor shall verify proper spray equipment set up, calibration, and operating procedures by performing a bend test at the beginning of each work shift that metallizing is to be applied in accordance with requirements described in the Pre-Production Test Section.
2. In addition to the bend test, a cut test shall be performed on the companion coupons, one during the production day and one at the end of each shift, to confirm that metallizing is being properly applied. The cut test consists of a single cut 1.5 inches long through the thermal spray coating to the substrate without severely cutting the substrate. A cut shall be made with a hammer and sharp chisel. The chisel cut shall be made at a shallow angle. The bond of the metallizing is considered unsatisfactory if any part of the metallizing lifts from the substrate along the cut.
3. The Engineer shall be notified immediately of any unsatisfactory tests.

G. Bolted Connections and Other Areas:

1. The Contractor shall state in writing to the Engineer a list of areas they believe are inaccessible prior to the start of work. The Engineer will have the final determination as to the accessibility of those areas.
2. Bolted connections shall be processed in a manner that achieves the required Slip Critical Classification detailed on the approved steel shop drawings.
3. Thickness in bolted, Class B, connection areas shall not exceed those listed on the Metallizing Manufacturer's Class B Slip Critical Certificate of Compliance. Under no circumstance shall any thickness reading exceed 16 mils.
4. All connection points shall be appropriately masked off either before or after metalizing and prior to the application of seal coat.
5. After members have been erected in the field, all previously masked areas that remain exposed shall be thoroughly cleaned and lightly sanded by hand to receive a brush-applied coat of the same sealer and topcoat used in the shop.
6. Areas such as bolt holes, backs of snipes and other similar areas where the standard application of a metallized coating cannot be performed shall be cleaned and free of dirt and any loose overspray, and shall receive a brush applied coating of the approved coating system.
7. The top of the top flange shall be metallized. No sealer or topcoat shall be applied on this area.
8. Metallized coating applied to surfaces not required to be coated may remain if found to be tightly adhered, as determined by the Engineer.

Sealer and Topcoat Application:

A. The sealer shall be applied in a single mist coat followed by a full topcoat.

1. The Metallizing Contractor shall apply the sealer in accordance with the manufacturer's recommendations, unless otherwise specified.
2. The sealer shall be applied no more than 8 hours after application of the metallizing, and

in no case shall the sealer be applied over dust, rust that may have bled through (if there was not enough thickness), loose oxides or other visible contaminants that would interfere with the sealer.

3. When conventional spray equipment is used, the Contractor shall verify that the compressed air supply is clean and dry as determined by the blotter test (ASTM D4285).
 4. The topcoat shall be applied to achieve a 4 to 6 mils dry film thickness and shall be applied after the seal coat has been allowed to dry as required by the recoat time in the manufacturer's written instructions, but in no case shall a coat remain exposed for longer than ten (10) calendar days prior to overcoating.
- B. Coverage and Continuity: All surfaces shall be completely coated and free of voids, runs, sags or other defects. Special attention shall be given to hard-to-reach or inaccessible areas and irregular surfaces. Some configurations may require spraying from multiple directions to assure complete coverage.
- C. Sealer and Topcoat Adhesion to Metallized Surfaces:
1. The Metallizing Contractor shall apply the sealer and topcoat in such a manner to assure adherence to the underlying surface. Any lifting of an underlying coat, or poor adhesion between coats or to the substrate, will require removal of the coating in the affected area to adjacent intact, adherent, coating, and reapplication of the material.
 2. Topcoat adhesion shall be verified using adhesion tests in accordance with ASTM D4541 as directed by the Engineer.
- D. Coating Thickness
1. Wet Film Thickness: The Contractor shall verify and document the thickness of each liquid coat at the time of application using wet film thickness gages in accordance with ASTM D4414.
 2. Dry Film Thickness: The dry film thicknesses of the completed coating shall be:

Metallizing	8 to 12 mils
Topcoat	<u>4 to 6 mils</u>
TOTAL SYSTEM	12 to 18 mils
- The Contractor shall measure the thickness of each coat using nondestructive magnetic dry film thickness gages. The procedure shall comply with SSPC-PA2 for the calibration and use of the gages, and the frequency of thickness measurements. Spot readings both 20% above and 20% below the thicknesses shown above are permitted, provided the average thicknesses are within the specified tolerances.

Field Required Coating Operations: Any areas requiring sealer or topcoat after erection shall be done in accordance with the previously submitted and approved field coating procedures and shall be in accordance with the manufacturer's recommendations.

Repair of Film Discontinuities and Damage to Coating System after Erection: A repair procedure shall be submitted for concurrence by the Engineer prior to the start of repair work.

Shipping and Storage: All materials shall be shipped and stored in a manner to prevent damage from all physical and environmental factors.

Date of Completion: The words “METALLIZED AND TOPCOATED” followed by the month and year the coating of the structure is completed along with the CTDOT Project Number and the manufacturer's abbreviations, shall be stenciled on the inside of a fascia girder at mid-depth of the girder in three (3) inch high block letters located near the abutment, so as to be clearly visible from the ground below. Paint for stenciling information shall be of a contrasting color and be compatible with the topcoat and shall be approved by the Engineer prior to application of the stenciled information.

Method of Measurement: The work under this item, being paid on a lump sum basis, will not be measured for payment.

Basis of Payment: The coating of structural steel, incorporated in the completed and accepted structure, will be paid for at the Contract lump sum price for “Metallizing Structural Steel (Site No. X).” The lump sum price shall include all materials, equipment, tools, transportation, repairs, corrective actions, inspection access, and labor incidental thereto

A schedule of values shall be submitted to the Engineer for review and comment prior to application of the metallizing coating.

Pay Item	Pay Unit
Metallizing Structural Steel (Site No. X)	l.s.

SECTION 1.08 – PROSECUTION AND PROGRESS

Article 1.08.03 – Prosecution of Work – Add the following:

A “MILESTONE” is herein defined as the completion of specific contract work (“activities”) on or before the scheduled “Milestone Completion Date”.

A maximum of 65 consecutive days is permitted for the closure of Route 82 at Bridge Nos. 01140 and 05401 between June 19, 2021 and August 22, 2021. The Contractor is required to complete the activities listed in Article 1.03.09 within the permitted closure period. The scheduled road closure date shall be determined by the Contractor who shall notify the Engineer of the scheduled date not less than 14 days prior to the closure. The Milestone Completion Date shall be the last date of the permitted closure period. Multiple corresponding detours will service the traffic as detailed within the Contract.

Article 1.08.04 - Limitation of Operations - Add the following:

In order to provide for traffic operations as outlined in the Special Provision "Maintenance and Protection of Traffic," the Contractor will not be permitted to perform any work which will interfere with the described traffic operations on all project roadways as follows:

Route 82 (East Haddam Road)

Monday through Friday between 6:00 a.m. and 9:00 a.m. & between 3:00 p.m. and 6:00 p.m.
Saturday and Sunday between 10:00 a.m. and 6:00 p.m.

Additional Restrictions:

- A. During the preliminary approach embankment work, utility relocation, slope stabilization, partial cofferdam installation, dewatering, and pile installation, the Contractor shall be allowed to maintain an alternating one-way traffic operation controlled by Temporary Signalization for the duration of Stages 1 and 2.
- B. The work proposed in Stages 3, 4, and 5 shall be completed using the full detour in accordance with the detour plans.
- C. The Contractor shall notify the Engineer at least 14 days in advance of the start of the Route 82 closure. The detour will be allowed between the dates of June 19th, 2021 and August 22nd, 2021 (a maximum of 9 weeks and 2 days). A separate truck detour shall be signed according to the detour plan for trucks over 8 tons. During all periods when Route 82 is closed, a truck detour must be provided as shown on the Truck Detour Plan.
- D. Additionally, during Stages 1 and 2, for pile installation, pavement saw cutting, and pavement restoration directly adjacent to the centerline of roadway, a full detour may be required to accommodate the work. The full detour during these stages is limited to just these activities that cannot feasibly be performed behind the precast barrier under one-way

alternating traffic operations and must only be performed so as not to interfere with the described traffic operations for Route 82 (East Haddam Road) above.

Additional Lane Closure Restrictions

It is anticipated that work on adjacent projects will be ongoing simultaneously with this project. The Contractor shall be aware of those projects and anticipate that coordination will be required to maintain proper traffic flow at all times on all project roadways, in a manner consistent with these specifications and acceptable to the Engineer.

The Contractor will not be allowed to perform any work that will interfere with traffic operations on a roadway when traffic operations are being restricted on that same roadway, unless there is at least a one-mile clear area length where the entire roadway is open to traffic or the closures have been coordinated and are acceptable to the Engineer. The one-mile clear area length shall be measured from the end of the first work area to the beginning of the signing pattern for the next work area.

Article 1.08.07 - Determination of Contract Time:

Delete the second, third and fourth paragraphs and replace them with the following:

When the contract time is on a calendar day basis, it shall be the number of consecutive calendar days stated in the contract, INCLUDING the time period from December 1 through March 31 of each year. The contract time will begin on the effective date of the Engineer's order to commence work, and it will be computed on a consecutive day basis, including all Saturdays, Sundays, Holidays, and non-work days.

Article 1.08.08 - Extension of Time:

Delete the sixth paragraph, "If an approved extension of Contract time.... the following April 1".

Article 1.08.09 – Failure to Complete Work on Time – Add the following:

The Milestone Completion Date has been established for the Contract under Article 1.08.03, and said Date will not be adjusted thereafter for any reasons, cause or circumstance, regardless of fault on the part of any party, unless delays result from unforeseeable causes beyond the control and without the fault or negligence of the Contractor. The Milestone Liquidated Damages determined for this project have been calculated as the daily cost to road users for delays beyond the Milestone Completion Date. Delays due to weather or seasonal conditions shall not be included in such unforeseeable causes (unless extraordinary and catastrophic such as a hurricane or declared state of emergency). Unforeseeable causes include, but are not limited to, natural catastrophes, acts of State in either its sovereign or contractual capacity, acts of another contractor in the performance of a contract with the State, or delays resulting from utility work by Utility Companies.

Separate from the above unforeseeable causes, the Contractor must anticipate that Project delays may occur and may arise from any one of various kinds of events and circumstances prior to or during the Contract period, including, but not limited to, the deletion of Contract work, the issuing of construction orders, the execution of supplemental agreements, the discovery of differing site conditions, the adding of extra work to the Contract, the emergence of right-of-way conflicts, problems with the obtaining or the terms of permits, action or inaction by persons or entities working on the project or by third parties, delays in the process of reviewing or approving shop drawings, expansion of the physical limits of the Project, the effects of weather conditions on Project activities, the occurrence of weekends or holidays, the suspension of any Project operation, or other events, forces or factors that affect highway construction work. Such events, forces or factors, and the Project delays, disruptions, inefficiencies or any other detrimental effects caused by them, are to be deemed to have been anticipated and contemplated by the parties in entering into this Contract, and **shall not extend or constitute cause for extending any Milestone Completion Date.**

Further, any and all costs or detrimental effects incurred by the Contractor in accelerating its work in an attempt to meet the Milestone Completion Date, regardless of the effects of any delay, disruption, inefficiency or other detrimental effect of the kinds of events, forces or factors referred to above, shall be solely the Contractor's responsibility, and may not be used as the basis for any claim by the Contractor for additional compensation. **The work shall be conducted in a manner and with sufficient materials, equipment and labor as are necessary to ensure completion of the listed activities of Article 1.03.09 on or before the Milestone Completion Date.**

If a catastrophic event (as defined above), acts of State in either its sovereign or contractual capacity or acts of another contractor in performance of a contract with the State directly and substantially delays or disrupts a portion of the Contract work as described in the bulleted tasks of Article 1.03.09, and if said effects and their claimed extent are supported by the Contractor's Critical Path Schedule, the Contractor and the Department shall agree on the number of calendar days by which to extend the pertinent Milestone Completion Date, and the adjusted Date will be used in calculating any related Milestone Liquidated Damages. If the Contractor and the Department cannot agree on the appropriate adjustment of the pertinent Date, the Department will adjust the Date in accordance with the period of delay that the Department reasonably deems to have been caused solely by the catastrophic event, acts of State in either its sovereign or contractual capacity or acts of another contractor in performance of a contract with the State. The Contractor shall have no right whatsoever to contest such determination, except in the event that the Contractor establishes that the number of calendar days of delay recognized by the Department in this context was arbitrary and without any reasonable basis.

ITEM #0506040A – PRECAST CONCRETE HEADWALL
ITEM #0601185A – PRECAST CONCRETE WINGWALLS
ITEM #0601276A – PRECAST SUBSTRUCTURE ELEMENTS

Description: Work under this item shall consist of furnishing, erecting and installing all precast headwall, wingwall and substructure elements as indicated on the plans, including all necessary materials and equipment to complete the work, as shown on the plans. The use of cast-in-place concrete will not be considered for substitution. This item shall also include the development of Shop Drawings and Working Drawings for the fabrication and assembly of the precast elements.

All precast elements shall be cast, dry fit and approved prior to initiation of any detours or road closures, specifically being used to facilitate installation of these elements, as specified elsewhere in the Contract.

The precast elements shall include the following:

- A. The fabrication, delivery and installation of new reinforced precast concrete headwall units at Site No. 3 within the project limits. The precast concrete units shall consist of complete footing and stem sections of various lengths and heights as indicated on the contract plans that can be rapidly installed in place on pre-leveled bearing surfaces, lifted in place by crane from a flatbed trailer.
- B. The fabrication, delivery and installation of new reinforced precast concrete wingwall units at Site Nos. 1 and 2 within the project limits. The precast concrete units shall consist of complete footing and stem sections of various lengths and heights as indicated on the contract plans that can be rapidly installed in place on pre-leveled bearing surfaces, lifted in place by crane from a flatbed trailer.
- C. The fabrication, delivery and installation of new precast concrete substructure units, at Site Nos. 1 and 2 within the project limits. The substructure units shall consist of reinforced concrete voided units that can be rapidly installed in place on pre-leveled bearing surfaces and lifted in place by crane from a flatbed trailer. The substructure units shall be constructed with voids such that they align with previously installed driven piles to make the lower portion of the proposed bridge integral abutments. The substructure units shall be made composite with the piles and each other by multiple closure pours and by filling pile voids and segment construction joints with concrete as indicated on the plans.

Materials:

1. The concrete mix design for all precast elements shall meet the requirements of Section M.03.02, Class PCC05560, and shall be submitted to the Engineer.
2. The concrete mix design for the cast-in-place elements and components, such as shear keys and voids, shall be Abutment and Wall Concrete, PCC03340, as specified on the plans, and shall be submitted to the Engineer.
3. The reinforcement shall be galvanized and shall meet the requirements of Section

- M.06.01.
4. Corrugated metal pipe, if used, shall meet the requirements of AASHTO M 36.
 5. All lifting fixtures, keys, threaded inserts, bolts, devices, attachments, and miscellaneous hardware cast into precast concrete components shall be of a design satisfactory for the purpose intended and shall be galvanized in accordance with ASTM A153 or ASTM B695, grade 50, or shall be stainless steel. All portions of the lifting and seating devices shall be recessed from the finished concrete surface.
 6. The dowel bar splicer system, if used, shall be galvanized and shall meet the requirements of Section M.06.02.
 7. Non-shrink grout shall meet the requirements of Section M.03.05 and be suitable for submerged applications.
 8. Leveling Methods: Precast elements shall be placed on leveling devices that are adjustable and can support the anticipated loads. Leveling devices shall be designed by the Contractor. Flowable grout or controlled low strength material may be used after the placement on the leveling devices, and any anticipated flowable material, shall be shown on the Working Drawings.

Construction Methods:

1. **Submittals:** All submittals shall include a title sheet with the following:
 - Project number, town and crossing.
 - Bridge number, as shown on the plans.
 - Design code, as applicable.
 - Contact information for fabricator – contact information shall include name and address of the fabricator and the name of contact person with phone number and email address.
- a. **Shop Drawings - Precast Concrete Components:** Prior to fabrication, the Contractor shall submit shop drawings to the Engineer for approval in accordance with the plans, Section 1.05.02-3, and as follows:
 - Prepare and submit Shop Drawings for each precast substructure element.
 - Show all lifting inserts, dowel bar splicer systems, hardware, or devices and their locations on the Shop Drawings for Engineer's approval.
 - Show locations and details of the lifting devices, including supporting calculations, type, and amount of any additional reinforcing required for lifting. Design all lifting devices based on the No Cracking Criteria in Chapter 8 of the PCI Design Handbook (latest edition).
 - Shop Drawings shall be dimensioned from working points or working lines to prevent the accumulation of dimensional tolerances.
 - Show minimum compressive strength that must be attained prior to handling the precast elements.
 - Show details of leveling devices or vertical adjusting hardware.
 - Do not order materials or begin work until receiving final acceptance of the Shop Drawings.

- The Department will reject any elements fabricated before receiving written approval, or any elements that deviate from the accepted drawings. The Contractor is responsible for costs incurred due to faulty detailing or fabrication.
- b. **Working Drawings - Lifting and Seating Devices:** Prior to fabrication, the Contractor shall prepare and submit Working Drawings and supporting computations for the embedded lifting and seating devices required for the handling and installation of the precast concrete components, to the Engineer for review in accordance with 1.05.02. Prior to applying load to the embedded devices, the concrete shall attain the minimum concrete compressive strength associated with the safe working load of the device.
- c. **Working Drawings - Installation of Precast Substructure Elements:** Prior to installation of the precast elements, the Contractor shall submit Working Drawings and supporting computations for the lifting and placement of the precast concrete components, to the Engineer for review in accordance with Section 1.05.02. Cranes shall be operated in accordance with the Connecticut Department of Public Safety regulations. The Contractor shall be responsible for verifying the weight of each lift.

The Working Drawing submittal shall include, at a minimum:

- Plan of the work area showing all structures, roads, railroad tracks, Federal and State regulated areas as depicted on the plans, overhead and subsurface utilities, property lines, or any other information relative to erection. No picks shall be allowed over vehicular, pedestrian, railway or vessel traffic.
- Include details of all equipment to be used to lift substructure elements for assembly including cranes, excavators, lifting slings, sling hooks, and jacks. Include crane locations, operation radii, and lifting calculations. Factors of safety for all lifting calculations of elements will be 125% of the weight of the element being lifted.
- Follow Chapter 8 of the PCI Design Handbook (latest edition) for handling, erection, and bracing requirements. Calculations shall be prepared for the lifting and handling in accordance with the no discernible cracking criteria and shall be submitted as part of the Working Drawings. Lifting hook locations and hardware should be coordinated with the fabricator.
- A detailed narrative describing the lifting and installation sequence. Include a detailed schedule with a timeline for all operations. In development of the schedule the Contractor shall account for setting and cure time for void concrete and concrete closure pours.
- Manufacturer's data sheet for the crane(s) including the load/capacity chart. The capacity of the crane shall be adequate for the total lift/pick load including rigging, spreaders and other materials. In the area of railroads and navigable waterways, the capacity shall be as required by the regulatory authorities.
- Manufacturer's data sheets and product data sheets for all rigging (slings, spreader bars, blocks, etc.), lifting devices, and other connecting equipment and hardware listing the number, type, size, arrangement and capacity of each.

- Include calculations for the interim stages of construction. These calculations will provide the necessary material strengths required to proceed to the next stage in construction. A minimum factor of safety of 2.0 is required in preparation of the calculations and testing performed by the Contractor will be required before the Contractor is allowed to proceed.
 - Include methods of providing temporary support of the elements. Include methods of adjusting and securing the element after placement.
 - Include procedures for controlling erection tolerances for both the horizontal and vertical direction. Include details of any alignment jigs including bi-level templates for reinforcing anchor dowels.
 - Location of each crane for each pick.
 - Crane support measures, including any support beneath the outriggers such as bearing pads, crane mats, planking or special decking, or other means to transfer the crane’s total weight (including the lifted load) into the earth or structure beneath it.
 - Delivery location of each component.
 - Boom length and the lift and setting radius for each pick (or maximum lift radius).
 - Pick point location(s) on each component.
 - Lifting weight of each component including rigging (clamps, spreader beams, etc.)
- d. **Product Data – Field Installed Materials:** Prior to installation of the precast concrete components, the Contractor shall submit product data for field installed materials, such as flowable grout or controlled low strength material not addressed in other submissions to the Engineer for review, in accordance with Section 1.05.02.

2. **Fabrication and Manufacture:** The fabrication and manufacture of the precast elements shall be in accordance with the latest edition of the AASHTO LRFD Bridge Design Specifications, including the latest interim specifications, as supplemented by the following:

- a. **Forms and Forming Material:** Forms shall be mortar-tight and sufficiently strong to prevent misalignment of adjacent precast sections. Forms shall be constructed to allow removal without causing damage to the concrete. A positive means of supporting reinforcing cages in place during forming shall be required.

The forms shall not be removed until the concrete is sufficiently strong enough to avoid possible damage to the concrete. Forms shall not be removed without approval from the Engineer. Damage to the concrete due to early removal of the forms will be cause for rejection.

All forming materials used for casting cylindrical openings for lifting holes or holes for grouting deformed steel bars shall be removed. All non-plastic material used as forms for casting weepholes shall also be removed.

- b. **Concrete Mix:** The Contractor shall design and submit to the Engineer for review a concrete mix that shall attain a minimum 28-day compressive strength, f'_c , of 5,000 psi.
- c. **Reinforcing Steel:** Shall be subject to the provisions of Sections 6.02.03-2 through 6.02.03-8. The welding of reinforcement, unless specifically indicated in the plans, will not be permitted.
- d. **Placing Concrete:** Concrete shall not be deposited in the forms until the Engineer has verified the presence and proper location of the reinforcing steel, the couplers, and other components, and has given approval thereof.

The Contractor shall provide the Engineer a tentative casting schedule at least two (2) weeks prior to scheduled casting to make inspection and testing arrangements. A similar notification is required for the shipment of precast elements to the Site.

Concrete shall not be deposited into the forms when the ambient temperature is below 40 degrees F or above 100 degrees F, unless adequate heating or cooling procedures are provided and have been previously approved by the Engineer. The concrete temperature shall be within the range of 60 degrees F to 90 degrees F at the time of placement.

Truck-mixed or transit-mixed concrete will not be allowed.

Production during the winter season, from November 15 to March 15 inclusive, will be permitted only in a completely enclosed structure of suitable size and dimension that provides a controlled atmosphere for the protection of both the casting operation and the product.

Outside concreting operations will not be permitted during rainfall unless the operation is completely under cover.

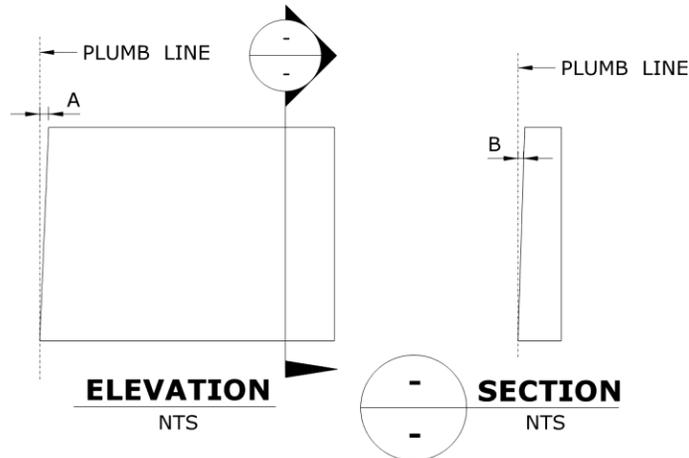
The concrete shall be vibrated internally, or externally, or both, as ordered by the Engineer. The vibrating shall be done with care in such a manner as to avoid displacement of reinforcing steel, forms, or other components. There shall be no interruption in the pouring of any of the members. Concrete shall be carefully placed in the forms and sufficiently vibrated to produce a surface that is free from imperfections such as honeycombing, segregation, cracking, or checking. Any deficiencies noted in the members may be cause for rejection.

- e. **Test Cylinders:** During the casting of the substructure elements, the Contractor shall make test cylinders under the supervision of a representative of the Department. A minimum of 4 cylinders shall be taken during each production run or as ordered by the Engineer. The dimensions and type of cylinder mold shall be as specified by the Engineer. Cylinders shall be cured under the requirements of ASTM C31 and shall be used to determine the 28-day compressive strength requirements (f'_c). The Engineer reserves the right to request and test core specimens from the sections to determine their adequacy.
- f. **Finishing:** All fins, runs, or mortar shall be removed from the concrete surfaces which will remain exposed. Form marks on exposed surfaces shall be smoothed by grinding. All exposed, outside concrete surfaces shall be given a grout clean-down finish in accordance with Section 6.01.03-II-10.
- g. **Handling and Storage:** Care shall be taken during storage, transporting, hoisting and

handling of all pieces to prevent damage. Sections damaged by improper storing, transporting or handling shall be repaired or replaced by the Contractor, as directed by the Engineer and at no cost to the Department. All storage and handling operations shall be as directed by the Engineer.

The substructure elements shall not be shipped to the Site until the 28-day strength ($f'c$) has been attained.

- h. **Repairs:** The Engineer will evaluate the acceptability and the cause of any defects, and the service condition of the substructure elements. No repairs shall be done by the Contractor unless permission has been granted by the Engineer. The Contractor shall submit to the Engineer, for review, the proposed methods and materials to be used in the repair operation. All repairs shall be sound and properly finished and cured before the substructure elements are delivered to the Site. The Contractor shall bear the costs of all repair work.
- i. **Working Lines:** One common working line shall be used for all transverse and longitudinal measurements.
- j. **Fabrication Tolerances:** The length of each precast element measured along its longitudinal axes shall be equal to that shown on the plans plus or minus $\frac{1}{4}$ inch. The thickness of each precast element shall be equal to that shown on the plans plus or minus $\frac{1}{4}$ inch. The height of each precast element, measured from the bottom to the top of the of the precast elements, shall be equal to that shown on the plans plus or minus $\frac{1}{4}$ inch.
- k. **Erection Tolerances:** The top of precast substructure element elevation shall be equal to that shown on the plans plus or minus 0.02 foot. The end squareness, dimension "A" in the elevation view below, shall not exceed plus or minus $\frac{1}{8}$ inch. Dimension "B," as shown in the section view below, shall not exceed plus or minus $\frac{1}{4}$ inch for every 10 feet of precast element height.



- l. **Shop-fitting:** Adjacent precast substructure element connections shall be dry fit at the casting yard prior to shipment of the precast concrete sections.

3. Quality Assurance:

- a. All precast elements shall be fabricated by a CTDOT approved PCI certified fabricator with a minimum certification of "B1."
- b. Permanently mark each precast element with date of casting and supplier identification. Stamp markings in fresh concrete.
- c. Prevent cracking or damage of precast elements during handling and storage.
- d. Replace defects and breakage of precast elements:
 - Members that sustain damage or surface defects during fabrication, handling, storage, hauling, or erection are subject to review or rejection.
 - Obtain approval from the Engineer before performing repairs.
 - Repair work must reestablish the elements' structural integrity, durability, and aesthetics to the satisfaction of the Engineer.
 - Determine the cause when damage occurs and take corrective action.
 - Failure to take corrective action, leading to similar repetitive damage, can be cause for rejection of the damaged element.
 - Cracks that extend to the nearest reinforcement plane and fine surface cracks that do not extend to the nearest reinforcement plane but are numerous or extensive are subject to review and rejection.
 - Full depth cracking and breakage greater than one foot are cause for rejection.
- e. Construct precast elements to tolerances shown on the plans. Where tolerances are not shown, follow tolerance limits in the PCI MNL116-99, "Manual for Quality Control for Plants and Protection of Structural Precast Concrete Products, 4th Edition."
- f. The plant shall document all test results. The quality control file shall contain at least the following information:
 - Element identification.
 - Date and time of cast.
 - Concrete cylinder test results.
 - Quantity of concrete used and the batch printout.
 - Form-stripping date, and repairs if applicable.
 - Location/number of blockouts and lifting inserts.
 - Temperature and moisture of curing period.
 - Document lifting device details, requirements, and inserts.
- g. The concrete strengths required for various operations shall be indicated on the Working Drawings. The Contractor shall demonstrate that these minimum strengths have been met through the use of material testing. As such, the Contractor will be required to perform strength testing at their own expense and shall be responsible for taking a sufficient number of concrete cylinders or cubes to meet this requirement. The Contractor shall not rely solely on compressive tests conducted by CTDOT, as the CTDOT testing schedule may not be changed to accommodate Contractor's scheduling requirements for interim testing.

- 4. Installation:** The installation of the precast substructure elements shall be in accordance with the plans and the following:
- a. The installation of the precast substructure elements shall proceed as required by the sequence of construction, stage construction plans, the requirements Section 1.08, “Prosecution and Progress” and Item #0971001, “Maintenance and Protection of Traffic,” and shall be in accordance with the methods outlined in the Working Drawings.
 - b. The Contractor shall review the approved Working Drawings. If changes are warranted due to varying site conditions, resubmit the plan for review and approval. Working points, working lines, and benchmark elevations shall be established prior to placement of all elements.
 - c. Concrete shall be placed in all shear keys and precast element voids only after the horizontal and vertical alignment within the tolerances specified herein is confirmed. After placement, the precast elements shall be protected from damage, rotation, and displacement during the concrete placement and curing.
 - d. Concrete to be placed inside the precast element voids around the pile tops shall be allowed to flow partially under the stem. The entire underside of the stem need not be filled with concrete.
 - e. The installation of elements above the abutment stems is not permitted until the compressive test result of the cylinders for the concrete used for the shear keys and voids has reached the specified minimum values in the approved Working Drawings.
 - f. Exposed surfaces of all shear keys and voids shall form a smooth and continuous plane, free from irregularities, with the adjacent concrete.
 - g. After installation, any precast substructure element, as determined by the Engineer, not acceptable in vertical or horizontal alignment for any reason, including settlement, displacement, or misfit, shall be removed by the Contractor and correctly installed, as directed by the Engineer at the Contractor’s expense.
 - h. All portions of the lifting and seating devices that extend to or beyond the finished concrete surface shall be removed. All fixtures or holes cast into the sections for lifting or seating shall be completely filled with non-shrink grout and finished smooth and flush with the adjacent concrete surface.

Method of Measurement:

The work described herein for Precast Concrete Headwalls and Precast Substructure Elements will be measured for payment by the cubic yard of precast elements, of the size indicated, complete in place and accepted, as described on the plans. The calculation of the volume of concrete used for payment shall include all voids and keys and shall be based on the overall plan and elevation dimensions of the elements, except as specified below.

The work described herein for Precast Concrete Wingwalls will be measured for payment by the linear foot of cast, shipped and erected wall in place, and accepted, measured along the curb line

from working point to working point as described on the plans.

Basis of Payment:

The work described herein for Precast Concrete Headwall and Precast Substructure Elements will be paid for at the contract cubic yard price and for Precast Concrete Wingwalls at the contract linear foot price which prices shall include all work described herein including, but not limited to, preparation of shop drawings, working drawings, erection drawings, quality control, fabricating, placement & curing concrete, reinforcement steel, dowel bar splicer system, weep holes, embedded elements, transporting, storage and handling, erecting, leveling devices, corrugated metal pile, falsework, support of excavation, protection of existing structures, soil bearing surface preparation, all materials, equipment, tools and labor incidental thereto, will be paid for under unit prices for the Items to which they pertain.

<u>Pay Item</u>	<u>Pay Unit</u>
Precast Concrete Headwall	C.Y.
Precast Concrete Wingwalls	L.F.
Precast Substructure Elements	C.Y.

ITEM #0601107A – HIGH EARLY STRENGTH CONCRETE

Work under this item shall conform to Section 6.01 Concrete for Structures and M.03 as supplemented and amended as follows:

6.01.01 – Description: Add the following:

Work under this item shall consist of furnishing and placing cast in place concrete for the approach slabs, longitudinal closure pours, deck ends and backwalls, and where shown on the plans, including all necessary materials and equipment to complete the work.

6.01.02 – Materials: Add the following:

The high early strength concrete shall conform to the requirements of M.03.01 for PCC05562 and the following criteria:

1. Portland cement shall be Type II, IIA or III conforming to AASHTO M85 or M240, as appropriate.
2. All cement used in the manufacture of the members shall be the same brand, type and color, unless otherwise permitted.
3. Use Portland cement conforming to AASHTO M85 with compatible admixtures and air entraining agent.
4. Water-cementitious material ratio shall not exceed 0.42 by weight, including water in the admixture solution and based on saturated surface dry condition of aggregates.
5. Use a maximum size coarse aggregate of no. 6.
6. The amount of entrained air shall be 6.0 +/- 1.5%.
7. High early strength concrete shall achieve the early minimum compressive strength indicated on the plans, by the time that the bridge is opened to traffic.
8. The early strength characteristics of the concrete shall be commensurate with the intended construction procedure that is developed by the Contractor in the PBU and Approach Slab Assembly Plans.
9. The minimum final design (28 day) compressive strength shall not be less than 5000 psi.
10. A shrinkage reducing admixture shall be added to the concrete mix according to the manufacturer's recommendation such that there will be no cracks at 14 days in the sample tested in AASHTO T334 (see below). A shrinkage reducing admixture shall be tested by an approved testing lab and meet the requirements of ASTM C494-10 Type S, except that in Table 1 length change shall be measured as: Length Change (percent of control) shall be a minimum of 35% less than that of the control. Table 1 Length Change (increase over control) shall not apply. Shrinkage reducing admixtures shall not contain expansive metallic materials.
11. The maximum allowable total chloride content in concrete shall not exceed 0.1% by weight of cement.
12. Minimum electrical resistivity at 28 days $k\Omega\text{-cm}$ of 29 per AASHTO T 358.

Mix Design Requirements

Concrete shall be controlled, mixed, and handled as specified in the pertinent portions of Section 6.01 Concrete for Structures, Supplemental Specifications and as indicated below:

The Contractor shall design and submit for approval the proportions and test results for a concrete mix which shall attain the minimum final design compressive strength and the early compressive strength as defined by the approved Assembly Plan and consistent with the approved Quality Control Plan.

The concrete mix design shall have a rapid chloride ion permeability between 1000 and 1500 Coulombs at not more than 28 days using AASHTO T 277 and the air entrainment shall be targeted at a value of 6.5 percent +/-1.5 percent. Contractor may opt to take multiple tests prior to 28 days which will be considered accepted once the target value of 1,000 coulombs is reached. Testing shall be in accordance with AASHTO T 119 and T 152. Multiple samples should be tested using the intended curing methods in order to establish the required cure times for the mix.

Should a change in sources of material be made, a new mix design shall be established and approved prior to incorporating the new material. When unsatisfactory results or other conditions make it necessary, the Department will require a new mix design.

The concrete mix design shall be submitted to the Department for review and approval. The Department shall be notified at least 48 hours prior to the test batching and shall be present to witness the testing.

All tests necessary to demonstrate the adequacy of the concrete mix shall be performed by the Contractor, witnessed by the Department, including: slump, air content, temperature, initial set and final set (AASHTO T197). Compressive strength tests shall be determined on field cured cylinders (6" X 12" cylinders) at intervals as needed to show that the concrete has reached the required strength to open the bridge to traffic, and standard cured cylinders at 7 days and 28 days. Additionally, a confined shrinkage test as outlined in the AASHTO T334 - Practice for Estimating the Crack Tendency of Concrete shall be performed by an AASHTO accredited laboratory. The results of these tests (documenting zero cracks at 14 days) shall be submitted to the Department.

Field Trial Placement

In addition, a trial placement shall be done a minimum of (90) ninety days before the intended date of the initial closure pour placement. The Contractor will be required to demonstrate proper mix design, batching, placement, finishing and curing of the high early strength concrete. The trial placement shall simulate the actual job conditions in all respects including plant conditions, transit equipment, travel conditions, admixtures, forming, the use of bonding compounds, restraint of adjacent concrete, placement equipment, and personnel.

The trial shall also demonstrate the ability of the concrete to accept the installation of the membrane waterproofing system that is to be used. A representative portion of the trial concrete shall be coated with the membrane waterproofing in accordance with the specifications for the waterproofing. The timing of the installation of the waterproofing on the trial concrete shall be

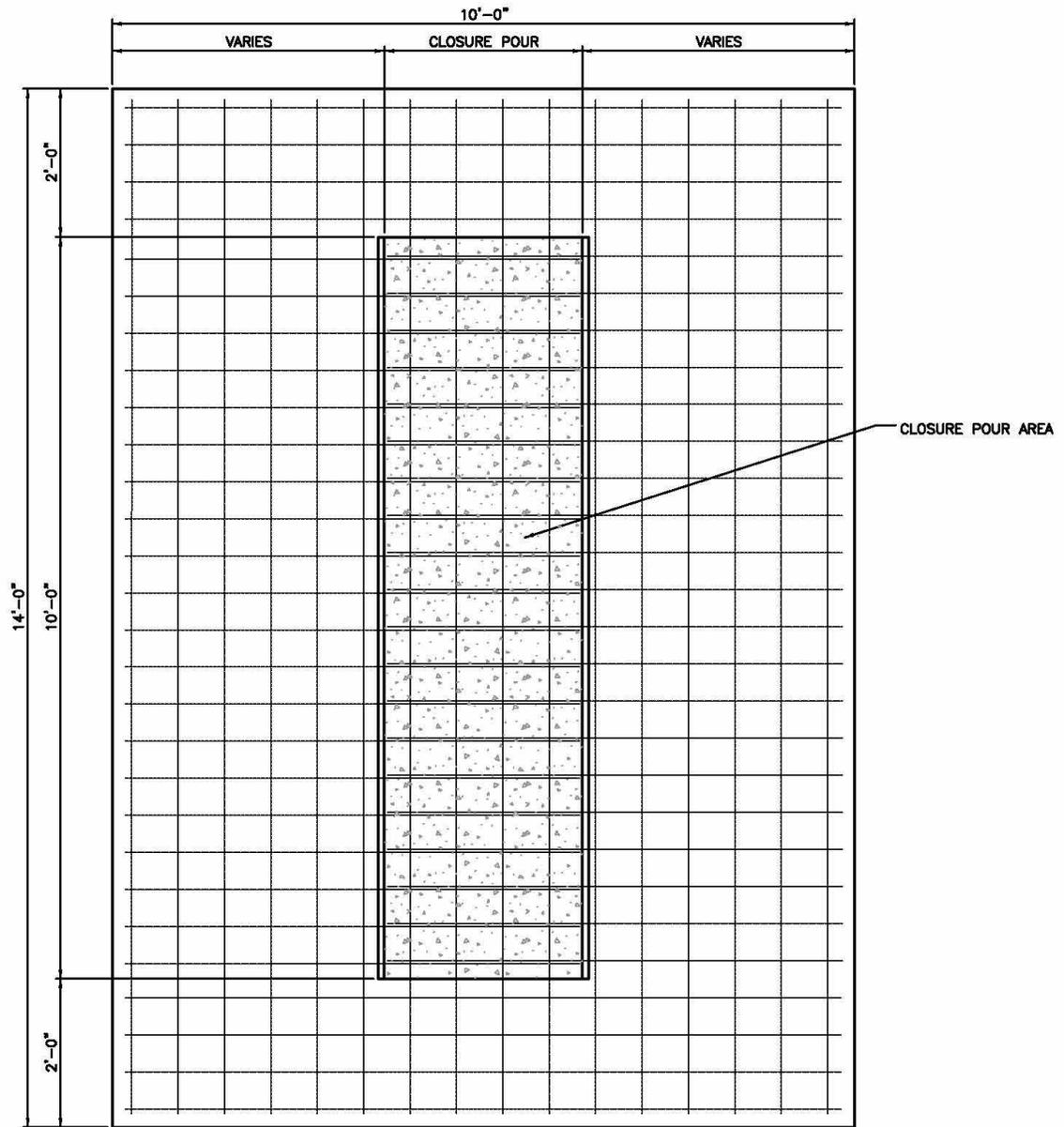
commensurate with the intended construction procedure and schedule that is developed by the Contractor. The Contractor shall demonstrate that the waterproofing meets all the requirements of the specifications.

The details for the trial placement configuration are shown in Figure 1. Acceptance criteria for the trial placement shall be as follows:

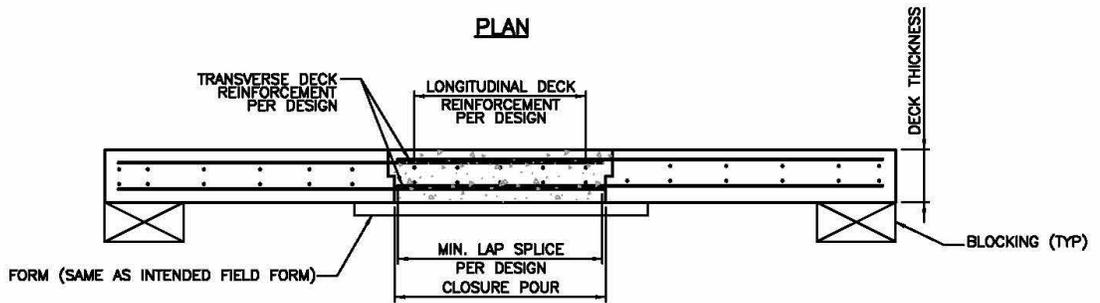
- The trial placement concrete shall not exhibit cracking or separation from the test panel in excess of 0.016 inches wide
- There shall be no more than one transverse crack in excess of 0.010 inches wide in the 10 foot long pour.
- The evaluation of the trial placement shall take place 14 days after placement.

If the trial placement fails these criteria, the Contractor will be required to submit a corrective action plan on how repairs of these crack sizes will be performed. The Department may require the Contractor to conduct more trial batches and trial placements. The costs of trial batches, trial placements and the removal of trial placement concrete from the job site is incidental to the work and will not be measured for payment. The requirement for multiple test placements shall not be cause for a time extension.

The final accepted trial placement testing shall be used to establish the final acceptance testing protocol for the field placements.



PLAN



TYPICAL SECTION

FIGURE 1 - TRIAL PLACEMENT TEST SET-UP

6.01.03 Construction Methods: Add the following:

The Contractor shall engage an AASHTO accredited laboratory to provide testing facilities which are qualified laboratories under the NETTCP program to perform all Quality Control field testing. All personnel performing tests shall be qualified NETTCP Concrete Technicians and certified ACI Laboratory and Concrete Strength Technicians. Anytime the Contractor moves the laboratory, all associated equipment shall be recalibrated. This requirement is intended to minimize the movement of test cylinders.

The Contractor is required to perform initial set and final set tests (AASHTO T197) in addition to slump, air content and temperature on concrete from each concrete truck used in the placing of this High Early Strength Concrete. Field cured cylinders (6" X 12" cylinders) will be made from the first and last concrete trucks. A set of three (3) field- cured cylinders shall be made for each informational test associated with early structural loading. The Contractor is advised to fabricate adequate sets of cylinders to allow multiple tests to verify field concrete strength. The Department shall be allowed to witness the test and comment on all the tests performed by the Contractor. The Contractor shall not open the roadway to traffic until the minimum compressive strength has been met and when the Department has directed that the roadway can be opened to traffic.

The specimens shall be tested for resistivity in accordance with AASHTO T 358 after the 28 day curing period. Following testing for resistivity, the same specimens may be tested for compressive strength.

All testing and equipment shall conform to AASHTO T-22, and the making and curing of concrete cylinders shall conform to AASHTO T23. All costs associated with the on-site mobile testing facilities, personnel and field testing, equipment calibration and verification to demonstrate the field concrete strength shall be incidental to the work.

Acceptance tests will be performed by the Department on standard cured cylinders at 7 days and 28 days. Cylinder breaks at 3 days and 7 days must be at least 10% above the approved trial batch results. The Contractor will be notified of any verification tests that do not meet these requirements and will be required to develop a contingency corrective action plan incase final strength is not achieved. Concrete will be accepted based on meeting the 28-day strength requirement of 5000 psi.

Curing Methods

The concrete curing methods shall be developed by the Contractor as part of the Quality Control Plan. The curing method shall allow for the application of traffic on the concrete prior to full curing without compromising the desired final properties and the durability of the finished product. The curing methods used in the production placements shall be the same as the curing methods used for the trial placement.

High Early Strength Concrete Crack Inspection

The Contractor shall inspect the finished high early strength concrete surface for cracks. Inspection of the deck for cracking shall be completed prior to the preparation of the deck for placement of the membrane waterproofing system.

The Contractor shall document the location and frequency of cracks on the closure pours (number of cracks per square foot). Cracks greater than 0.016 inches in width shall be repaired as required by the membrane waterproofing manufacturer.

6.01.05 Basis of Payment: Add the following

The work completed under this Item will be paid for at the contract price per actual number of cubic yards of high early strength concrete that is measured complete in place. Payment under this Item includes full compensation for all testing and approval of the mix design.

Payment for the trial placement concrete will be paid for at the contract unit price for high early strength concrete. Payment for reinforcement for the trial placement will be paid for at the contract unit price for Deformed Steel Bars – Galvanized, Item 0602030. All other labor, materials, tools and incidentals associated with the trial placement will not be measured for payment, but rather shall be considered incidental to the item high early strength concrete.

<u>Pay Item</u>	<u>Pay Unit</u>
High Early Strength Concrete	c.y.

STORMWATER POLLUTION CONTROL PLAN

Replacement of Bridge Nos. 01140 & 05401 Route 82 over the East Branch Eightmile River & Swamp Brook Salem, CT

**State Project No.: 0120-0090
EzFile No. 65545**

Connecticut Department of Transportation



September 2020

This Stormwater Pollution Control Plan (SPCP) is prepared to comply with the requirements for the General Permit for Stormwater Discharges (GPSD) from Construction Activities. Also to be considered part of the SPCP are the proposed construction plans, special provisions, and the Connecticut Department of Transportation's "Standard Specifications for Roads, Bridges and Incidental Construction" (Form 817) including supplements thereto and the 2002 Connecticut Guidelines for Soil Erosion and Sediment Control

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1. Site Description

The project involves two bridges, Bridges Nos. 01140 and 05401, that carry Route 82 over East Branch Eightmile River and Swamp Brook, respectively, in the Town of Salem. A location map is attached as Appendix A. Bridge No. 01140 is a two-span bridge that was constructed in 1924 and considered to be structurally deficient as a result of the serious condition and deterioration of the reinforced concrete slab. The bridge consists of reinforced concrete pier and abutments, which support the reinforced concrete slab. Approximately 200 feet east of Bridge No. 01140 is Bridge No. 05401 which carries Route 82 over Swamp Brook. Bridge No. 05401 is a single-span bridge that was constructed in 1924 and rehabilitated in 1986. Bridge No. 05401 crosses Swamp Brook, a watercourse that is hydrologically connected to the East Branch Eightmile River. The area between the two spans is wetland floodplain. Both structures are classified as hydraulically inadequate, as they operate in pressure flow with no underclearance for the 100-year design storm event. An additional 200 feet to the east of Bridge No. 05401 are twin 30 inch corrugated metal pipes that are called out on the original plans as culverts for an overflow ditch. All three structures carry two lanes of bidirectional traffic, one in each direction. At this location, route 82 is classified as Rural Minor Arterial.

The East Branch Eightmile River and Swamp Brook have a combined drainage area of 16.7 square miles. The watercourse lies within the Eightmile River Regional Basin No 48 and Connecticut River Major Basin No. 4. The East Branch Eightmile River is designated as a National Wild & Scenic River. According to the Federal Emergency Management Agency's (FEMA) Flood Insurance Rate Map number 09011C0308G, New London County, Connecticut (effective date July 18, 2011), the area of the crossing is located in FEMA mapped 100-year Flood Zone AE with a mapped Floodway. The project utilizes the FEMA 100-year design storm calculated at elevation of approximately 208 feet. The elevations can be seen in the attached plan sheets in Appendix B. A Flood Management Certification has been issued by CT DEEP and is included as Appendix C.

The project proposes the replacement of Bridges Nos. 01140 and 05401. Bridge No. 01140 will be replaced with a new 56 foot single span bridge with a 54 foot clear hydraulic opening. The superstructure will utilize prefabricated bridge units (PBUs) which will be supported by precast integral abutments founded on steel piles. Bridge No. 05401 will be replaced with a new 32 foot single span bridge with a 30 foot clear hydraulic opening. The superstructure will consist of PBUs supported by precast integral abutments founded on steel piles. Crash tested open bridge railing systems will be installed along each fascia for both bridges. Riprap scour countermeasures placed at the proposed bridges' abutments within the watercourse will be top-dressed with approximately 2 feet of natural streambed material. A minimum of 1 foot of natural streambed material will be utilized to regrade the channel. Where the riprap scour countermeasures extend into the slope embankment, additional natural streambed material for top-dressing will also be utilized. The twin 30 inch corrugated steel pipes are to be replaced with 30 inch concrete pipes and new cast-in-place concrete headwalls. Precast U-Type wingwalls founded on spread footings will be installed for the bridge structures. The walls will be configured to contain the approach roadway and minimize impacts to the surrounding wetlands as a result of the roadway widening and profile raise. The project also includes the temporary and permanent overhead utility pole relocations. The spans of the proposed replacement bridges will be widened as compared to existing bridge dimensions. The widening of each bridge will accommodate two 12 foot vehicle lanes and two 5 foot bicycle compatible shoulders. The approach roadway will be widened to provide a curb-to-curb width of 34 feet within the project limits. The roadway is also proposed to be raised to accommodate the new structures. The roadway embankments will be sloped at 2:1. The side slopes and roadway embankments will be seeded and revegetated with native plantings following construction. In both existing and proposed conditions, stormwater runoff from Route 82 sheet flows to the vegetated shoulders and wetlands.

Estimated Disturbed Area

The total area of the project site is 1.4 acres, all of this will be disturbed by construction activities.

Estimated Runoff Coefficient

The runoff coefficient assumed for pavement is 0.9. For the pervious areas, a coefficient of 0.3 was assumed.

Pre-Construction

$$\frac{(0.8 \text{ ac.} \times 0.3) + (0.6 \text{ ac.} \times 0.9)}{0.8 \text{ ac.} + 0.6 \text{ ac.}} = 0.56$$

Post-Construction

$$\frac{(0.65 \text{ ac.} \times 0.3) + (0.75 \text{ ac.} \times 0.9)}{0.65 \text{ ac.} + 0.75 \text{ ac.}} = 0.62$$

Receiving Waters

The receiving waters for the eastern portion of the site is the East Branch Eightmile River. The receiving waters for the western portion of the site is Swamp Brook. Both the East Branch Eightmile River and Swamp Brook ultimately drain to the Connecticut River.

Extent of Wetlands on Site

The project results in 9,075 square feet (0.21 acres) of permanent wetland impacts. This number accounts for the construction of the two new bridge structures and new twin culvert and building up the roadway fill slopes. The project results in 4,725 square feet (0.11 acres) of permanent watercourse impacts. This number accounts for the placement of scour countermeasures and the regrading of the streambed through the two project bridges. The project will not result in permanent conversion of watercourse to upland. Temporary impacts include the area necessary for the water handling and tree clearing (not including grubbing). Temporary impacts to wetlands are 8,125 square feet (0.18 acres) and temporary impacts to the watercourses are 500 square feet (0.01 acres).

2. Construction Sequencing

The Contractor will be given approximately 8 months for the construction of all phases of the project.

The suggested sequence of construction is as follows:

1. Conduct a preconstruction meeting.
2. Install erosion controls at limits of disturbed slopes.
3. Perform clearing and grubbing activities.
4. Complete utility relocations activities.
5. Apply temporary stabilization measures for disturbed areas in accordance with page 7, Temporary Stabilization Practices.
6. Complete bridge demolition
7. Complete new embankment fill and stabilization.
8. Complete bridge replacement and culvert replacements and full depth roadway reconstruction.
9. Complete paving.
10. Remove erosion controls when it is determined that disturbed areas have been stabilized. (This determination will be made by the Qualified Inspector).
11. Remove any remaining silt fence shall be removed prior to the filing of the "Notice of Termination Form" in Appendix E.
12. Perform project cleanup.

If the construction sequencing activities create an area of disturbance with a total contributing drainage area of between two (2) acres and five (5) acres per discharge point, a temporary sediment trap must be provided and the Contractor must submit to the Engineer a revised SWPCP for review and approval. The SWPCP must include locations of the temporary sedimentation trap per discharge point with a capacity to contain 134 cubic yards per acre of material in accordance with the 2002 CT Erosion and Sedimentation Guidelines (2002 Guidelines). The Contractor shall provide an inspection and maintenance plan for the temporary sedimentation trap as part of the amended SWPCP.

If the areas of disturbance with a total contributing drainage area of more than five (5) acres per discharge point, a temporary engineered sedimentation basin must be provided and the Contractor must submit to the Engineer a revised SWPCP for review and approval. The SWPCP must include locations of the temporary engineered sedimentation basin designed and installed in accordance with the 2002 Guidelines. The Contractor shall provide an inspection and maintenance plan or the engineered sedimentation basin as part for the amended SWPCP.

3. Control Measures

Erosion and Sedimentation Controls

The Department of Transportation (Department) will have a qualified inspector assigned to the project in order to oversee the Contractor's operations to ensure compliance with the provisions of the Contract. Further Department oversight is provided by the District 2 Environmental Coordinator and the Office of Environmental Planning.

The following timelines will be followed for the proposed construction activities:

- If construction activities are completed to final grade, permanent seeding shall take place within seven (7) days.
- Areas that remain disturbed but inactive for at least 30 days shall receive temporary seeding or soil protection within seven (7) days.
- Areas that will be disturbed past the planting season will be covered with a long-term, non-vegetative stabilization method that will provide protection through the winter.
- The Contractor shall stabilize disturbed areas with temporary or permanent measures as quickly as possible after the land is disturbed. Requirements for soil stabilization are detailed in Form 817 Section 1.10, Environmental Compliance.

Temporary Soil Stabilization Practices

- Sedimentation Control System (SCS): SCS shall be placed at the toe of the slope or as directed by the Engineer
- Temporary Seeding: On soils to be exposed for a period greater than 1 month but less than 1 year, temporary seeding shall be used to temporarily stabilize the soil until permanent stabilization is established.

Stabilization practices shall be implemented after completion, as final grades are reached, within seven (7) days.

Temporary seeding shall be spread over any disturbed areas which will remain inactive for at least 30 days. Areas to remain disturbed through winter shall be protected with non-vegetative stabilization measures. The Contractor must provide an Erosion and Sedimentation Control plan for each winter season during construction operations.

The Contractor may use other controls in the project as necessary if they conform to the 2002 Guidelines and are approved by the Engineer. The Contractor will be required to provide the necessary details for any erosion controls not specifically called for on the project plans.

During construction, all areas disturbed by the construction activity that have not been stabilized, structural control measures, and locations where vehicles enter or exit the site shall be inspected at least once a week and within 24 hours of the end of a storm that generates a discharge. For storms that end on a weekend, holiday or other time in which normal working hours will not commence within 24 hours, an inspection is required within 24 hours following any storm in which 0.5 inches or greater of rain occurs. For lesser storms, inspection shall occur immediately upon the start of subsequent normal working hours.

Permanent Soil Stabilization Practices

During construction, the following methods of permanent stabilization shall be installed:

- Topsoiling: In conjunction with permanent seeding, once final grades have been established, topsoil shall be applied to provide a suitable growth medium for vegetation.
- Permanent Seeding: Once soils have been brought to final grade, permanent seeding shall be used to stabilize the soil with a vegetative cover. Disturbed areas below the wetland limit shall be seeded with a wetland seed mix and/or above the wetland limit shall be seeded with a conservation seed mix.
- Landscaping: Plantings (trees, shrubs, etc.) will be planted along with the use of Conservation Mix seeding pursuant to the plan PMT-11.

All new embankments disturbed by construction and unpaved areas that are graded or disturbed by construction will receive erosion control matting, topsoil and/or turf establishment. The Contractor may use other permanent stabilization practices approved by the Engineer and conforming to 2002 Guidelines.

Maintenance

All construction activities and related activities shall conform to the requirements of Section 1.10 "Environmental Compliance" of the Department's Standard Specifications, Form 817. In general, all construction activities shall proceed in such a manner so as not to pollute any wetlands, watercourses, water body, and conduit carrying stormwater. The Contractor shall limit, in so far as possible, the surface area of earthen materials exposed by construction activity and immediately provide temporary and permanent pollution control to prevent soil erosion and contamination on the site. Water pollution control provisions and best management practices per Section 1.10, Environmental Compliance of the Standard Specifications shall be administered during construction. Control measures shall be inspected and maintained in accordance with the 2002 Guidelines and as directed by the Engineer.

4. Dewatering Wastewaters

A Water Handling Plan with details regarding the project dewatering is included on plan sheets PMT-08 through PMT-10. Pump will not discharge directly into a wetland, watercourse or stormwater drainage system. Prior to any dewatering, the Contractor must submit to the Engineer a written proposal for specific methods and devices to be used, and must obtain the Engineer's written approval of such methods and devices, including, but not limited to, the pumping of water into a temporary sedimentation basin, providing surge protection at the inlet or outlet of pumps, floating the intake of a pump, or any other method for minimizing and retaining the suspended solids. If the Engineer determines that a pumping operation is causing turbidity problems, the Contractor shall halt said operation until a means of controlling the turbidity is submitted by the Contractor in writing to the Engineer, approved in writing by the Engineer and implemented by the Contractor. No discharge of dewatering wastewater shall contain or cause a visible oil sheen, floating solids or foaming in the receiving water. If required, all activities are to be performed in compliance with the Department's Form 817.

5. Post-Construction Stormwater Management

Post-construction Guidelines

After the project is complete, the Department will perform the following maintenance and restorative measures:

- Litter/debris and sweepings will be removed from the site regularly.
- Mowing and maintenance of the turf areas and vegetated areas will occur as needed.

Post Construction Performance Standards for Redevelopment

The project site is more than 40% impervious in the existing conditions. There will be a small increase in impervious area, approximately 5,600 square-feet as a result of this project.

Pre-Construction Impervious Cover

$(0.6 \text{ acres of impervious} / 1.4 \text{ acres project area}) \times 100 = 43\%$

Post-Construction Impervious Cover

$(0.75 \text{ acres of impervious} / 1.4 \text{ acres project area}) \times 100 = 54\%$

No stormwater retention is provided on-site due to the presence of wetlands directly adjacent to this linear project, the lack of vegetated center median, and the steep slopes of the areas near the bridge abutments.

6. Other Controls

Waste Disposal

Construction site waste shall be properly managed and disposed of during the entire construction period. Additionally,

- A waste collection area will be designated. The selected area will minimize truck travel through the site and will not drain directly to the adjacent wetlands.
- Waste collection shall be scheduled regularly to prevent the containers from overflowing.
- Spills shall be cleaned up immediately.
- Defective containers that may cause leaks or spills will be identified through regular inspection. Any found to be defective will be repaired or replaced immediately.
- Any stockpiling of materials should be confined to the designated area as approved by the engineer.

Washout Areas

Washout of applicators, containers, vehicles and equipment for concrete shall be conducted in a designated washout area. No surface discharge of washout wastewaters from the area will be allowed. All concrete wash water will be directed into a container or pit such that no overflows can occur. Washout shall be conducted in an entirely self-contained system and will be clearly designed and flagged or signed where necessary. The washout area shall be located outside of any buffers and at least 50 feet from any stream, wetland or other sensitive water or natural resources as determined or designated by the Department's Office of Environmental Planning or the project engineer.

Washout Area(s) will be site located by the Contractor, approved by the engineer and the SWPCP revised as appropriate. The "Concrete Washout Area" detail shows the recommended method of construction for the washout area. The designated area shall be designed and maintained such that no overflows can occur during rainfall or after snowmelt.

Anti-tracking Pads and Dust Control

Off-site vehicle tracking of sediments and the generation of dust shall be minimized. Temporary anti-tracking pads from the active work site to the existing pavement will be installed and maintained at the locations shown on the plans. The Contractor shall:

- Maintain the entrance in a condition which will prevent tracking and washing of sediment onto paved surfaces.
- Provide periodic top dressing with additional stone or additional length as conditions demand.
- Repair any measures used to trap sediment as needed.
- Immediately remove all sediment spilled, dropped, washed or tracked onto paved surfaces.
- Ensure roads adjacent to a construction site are left clean at the end of each day.

If the construction entrance is being properly maintained and the action of a vehicle traveling over the stone pad is not sufficient to remove the majority of the sediment, then the contractor shall either:

- Increase the length of the construction entrance,
- Modify the construction access road surface, or
- Install washing racks and associated settling area or similar devices before the vehicle enters a paved surface.

For construction activities which cause airborne particulates, wet dust suppression shall be utilized. Construction site dust will be controlled by sprinkling the ground surface with water until it is moist on an as-needed basis. The volume of water sprayed shall be such that it suppresses dust yet also prevents the runoff of water.

Maintaining and Storing Vehicles and Equipment

The Contractor shall take measures to prevent any contamination to wetlands and watercourses while maintaining and storing construction equipment on the site. All chemical and petroleum containers stored on site shall be provided with impermeable containment which will hold at least 110% of the volume of the largest container, or 10% of the total volume of all containers in the area, whichever is larger, without overflow from the containment area. All chemicals and their containers shall be stored under a roofed area except for those stored in containers of 100 gallon capacity or more, in which case double-walled tanks will suffice.

7. Inspections

All construction activities shall be inspected initially within the first 30 days, for Plan implementation and then weekly for Routine Inspections.

The Permittee will maintain a rain gauge on-site to document rainfall amounts. During construction, all areas disturbed by the construction activity that have not been stabilized, all erosion and sedimentation control measures, all structural control measures, soil stockpile areas, washout areas and locations where vehicles enter or exit the site shall be inspected for evidence of, or the potential for, pollutants entering the drainage system and impacts to receiving waters at least once every seven calendar days and within 24 hours of the end of a storm that generates a discharge. For storms that end on a weekend, holiday or other time in which working hours will not commence within 24 hours, an inspection is required within 24 hours only for storms that equal or exceed 0.5 inches. For lesser storms, inspection shall occur immediately upon the start of subsequent normal working hours. Where sites have been temporarily or finally stabilized, such inspection shall be conducted at least once every month for three months. For the final stabilization inspection, once the site has been stabilized for at least three (3) months, such inspection shall be by a qualified inspector to confirm final stabilization and compliance indicated on the Notice of Termination form in Appendix E.

Qualified inspectors provided by the Department's District 2 Office shall conduct inspections.

The following items shall be inspected as described below:

<u>Item</u>	<u>Procedure</u>
Sedimentation Control System (SCS)	The SCS shall be inspected to ensure that the fence line is intact with no breaks or tears. The fence shall be firmly anchored to the ground. Areas where the fence is excessively sagging or where support posts are broken or uprooted shall be noted. Depth of sediment behind the fence shall be noted.
Concrete Washout Area	Containers or pits shall be inspected at least once a week to ensure structural integrity, adequate holding capacity and will be repaired prior to future use if leaks are present. The contractor shall remove hardened concrete waste when it accumulates to a height of ½ of the container or pit or as necessary to avoid overflows. All concrete waste shall be disposed of in a manner consistent with all applicable laws, regulations and guidelines.
General	Construction areas and the perimeter of the site shall be inspected for any evidence of debris that may blow or wash off site or that has blown or washed off site. Construction areas shall be inspected for any spills or unsafe storage of materials that could pollute off site waters.

8. Keeping Plans Current

Revisions to Stormwater Pollution Control Plans

The Department shall amend the Plan if the actions required by the Plan fail to prevent pollution or otherwise comply with provisions of the General Permit. The Plan shall also be amended whenever there is a change in contractors or sub-contractors at the site. If the results of the inspections require modifications to the Stormwater Pollution Control Plan, the plans shall be revised as soon as practicable after the inspection. Such modifications shall provide for a timely implementation of any changes to non-engineered controls on the site within 24 hours and implementation of any changes to the plan within 3 (three) calendar days following the inspection. For Engineered measures, corrective actions shall be implemented on site within 7 (seven) days and incorporated into a revised Plan within 10 (ten) days of the date of inspection

In no event shall the requirements to keep the Plan current or update a Plan, relieve the permittee and their contactor(s) of the responsibility to properly implement any actions required to protect the waters of the State and to comply with all conditions of the permit.

9. Monitoring Requirements

A written report summarizing the scope of the inspection, the name(s) and qualifications of inspection personnel, the date and time of the inspection, major observations relative to the implementation of the Pollution Control Plan, and actions taken shall be completed within 24 hours of the inspection. This report shall be retained as part of the Stormwater Pollution Control Plan for at least five years after the date of the inspection.

Sampling is required of all point source discharges of Stormwater from disturbed areas. All sampling points should be clearly marked in the field with flags, stakes or other visible markers. Where there are 2 or more discharge points that discharge substantially identical runoff based on similarities of the exposed soils, slope and type of stormwater controls used, up to 5 substantially identical outfalls may be identified for one representative discharge. For linear projects, 10 substantially identical outfalls may be identified for one representative discharge. Additionally, if the project is planned to continue for more than one year, the inspector as designated by the permittee shall rotate twice per year the location where samples are taken so that a different discharge point is sampled every six months. The outfall locations for sampling will be identified by the inspector, based on disturbance and approved by the engineer and the SWPCP revised as appropriate.

Turbidity monitoring shall be conducted utilizing the drainage plans and a procedure consistent with 40 CFR Part 136 (http://www.epa.gov/region9/qa/pdfs/40cfr136_03.pdf) and may be taken manually or by an in-situ turbidity probe or other automatic sampling device equipped to take individual turbidity readings. The first sample shall be taken within the first hour of stormwater discharge from the site and at least three grab samples shall be taken during a storm event and shall be representative of the flow and characteristics of the discharge. Sampling shall be conducted at least monthly when there is a discharge of stormwater from the site while construction activity is ongoing, until final stabilization of the drainage area associated with each outfall is achieved.

Samples shall be taken during normal working hours, which for this project shall be defined as Monday through Saturday 7 am to 4 pm. If a storm continues past working hours, sampling shall resume the following morning or the morning of the next working day following a weekend or Holiday, as long as the discharge continues. Sampling may be temporarily suspended when conditions exist that may reasonably pose a threat to the safety of the person taking the sample.

Within 30 days following the end of each month, the stormwater sampling results shall be submitted on the Stormwater Monitoring Report (SMR) included in Appendix D and submit in accordance with Net DMR. If there is no stormwater discharge during a month, sampling is not required, however, SMR's indicating "no discharge" along with the reason, shall still be submitted as required.

10. Contractors

This section shall identify all Contractors and Subcontractors who will perform on site actions which may reasonably be expected to cause or have the potential to cause pollution of the waters of the State.

Certification Statement

All contractors and subcontractors must sign the attached statement. All certification will be included in the Stormwater Pollution Control Plan.

State Project No. 0120-0090

Replacement of Bridge Nos. 01140 & 05401
Route 82 over the East Branch Eightmile River & Swamp Brook
Salem, CT

“I certify under penalty of law that I have read and understand the terms and conditions of the General Permit for the Discharge of Stormwater and Dewatering Wastewaters from Construction Activities. I understand that as Contractor on the project, I am covered by this General Permit, and must comply with the terms and conditions of this permit, including, but not limited to, the requirements of the Stormwater Pollution Control Plan prepared for this project.”

GENERAL CONTRACTOR

Signed: _____

Date: _____

Title: _____

Firm: _____

Telephone: _____

Address: _____

SUBCONTRACTOR

Signed: _____

Date: _____

Title: _____

Firm: _____

Telephone: _____

Address: _____

Appendix A – Location Map

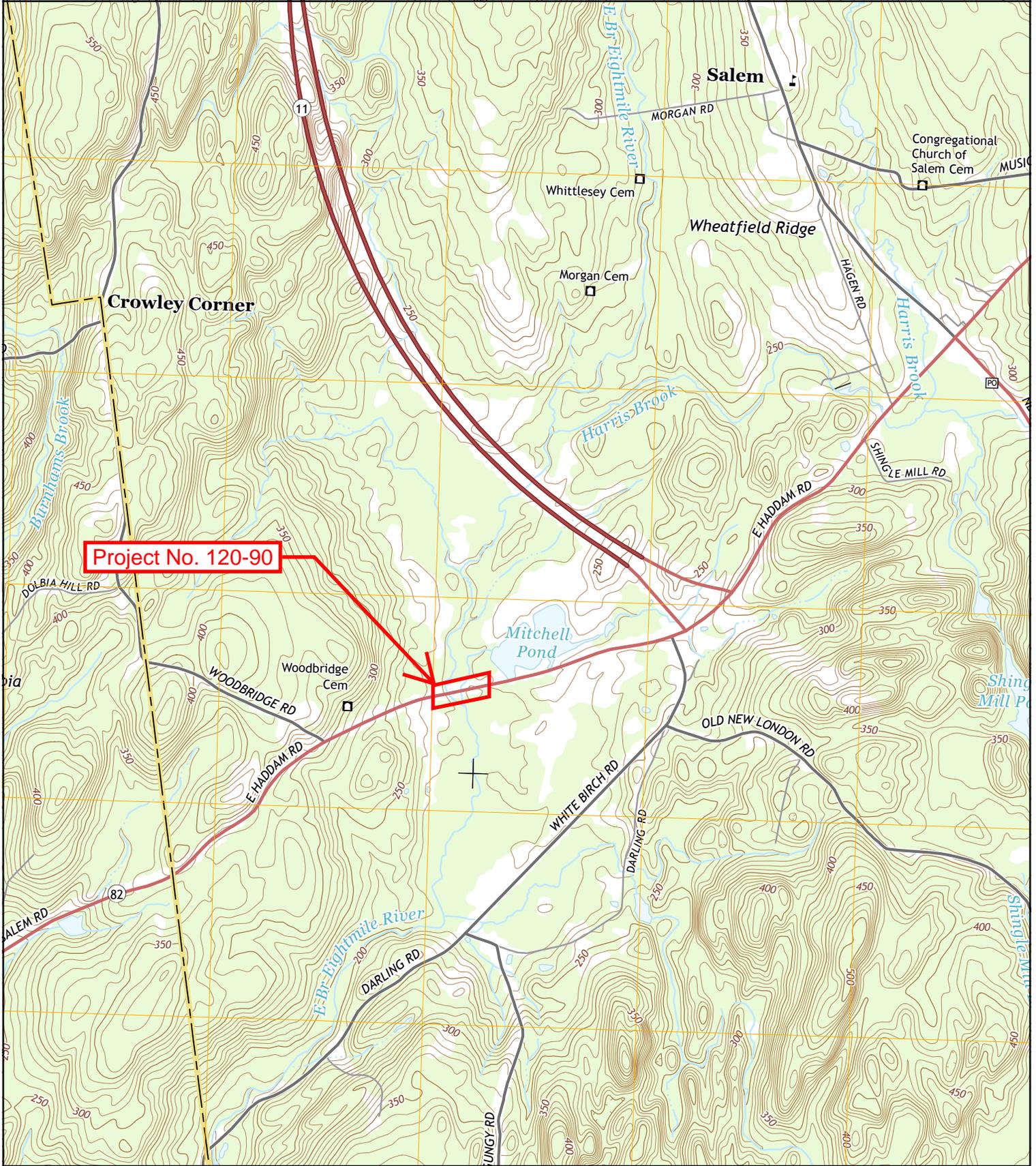


Engineers
 Designers
 Consultants
 Planners
 Scientists
 101 East River Drive, 1st Floor * East Hartford, CT 06108
 T 860.250.4100 * www.cmeengineering.com

USGS TOPOGRAPHIC MAP

PROJECT NO. 120-90 IN SALEM, CT

ROUTE 82 OVER EAST BRANCH EIGHT MILE RIVER



Project No. 120-90



**USGS MAP
 #85
 HAMBURG**



REQUESTER: CONNDOT

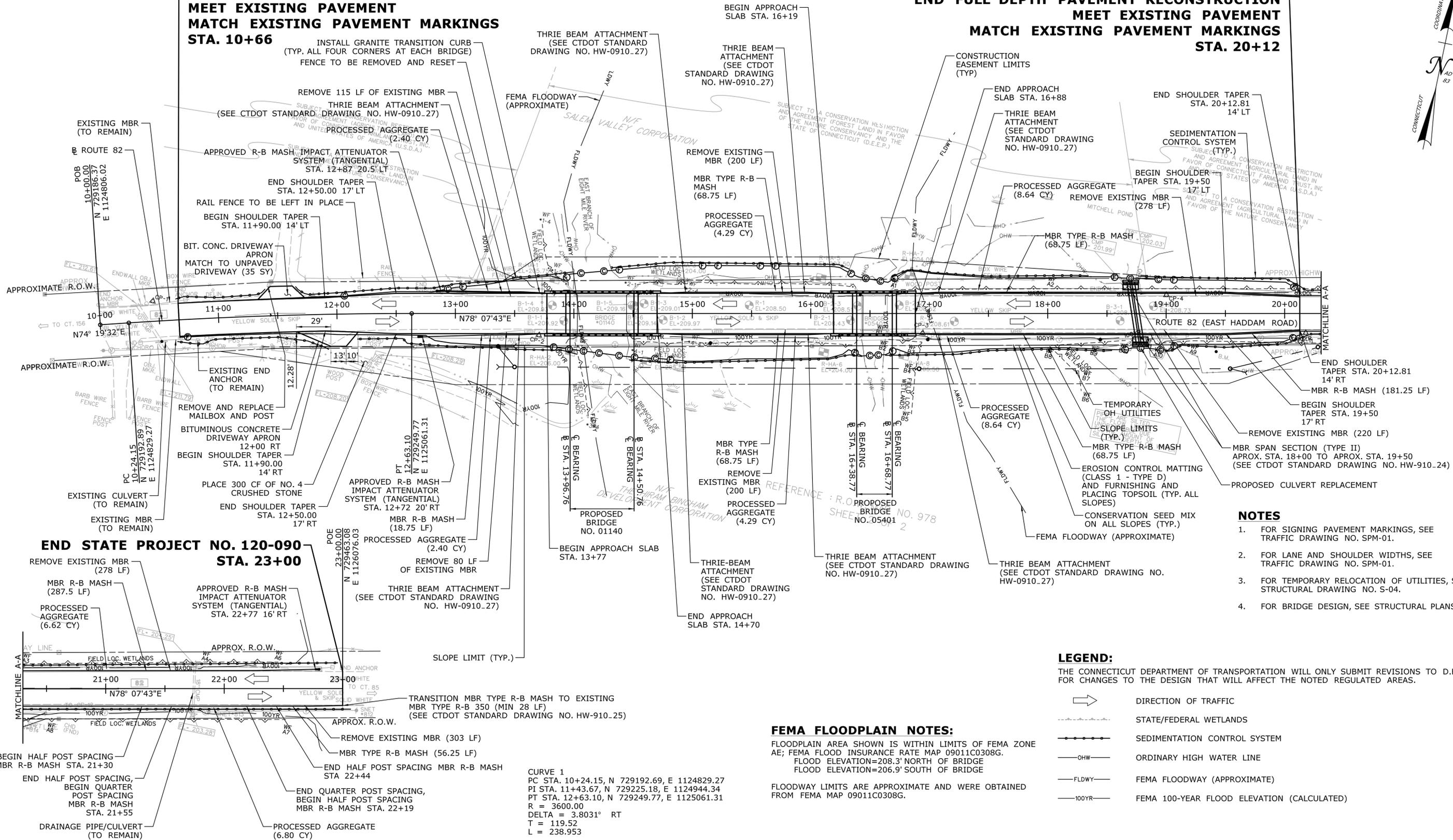
1 INCH = 2,000 FEET



Appendix B – Plan Sheets HWY-04 to HWY-05 and PMT-01 to PMT-11

**BEGIN STATE PROJECT NO. 120-090
CUT BITUMINOUS CONCRETE PAVEMENT
BEGIN FULL DEPTH PAVEMENT RECONSTRUCTION
MEET EXISTING PAVEMENT
MATCH EXISTING PAVEMENT MARKINGS
STA. 10+66**

**CUT BITUMINOUS CONCRETE PAVEMENT
END FULL DEPTH PAVEMENT RECONSTRUCTION
MEET EXISTING PAVEMENT
MATCH EXISTING PAVEMENT MARKINGS
STA. 20+12**



- NOTES**
- FOR SIGNING PAVEMENT MARKINGS, SEE TRAFFIC DRAWING NO. SPM-01.
 - FOR LANE AND SHOULDER WIDTHS, SEE TRAFFIC DRAWING NO. SPM-01.
 - FOR TEMPORARY RELOCATION OF UTILITIES, SEE STRUCTURAL DRAWING NO. S-04.
 - FOR BRIDGE DESIGN, SEE STRUCTURAL PLANS.

- LEGEND:**
- DIRECTION OF TRAFFIC
 - STATE/FEDERAL WETLANDS
 - SEDIMENTATION CONTROL SYSTEM
 - ORDINARY HIGH WATER LINE
 - FEMA FLOODWAY (APPROXIMATE)
 - FEMA 100-YEAR FLOOD ELEVATION (CALCULATED)

FEMA FLOODPLAIN NOTES:
FLOODPLAIN AREA SHOWN IS WITHIN LIMITS OF FEMA ZONE AE; FEMA FLOOD INSURANCE RATE MAP 09011C0308G. FLOOD ELEVATION=208.3' NORTH OF BRIDGE FLOOD ELEVATION=206.9' SOUTH OF BRIDGE
FLOODWAY LIMITS ARE APPROXIMATE AND WERE OBTAINED FROM FEMA MAP 09011C0308G.

CURVE 1
PC STA. 10+24.15, N 729192.69, E 1124829.27
PI STA. 11+43.67, N 729225.18, E 1124944.34
PT STA. 12+63.10, N 729249.77, E 1125061.31
R = 3600.00
DELTA = 3.8031° RT
T = 119.52
L = 238.953

REV.	DATE	REVISION DESCRIPTION	SHEET NO.	Plotted Date: 7/1/2020

DESIGNER/DRAFTER: **AJM**
CHECKED BY: **CVZ**
SCALE IN FEET
0 40 80
SCALE 1"=40'

STATE OF CONNECTICUT
DEPARTMENT OF TRANSPORTATION

SIGNATURE/BLOCK:

VN ENGINEERS INC.
Traffic • Infrastructure • Planning
116 WASHINGTON AVENUE
NORTH HAVEN, CT 06473
203.234.3862

PROJECT TITLE:
REPLACEMENT OF BRIDGE NOS. 01140 & 05401, ROUTE 82 OVER EAST BRANCH THE EIGHTMILE RIVER & SWAMP BROOK

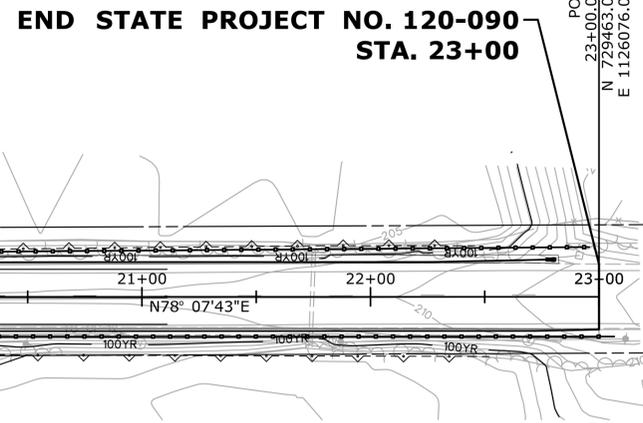
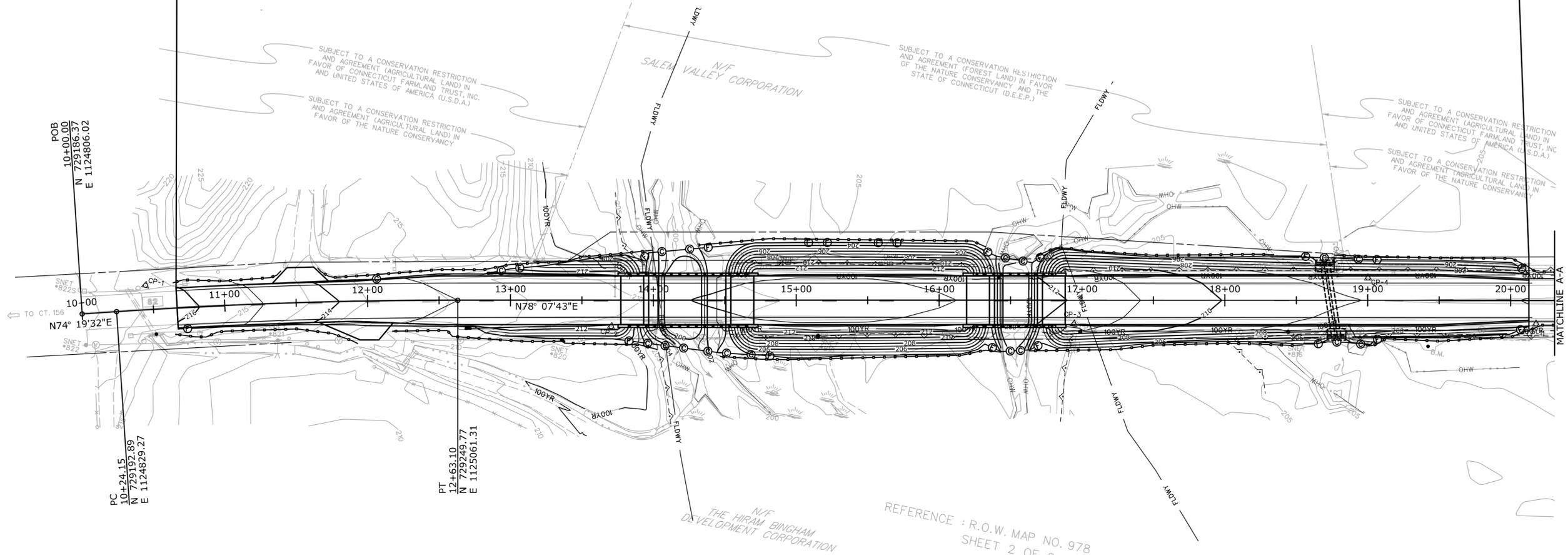
TOWN:
SALEM

DRAWING TITLE:
HIGHWAY PLAN

PROJECT NO.: **0120-0090**
DRAWING NO.: **HWY-04**
SHEET NO.: **03.04**

**BEGIN STATE PROJECT NO. 120-090
 CUT BITUMINOUS CONCRETE PAVEMENT
 BEGIN FULL DEPTH PAVEMENT RECONSTRUCTION
 MEET EXISTING PAVEMENT
 MATCH EXISTING GRADES
 STA. 10+66**

**CUT BITUMINOUS CONCRETE PAVEMENT
 END FULL DEPTH PAVEMENT RECONSTRUCTION
 MEET EXISTING PAVEMENT
 MATCH EXISTING GRADES
 STA. 20+12**



REFERENCE : R.O.W. MAP NO. 978
 SHEET 2 OF 2

LEGEND:

THE CONNECTICUT DEPARTMENT OF TRANSPORTATION WILL ONLY SUBMIT REVISIONS TO D.E.E.P. FOR CHANGES TO THE DESIGN THAT WILL AFFECT THE NOTED REGULATED AREAS.

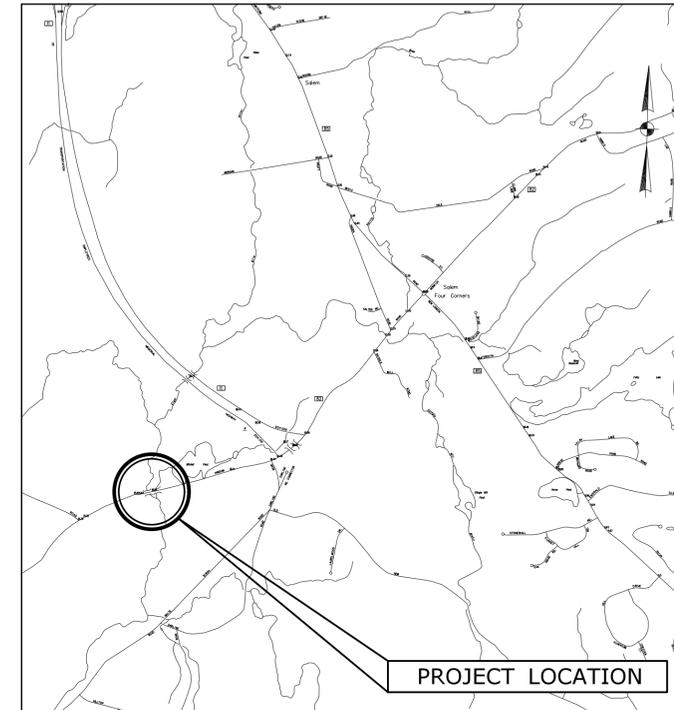
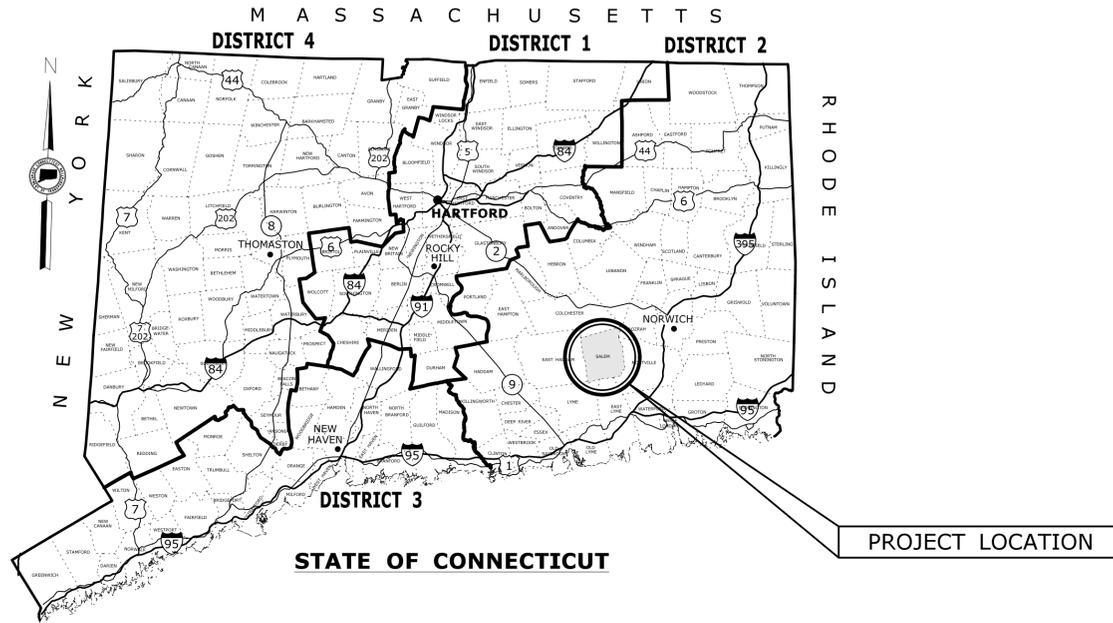
- STATE/FEDERAL WETLANDS
- SEDIMENTATION CONTROL SYSTEM
- OHW --- ORDINARY HIGH WATER LINE
- FLDWY --- FEMA FLOODWAY (APPROXIMATE)
- 100YR --- FEMA 100-YEAR FLOOD ELEVATION (CALCULATED)
- LIMIT OF CUT LINE
- LIMIT OF FILL LINE

FEMA FLOODPLAIN NOTES:

FLOODPLAIN AREA SHOWN IS WITHIN LIMITS OF FEMA ZONE AE; FEMA FLOOD INSURANCE RATE MAP 09011C0308G. FLOOD ELEVATION=208.3' NORTH OF BRIDGE FLOOD ELEVATION=206.9' SOUTH OF BRIDGE FLOODWAY LIMITS ARE APPROXIMATE AND WERE OBTAINED FROM FEMA MAP 09011C0308G.

THE INFORMATION, INCLUDING ESTIMATED QUANTITIES OF WORK, SHOWN ON THESE SHEETS IS BASED ON LIMITED INVESTIGATIONS BY THE STATE AND IS IN NO WAY WARRANTED TO INDICATE THE CONDITIONS OF ACTUAL QUANTITIES OF WORK WHICH WILL BE REQUIRED.		DESIGNER/DRAFTER: AJM	STATE OF CONNECTICUT DEPARTMENT OF TRANSPORTATION	VN ENGINEERS INC. Traffic • Infrastructure • Planning 116 WASHINGTON AVENUE NORTH HAVEN, CT 06473 203.234.7862	PROJECT TITLE: REPLACEMENT OF BRIDGE NOS. 01140 & 05401, ROUTE 82 OVER EAST BRANCH THE EIGHTMILE RIVER & SWAMP BROOK	TOWN: SALEM	PROJECT NO. 0120-0090
CHECKED BY: CVZ	SCALE IN FEET SCALE 1"=40'	SIGNATURE/ BLOCK:			DRAWING TITLE: GRADING PLAN	DRAWING NO. HWY-05	
REV. DATE REVISION DESCRIPTION SHEET NO. Plotted Date: 7/1/2020	FILENAME: ...\\plan\HW_MSH_120-090_HWY-05.dgn	STATE OF CONNECTICUT DEPARTMENT OF TRANSPORTATION		PROJECT TITLE: REPLACEMENT OF BRIDGE NOS. 01140 & 05401, ROUTE 82 OVER EAST BRANCH THE EIGHTMILE RIVER & SWAMP BROOK		TOWN: SALEM	PROJECT NO. 0120-0090 DRAWING NO. HWY-05 SHEET NO. 03.05

ENVIRONMENTAL PERMIT PLANS STATE PROJECT NO. 0120-0090 REPLACEMENT OF BRIDGE NOS. 01140 & 05401 IN THE TOWN OF SALEM



LOCATION MAP
1" = 1000'

GENERAL NOTES:

1. THESE PLANS 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 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 VERTICAL DATUM BASED ON NAVD 1988.
5. ALL CONSTRUCTION ACTIVITIES WILL BE CONDUCTED IN ACCORDANCE WITH THE DEPARTMENT'S STANDARD SPECIFICATIONS FOR ROADS, BRIDGE, AND INCIDENTAL CONSTRUCTION, FORM 817, SECTION 1.10 AND WILL ALSO FOLLOW REQUIRED BEST MANAGEMENT PRACTICES (BMPs) AND SEIMENT AND EROSION CONTROL MEASURES IN ACCORDANCE WITH THE 2002 EROSION & 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	WETLAND/WATERCOURSE IMPACT PLAN
PMT-04	100-YR FLOOD IMPACT PLAN
PMT-05	ELEVATIONS & SECTIONS PLAN - 1
PMT-06	ELEVATIONS & SECTIONS PLAN - 2
PMT-07	ELEVATIONS & SECTIONS PLAN - 3
PMT-08	STAGING & WATER HANDLING PLAN - 1
PMT-09	STAGING & WATER HANDLING PLAN - 2
PMT-10	STAGING & WATER HANDLING PLAN - 3
PMT-11	PERMIT PLANTING PLAN

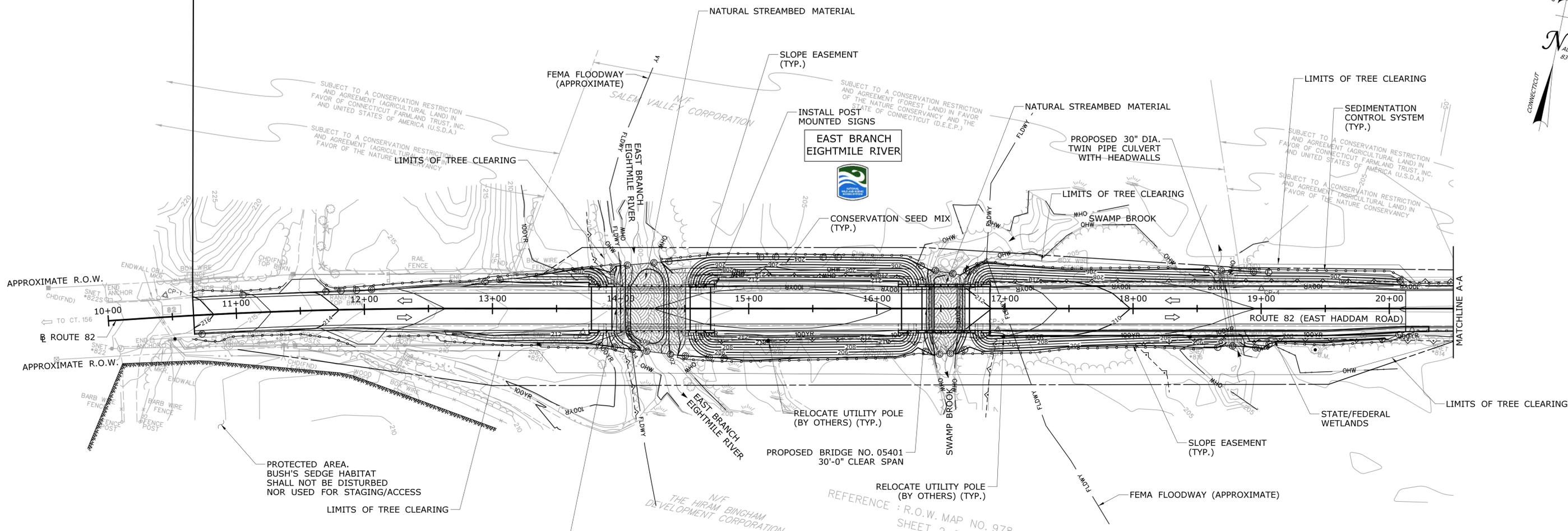
DESIGNED BY:
Dewberry Engineers Inc.

Dewberry
59 Elm Street, Suite 200
New Haven, CT 06510-2047

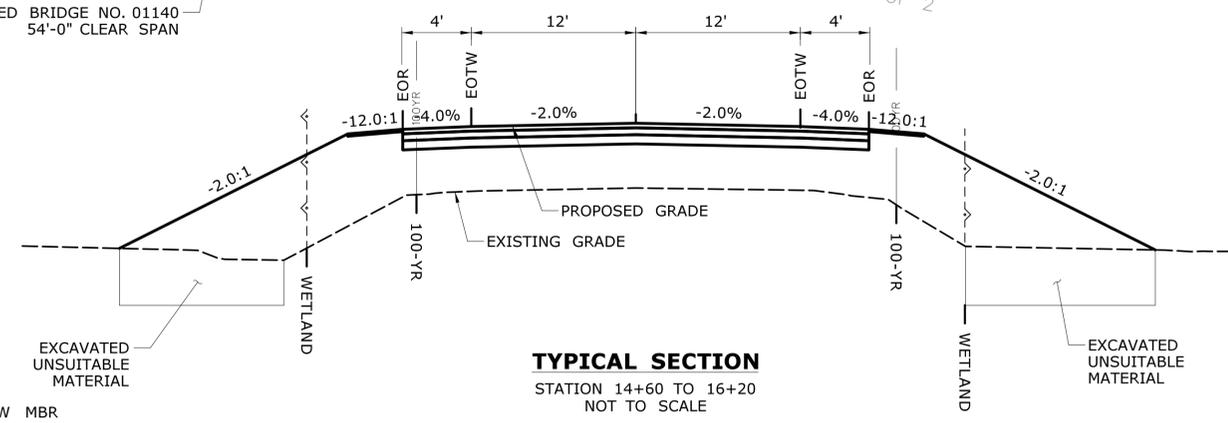
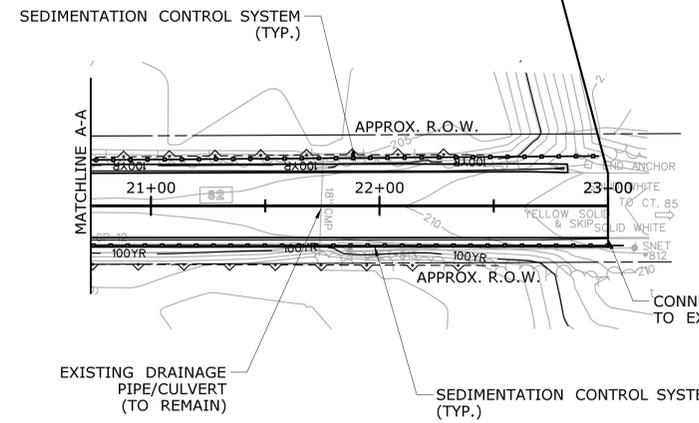
**ENVIRONMENTAL PERMIT PLANS
PLAN DATE: NOVEMBER 22, 2019**

REV.	DATE	REVISION DESCRIPTION	SHEET NO.	Plotted Date: 05/18/2020	DESIGNER/DRAFTER: J. TZOC CHECKED BY: D. JOHNSON	 STATE OF CONNECTICUT DEPARTMENT OF TRANSPORTATION	SIGNATURE/ BLOCK: 59 Elm Street, Suite 200 New Haven, CT 06510-2047	PROJECT TITLE: REPLACEMENT OF BRIDGE NOS. 01140 & 05401, ROUTE 82 OVER EAST BRANCH EIGHTMILE RIVER & SWAMP BROOK	TOWN: SALEM	PROJECT NO. 120-090 DRAWING NO. PMT-01 SHEET NO.
					SCALE AS NOTED			DRAWING TITLE: TITLE SHEET		

**BEGIN STATE PROJECT NO. 120-090
STA. 10+66.60**



**END PROJECT NO. 120-090
STA. 23+00**



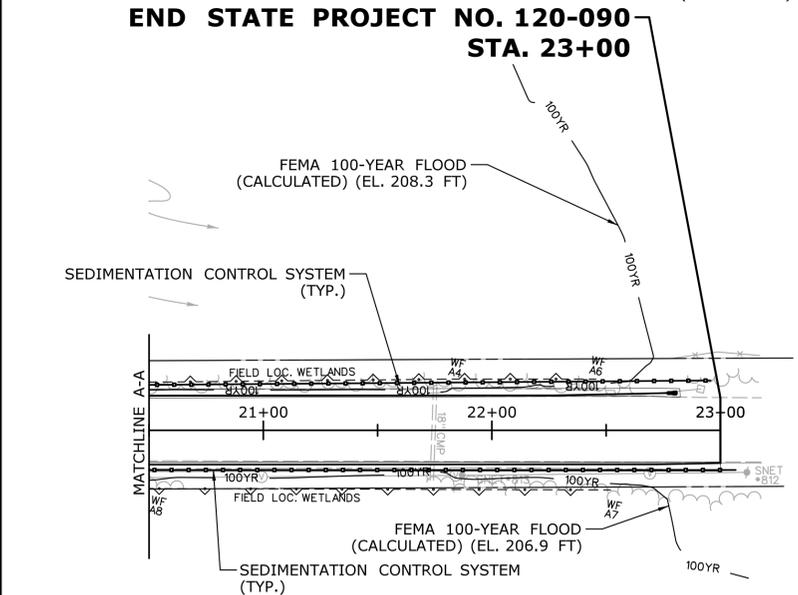
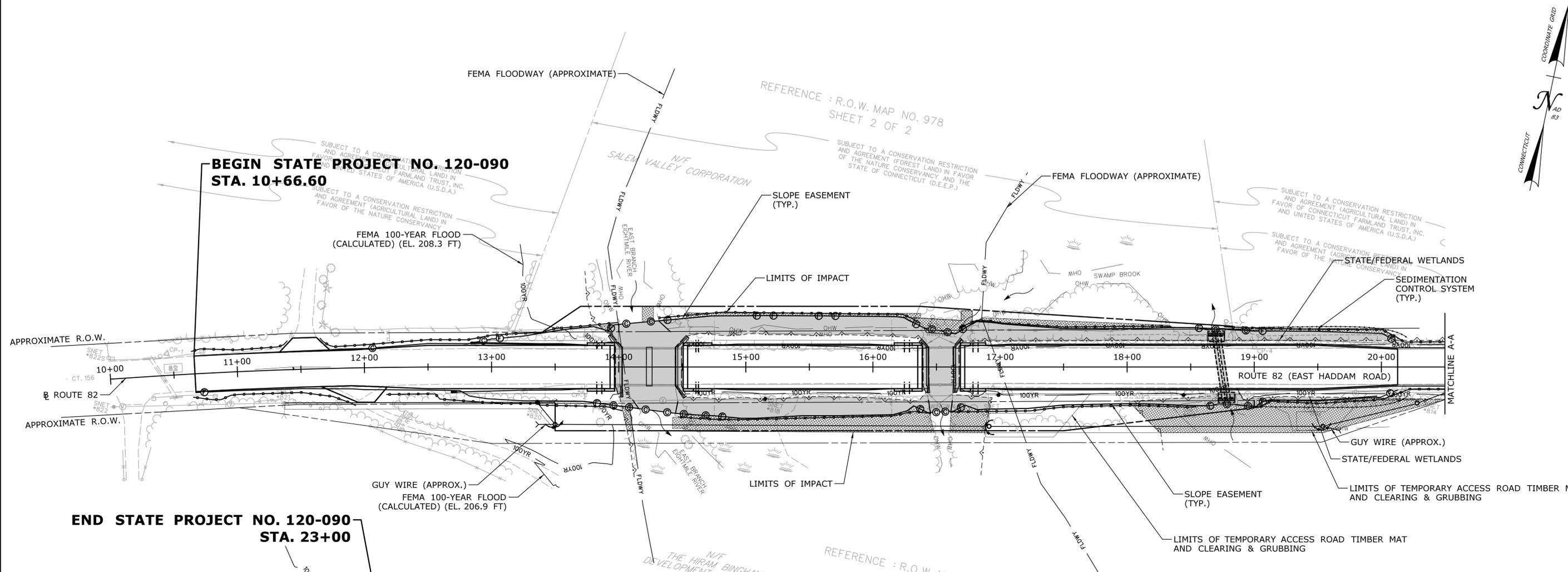
TYPICAL SECTION
STATION 14+60 TO 16+20
NOT TO SCALE

- LEGEND:**
THE DEPARTMENT OF TRANSPORTATION WILL ONLY SUBMIT REVISIONS TO DEEP FOR CHANGES TO THE DESIGN THAT WILL AFFECT THE NOTED REGULATED AREAS.
- STATE/FEDERAL WETLANDS
 - SEDIMENTATION CONTROL SYSTEM
 - OHW --- ORDINARY HIGH WATER LINE
 - FLDWY --- FEMA FLOODWAY (APPROXIMATE)
 - 100YR --- FEMA 100-YEAR FLOOD ELEVATION (CALCULATED)
 - NATURAL STREAMBED MATERIAL

NOTES:
FLOODPLAIN AREA SHOWN IS WITHIN LIMITS OF FEMA ZONE AE; FEMA FLOOD INSURANCE RATE MAP 09011C0308G. THE FLOODPLAIN LIMITS ARE DELINEATED BASED ON THE EXISTING CONTOURS.
FLOOD ELEVATION=208.3' NORTH OF BRIDGE
FLOOD ELEVATION=206.9' SOUTH OF BRIDGE
FLOODWAY LIMITS ARE APPROXIMATE AND WERE OBTAINED FROM FEMA MAP 09011C0308G.

**ENVIRONMENTAL PERMIT PLANS
PLAN DATE: NOVEMBER 22, 2019**

DESIGNER/DRAFTER: MDB/AJM CHECKED BY: CVZ SCALE IN FEET 0 40 80 SCALE 1"=40'		STATE OF CONNECTICUT DEPARTMENT OF TRANSPORTATION		SIGNATURE/BLOCK: VN ENGINEERS INC. Traffic • Infrastructure • Planning 116 WASHINGTON AVENUE NORTH HAVEN, CT 06473 203.234.7862		PROJECT TITLE: REPLACEMENT OF BRIDGE NOS. 01140 & 05401, ROUTE 82 OVER EAST BRANCH EIGHTMILE RIVER & SWAMP BROOK		TOWN: SALEM		PROJECT NO. 120-090	
THE INFORMATION, INCLUDING ESTIMATED QUANTITIES OF WORK, SHOWN ON THESE SHEETS IS BASED ON LIMITED INVESTIGATIONS BY THE STATE AND IS IN NO WAY WARRANTED TO INDICATE THE CONDITIONS OF ACTUAL QUANTITIES OF WORK WHICH WILL BE REQUIRED.		Plotted Date: 5/21/2020		FILENAME: ...VHW_MSH_120-090_GEN-PMT-02.dgn		DRAWING TITLE: GENERAL SITE PLAN		DRAWING NO. PMT-02		SHEET NO.	



LEGEND

THE DEPARTMENT OF TRANSPORTATION WILL ONLY SUBMIT REVISIONS TO CTDEEP FOR CHANGES TO THE DESIGN THAT WILL AFFECT THE NOTED REGULATED AREAS.

- SEDIMENTATION CONTROL SYSTEM
- STATE/FEDERAL WETLANDS
- ORDINARY HIGH WATER LINE
- FEMA FLOODWAY (APPROXIMATE)
- FEMA 100-YEAR FLOOD ELEVATION (CALCULATED)
- LIMIT OF TEMPORARY IMPACTS
- LIMIT OF PERMANENT IMPACTS

WETLAND IMPACT TABLE

	PERMANENT IMPACT (S.F.) [AC.]	TEMPORARY IMPACT (S.F.) [AC.]	TOTAL IMPACT (S.F.) [AC.]
WETLAND (CT INLAND, FEDERAL)	9075 [0.21]	8125 [0.18]	17200 [0.39]
OHW, WATERCOURSE	4725 [0.11]	500 [0.01]	5225 [0.12]
TOTAL IMPACT	13800 [0.32]	8625 [0.19]	22425 [0.51]

NOTES:

FLOODPLAIN AREA SHOWN IS WITHIN LIMITS OF FEMA ZONE AE; FEMA FLOOD INSURANCE RATE MAP 09011C0308G. THE FLOODPLAIN LIMITS ARE DELINEATED THE BASED ON THE EXISTING CONTOURS.
 FLOOD ELEVATION=208.3' NORTH OF BRIDGE
 FLOOD ELEVATION=206.9' SOUTH OF BRIDGE

FLOODWAY LIMITS ARE APPROXIMATE AND WERE OBTAINED FROM FEMA MAP 09011C0308G.

THE CONTRACTOR SHALL NOT WORK WITHIN THE LIMITS OF THE WETLANDS AND WATERCOURSE WITH THE EXCEPTION OF THOSE AREAS DELINEATED AS TEMPORARY OR PERMANENT IMPACTS TO THE WETLANDS AND WATERCOURSE. ALL DISTURBED AREAS SHALL BE RESTORED.

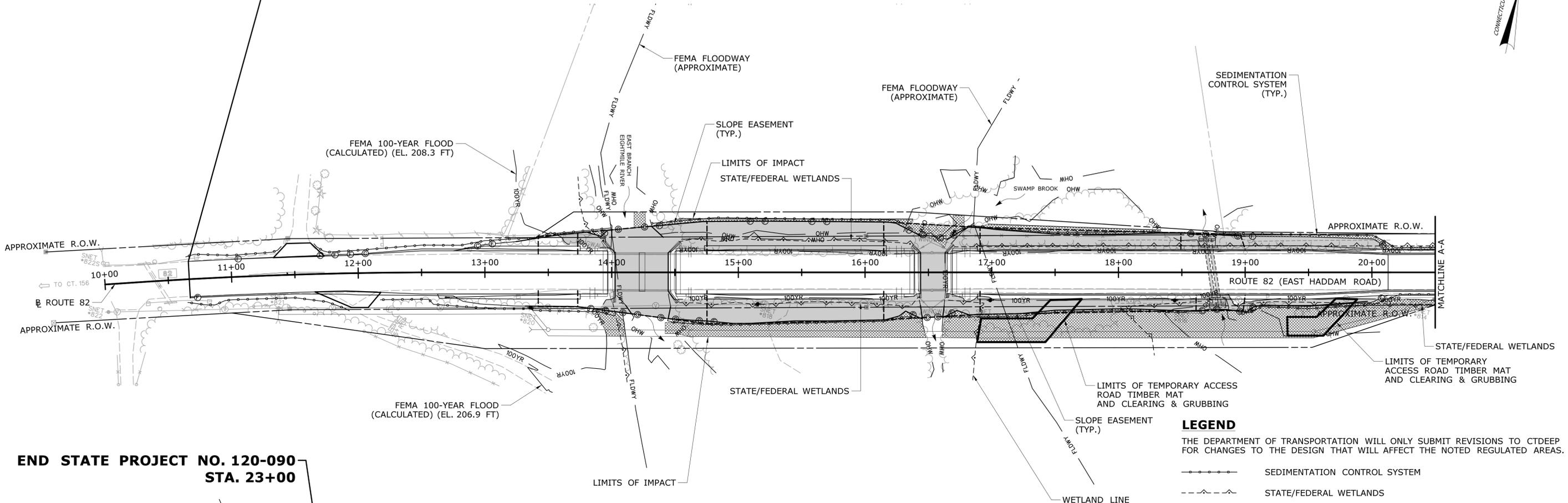
ENVIRONMENTAL PERMIT PLANS
PLAN DATE: NOVEMBER 22, 2019

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		CHECKED BY: RSB	STATE OF CONNECTICUT DEPARTMENT OF TRANSPORTATION	VN ENGINEERS INC. Traffic • Infrastructure • Planning 116 WASHINGTON AVENUE NORTH HAVEN, CT 06473 203.234.7862			DRAWING NO. PMT-03
THE INFORMATION, INCLUDING ESTIMATED QUANTITIES OF WORK, SHOWN ON THESE SHEETS IS BASED ON LIMITED INVESTIGATIONS BY THE STATE AND IS IN NO WAY WARRANTED TO INDICATE THE CONDITIONS OF ACTUAL QUANTITIES OF WORK WHICH WILL BE REQUIRED.		SCALE IN FEET 0 40 80 SCALE 1"=40'				WETLAND/WATERCOURSE IMPACT PLAN	
REV.	DATE	REVISION DESCRIPTION	SHEET NO.	Plotted Date: 5/21/2020	Filename: ...\\VH_MSH-120-090_WIP-PMT-03.dgn		

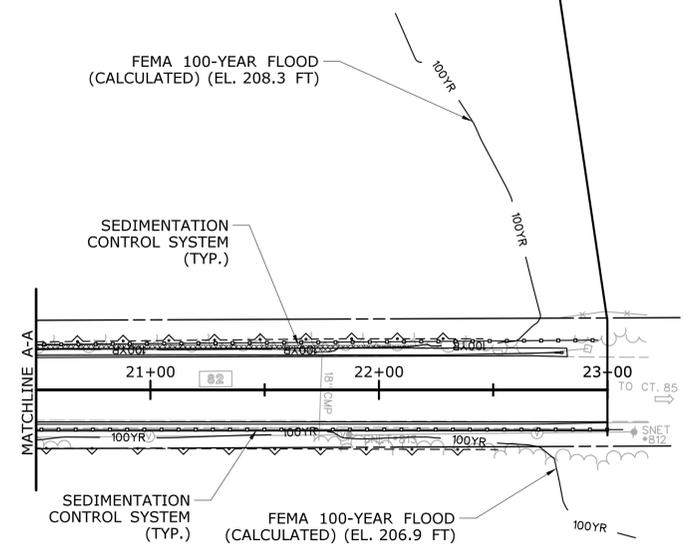
**BEGIN STATE PROJECT NO. 120-090
STA. 10+66.60**

FEMA FLOODWAY AREA IMPACTS, CUT, AND FILL	
VOLUME IMPACTS	
EXCAVATION IN FEMA FLOODWAY	FILL IN FEMA FLOODWAY
2740 C.Y.	3035 C.Y.

100-YR FLOODPLAIN AREA IMPACTS, CUT, AND FILL	
VOLUME IMPACTS	
EXCAVATION IN 100-YR FLOODPLAIN	FILL IN 100-YR FLOODPLAIN
4855 C.Y.	5325 C.Y.



**END STATE PROJECT NO. 120-090
STA. 23+00**



LEGEND

THE DEPARTMENT OF TRANSPORTATION WILL ONLY SUBMIT REVISIONS TO CTDEEP FOR CHANGES TO THE DESIGN THAT WILL AFFECT THE NOTED REGULATED AREAS.

- SEDIMENTATION CONTROL SYSTEM
- - - STATE/FEDERAL WETLANDS
- OHW - ORDINARY HIGH WATER LINE
- FLDWY - FEMA FLOODWAY (APPROXIMATE)
- 100YR - FEMA 100-YEAR FLOOD ELEVATION (CALCULATED)
- [Hatched Box] LIMIT OF TEMPORARY 100-YR FLOODPLAIN IMPACTS
- [Solid Box] LIMIT OF PERMANENT 100-YR FLOODPLAIN IMPACTS

NOTES:

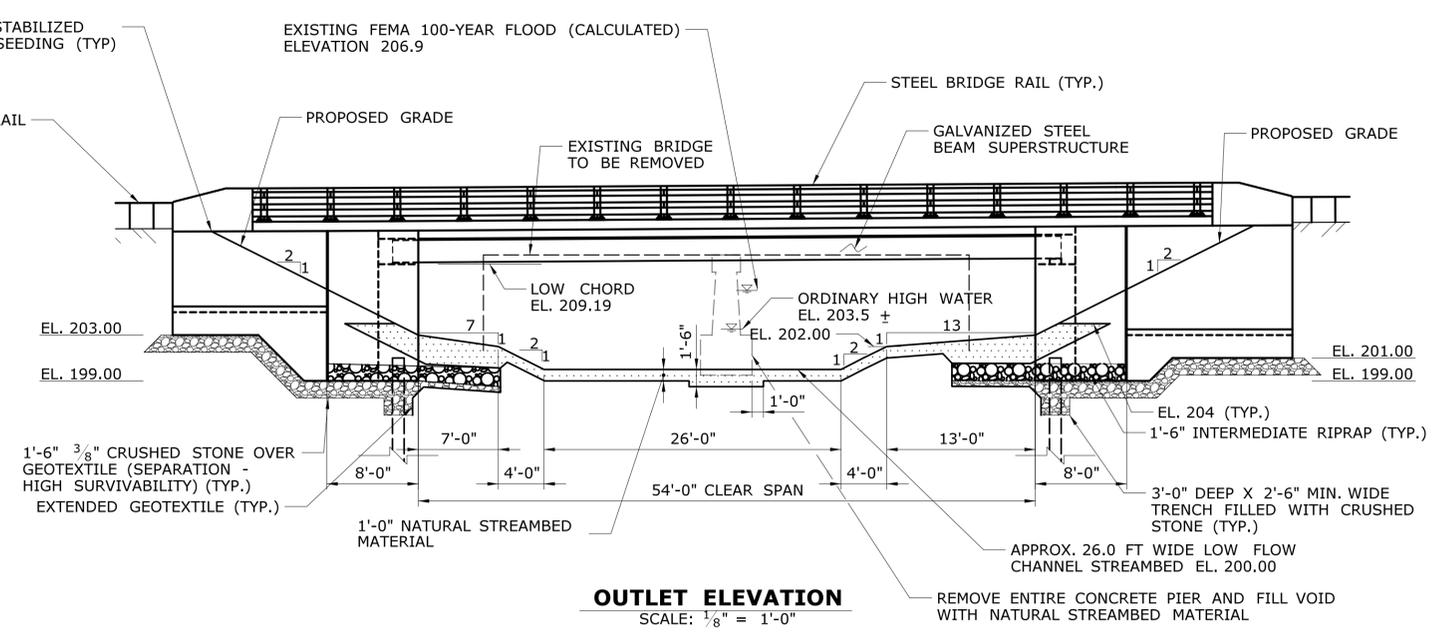
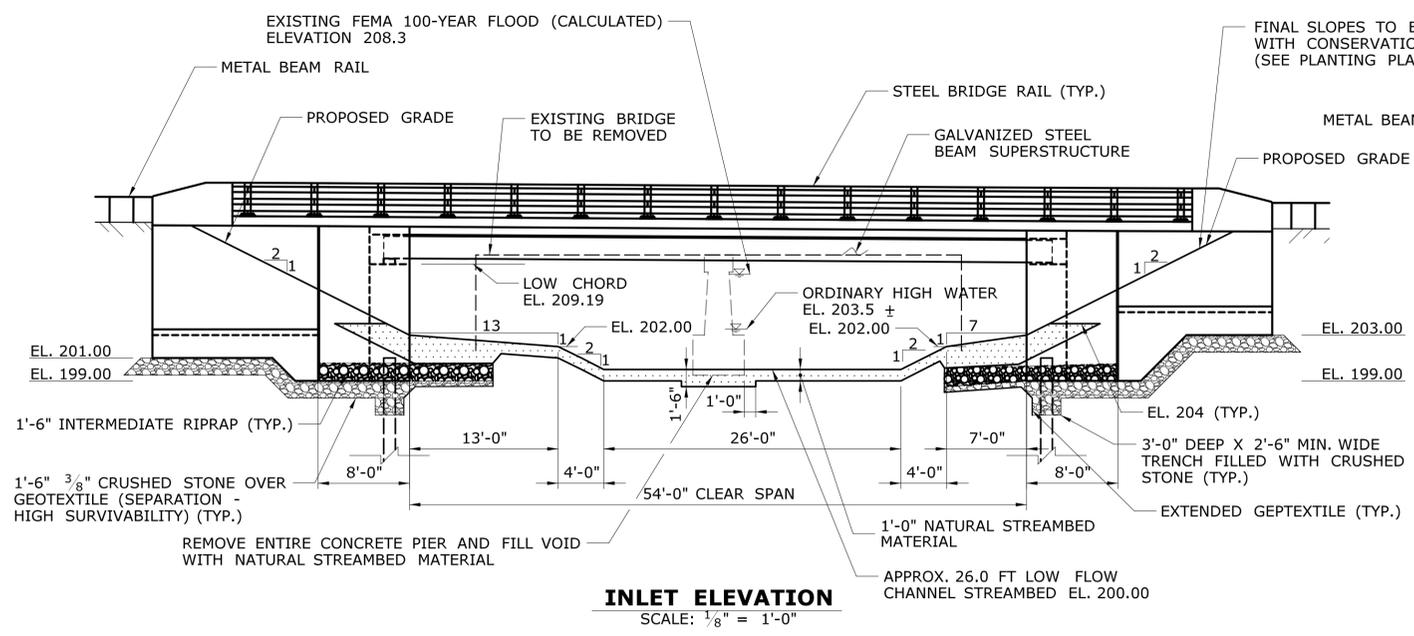
FLOODPLAIN AREA SHOWN IS WITHIN LIMITS OF FEMA ZONE AE; FEMA FLOOD INSURANCE RATE MAP 09011C0308G. THE FLOODPLAIN LIMITS ARE DELINEATED BASED ON THE EXISTING CONTOURS.
 FLOOD ELEVATION=208.3' NORTH OF BRIDGE
 FLOOD ELEVATION=206.9' SOUTH OF BRIDGE

FLOODWAY LIMITS ARE APPROXIMATE AND WERE OBTAINED FROM FEMA MAP 09011C0308G.

THE CONTRACTOR SHALL NOT WORK WITHIN THE LIMITS OF THE WETLANDS AND WATERCOURSE WITH THE EXCEPTION OF THOSE AREAS DELINEATED AS TEMPORARY OR PERMANENT IMPACTS TO THE WETLANDS AND WATERCOURSE. ALL DISTURBED AREAS SHALL BE RESTORED.

**ENVIRONMENTAL PERMIT PLANS
PLAN DATE: NOVEMBER 22, 2019**

THE INFORMATION, INCLUDING ESTIMATED QUANTITIES OF WORK, SHOWN ON THESE SHEETS IS BASED ON LIMITED INVESTIGATIONS BY THE STATE AND IS IN NO WAY WARRANTED TO INDICATE THE CONDITIONS OF ACTUAL QUANTITIES OF WORK WHICH WILL BE REQUIRED.	DESIGNER/DRAFTER: MDB/TGC CHECKED BY: RSR SCALE IN FEET 0 40 80 SCALE 1"=40'	<p>STATE OF CONNECTICUT DEPARTMENT OF TRANSPORTATION</p>	SIGNATURE/ BLOCK: <p>VN ENGINEERS INC. Traffic • Infrastructure • Planning 116 WASHINGTON AVENUE NORTH HAVEN, CT 06473 203.234.7862</p>	PROJECT TITLE: REPLACEMENT OF BRIDGE NOS. 01140 & 05401, ROUTE 82 OVER EAST BRANCH EIGHTMILE RIVER & SWAMP BROOK	TOWN: SALEM	PROJECT NO. 120-090 DRAWING NO. PMT-04 SHEET NO.
REV. DATE REVISION DESCRIPTION SHEET NO. Plotted Date: 5/21/2020	100-YR FLOOD IMPACT PLAN					

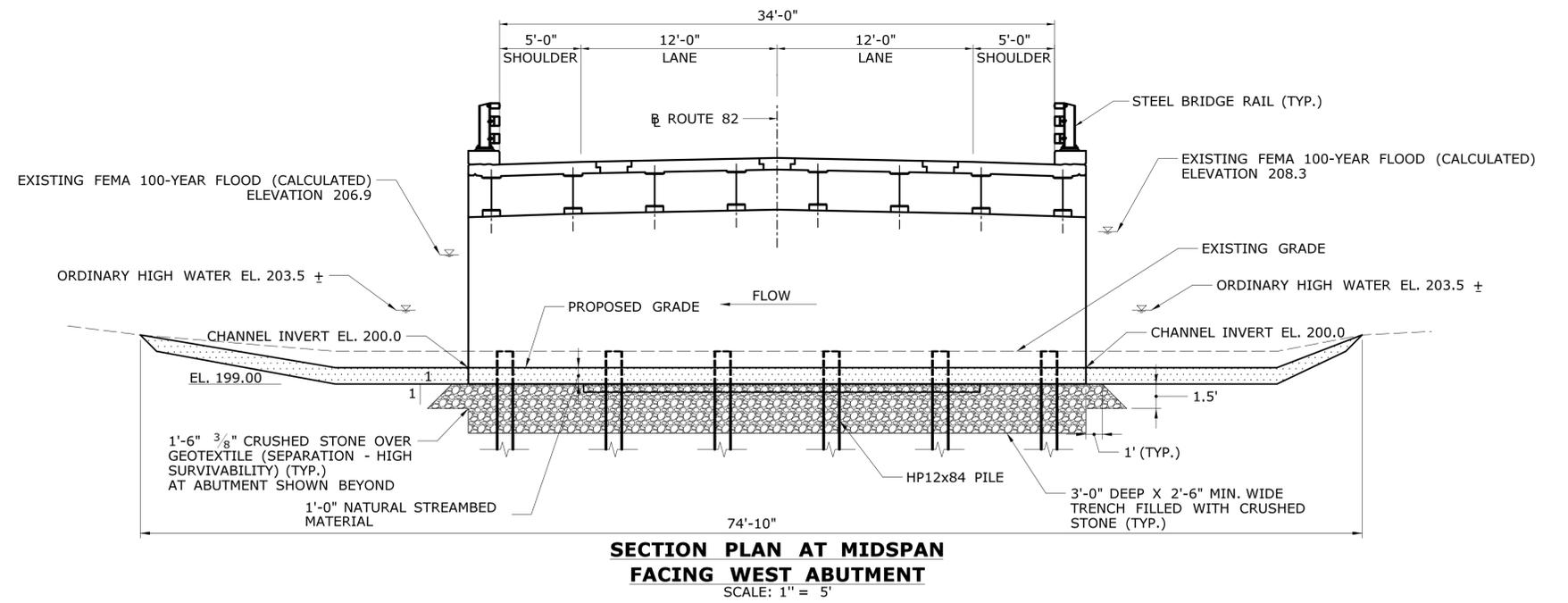


OPENNESS RATIO (OR):
 OR = OPEN AREA / BRIDGE WIDTH
 OR = 436.1 SF / 36.86 FT = 11.84 FT
 11.84 FT > 0.82 FT (RECOMMENDED MINIMUM)

BANK FULLWIDTH (BFW):
 BFW = 56.56 FT EXISTING UPSTREAM (OHW)
 1.2 BFW = 67.88 FT
 67.88 FT > 54 FT PROPOSED BRIDGE CLEAR SPAN

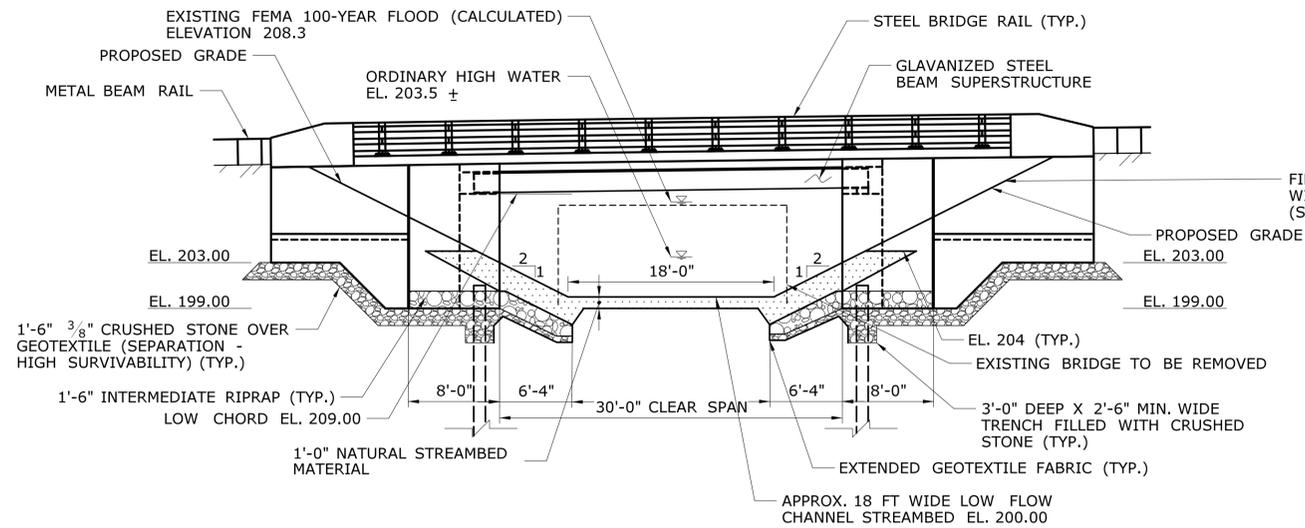
HYDRAULIC DATA - BRIDGE 01140	
DRAINAGE AREA	16.7 SQ. MILE
DESIGN FREQUENCY	100 YEAR
DESIGN DISCHARGE	TOTAL: 2300 CFS [BR01140: 1140 CFS]
AVERAGE DAILY FLOW ELEVATION	EL. 203.0
UPSTREAM DESIGN WATER SURFACE ELEVATION	EL. 207.6
DOWNSTREAM DESIGN WATER SURFACE ELEVATION	EL. 207.3
MAXIMUM SCOUR ELEVATION	EL. 190.0
FREQUENCY	500 YEAR
DISCHARGE	TOTAL: 3350 CFS [BR01140: 2120 CFS]
WORST CASE SCOUR SUBSTRUCTURE UNIT	EAST ABUTMENT

- NATIVE STREAMBED MATERIAL NOTES**
- NATIVE STREAMBED MATERIAL EXCAVATED DURING THE BRIDGE INSTALLATION SHALL BE STOCKPILED AND THEN REPLACED BETWEEN PROPOSED ABUTMENTS TO THE DEPTH SHOWN ON THE PLANS, AS DIRECTED BY THE ENGINEER, AND IN ACCORDANCE WITH PERMIT DOCUMENTS.
 - THE STOCKPILE SHALL BE LOCATED OUTSIDE THE WETLANDS LIMITS AND PROTECTED WITH SEDIMENTATION CONTROL SYSTEM.

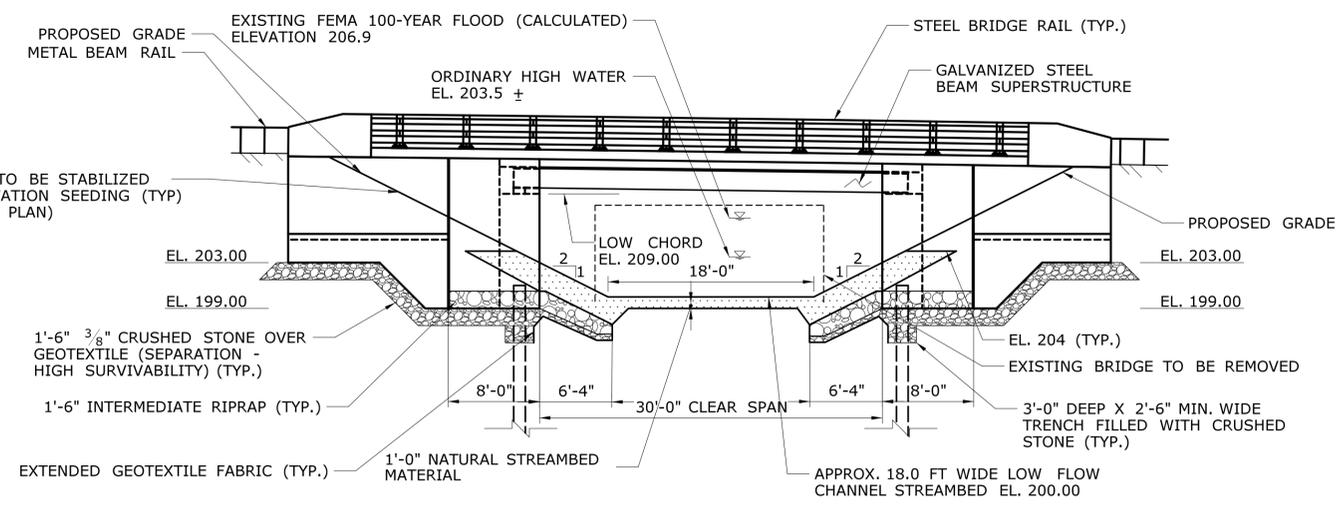


ENVIRONMENTAL PERMIT PLANS
PLAN DATE: NOVEMBER 22, 2019

REV. DATE REVISION DESCRIPTION SHEET NO. Plotted Date: 05/18/2020	DESIGNER/DRAFTER: J. TZOC CHECKED BY: D. JOHNSON SCALE AS NOTED	STATE OF CONNECTICUT DEPARTMENT OF TRANSPORTATION Filename: ...\\SB_MSH_Br01140_0120-0090_PERMIT_ESP	SIGNATURE/BLOCK: Dewberry 59 Elm Street, Suite 200 New Haven, CT 06510-2047	PROJECT TITLE: REPLACEMENT OF BRIDGE NOS. 01140 & 05401, ROUTE 82 OVER EAST BRANCH EIGHTMILE RIVER & SWAMP BROOK	TOWN: SALEM	PROJECT NO. 120-090 DRAWING NO. PMT-05 SHEET NO.
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INLET ELEVATION
SCALE: 1/8" = 1'-0"



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

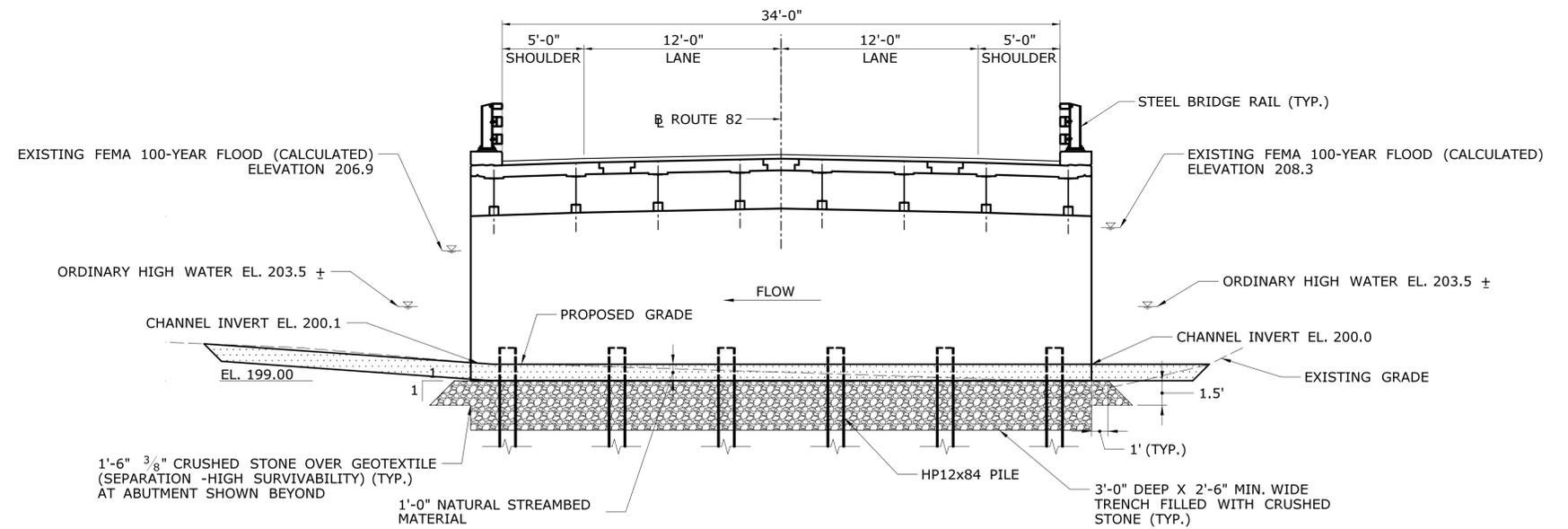
OPENNESS RATIO (OR):

OR = OPEN AREA / BRIDGE WIDTH
OR = 258.0 SF / 36.83 FT = 7.01 FT
7.01 FT > 0.82 FT (RECOMMENDED MINIMUM)

BANK FULLWIDTH (BFW):

BFW = 34.31 FT EXISTING UPSTREAM (OHW)
1.2 BFW = 41.17 FT
41.17 FT > 30 FT PROPOSED BRIDGE CLEAR SPAN

HYDRAULIC DATA - BRIDGE 05401	
DRAINAGE AREA	16.7 SQ. MILE
DESIGN FREQUENCY	100 YEAR
DESIGN DISCHARGE	TOTAL: 2300 CFS [BR05401: 860 CFS]
AVERAGE DAILY FLOW ELEVATION	EL. 203.0
UPSTREAM DESIGN WATER SURFACE ELEVATION	EL. 207.6
DOWNSTREAM DESIGN WATER SURFACE ELEVATION	EL. 207.3
MAXIMUM SCOUR ELEVATION	EL. 191.0
FREQUENCY	500 YEAR
DISCHARGE	TOTAL: 3350 CFS [BR05401: 1230 CFS]
WORST CASE SCOUR SUBSTRUCTURE UNIT	WEST ABUTMENT

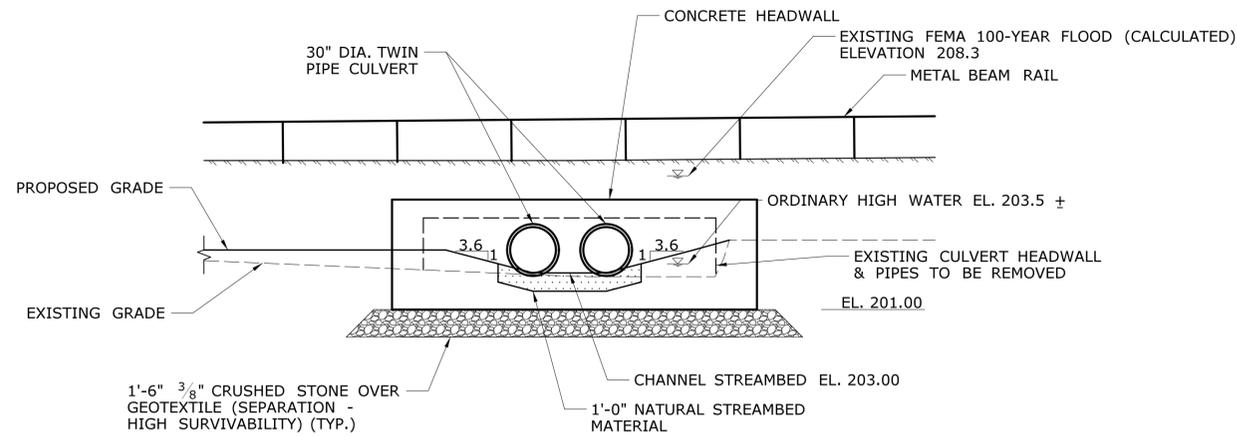


SECTION PLAN AT MIDSPAN FACING WEST ABUTMENT
SCALE: 1" = 5'

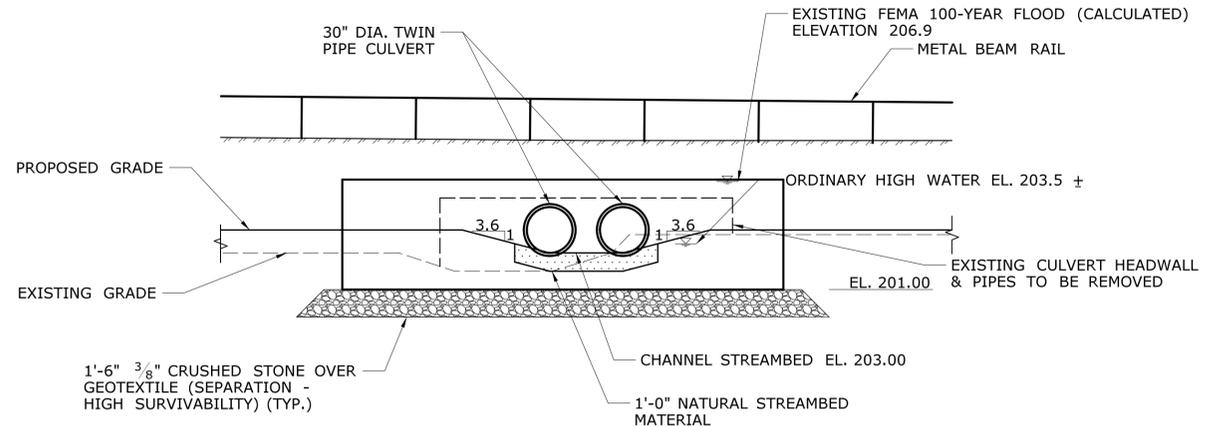
ENVIRONMENTAL PERMIT PLANS
PLAN DATE: NOVEMBER 22, 2019

REV.	DATE	REVISION DESCRIPTION	SHEET NO.	Plotted Date: 05/18/2020	DESIGNER/DRAFTER: J. TZOC CHECKED BY: D. JOHNSON	 STATE OF CONNECTICUT DEPARTMENT OF TRANSPORTATION Filename: ...\\SB_MSH_Br05401_0120-0090_PERMIT.ESP	 Dewberry 59 Elm Street, Suite 200 New Haven, CT 06510-2047	PROJECT TITLE: REPLACEMENT OF BRIDGE NOS. 01140 & 05401, ROUTE 82 OVER EAST BRANCH EIGHTMILE RIVER & SWAMP BROOK	TOWN: SALEM	PROJECT NO. 120-090 DRAWING NO. PMT-06 SHEET NO.
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DRAWING TITLE:
ELEVATIONS AND SECTIONS PLAN - 2



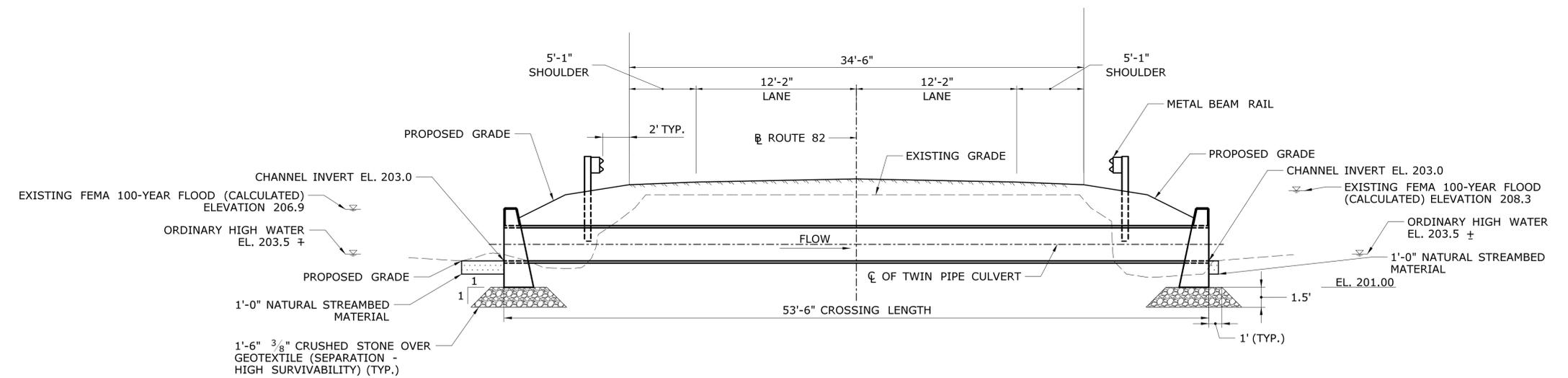
NORTH ELEVATION
SCALE: 1" = 5'



SOUTH ELEVATION
SCALE: 1" = 5'

SOUTH

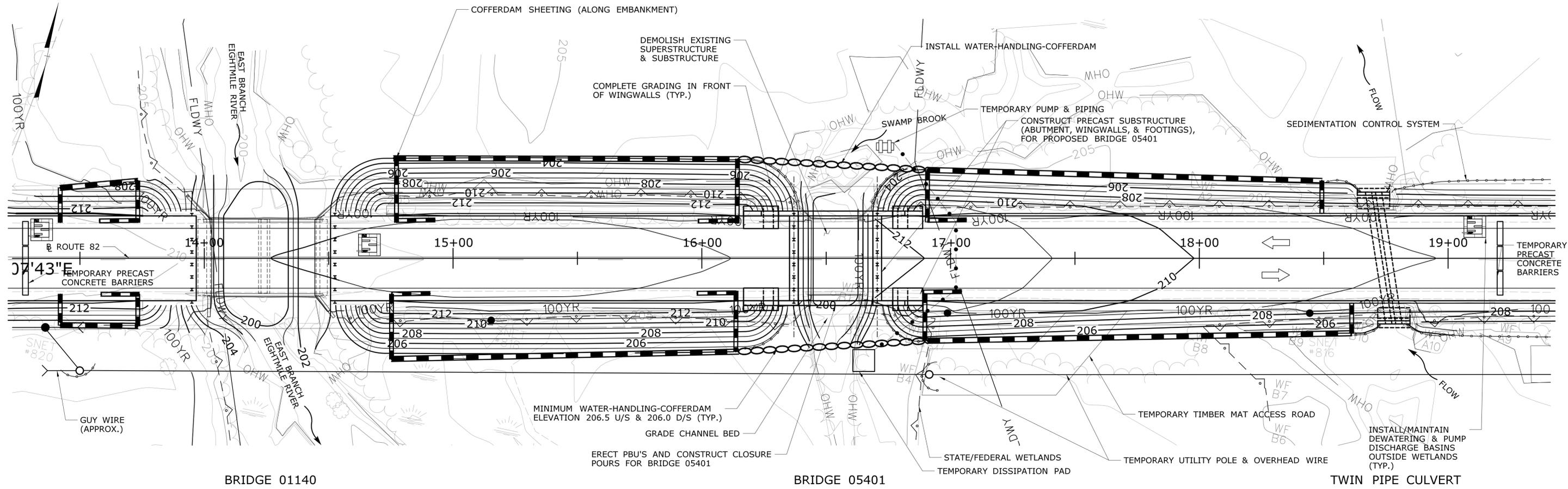
NORTH



SECTION PLAN AT MIDSPAN
FACING WEST
SCALE: 1" = 5'

ENVIRONMENTAL PERMIT PLANS
PLAN DATE: NOVEMBER 22, 2019

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REV.	DATE	REVISION DESCRIPTION	SHEET NO.	Plotted Date: 05/18/2020	ELEVATIONS AND SECTIONS PLAN - 3		



STAGE 4 - PLAN
SCALE: 1" = 20'

TEMPORARY HYDRAULIC DATA - BRIDGE 05401	
AVERAGE DAILY FLOW (ADF)	30 CFS
AVERAGE SPRING FLOW (ASF)	60 CFS
2-YEAR FREQUENCY DISCHARGE	450 CFS
TEMPORARY DESIGN DISCHARGE	450 CFS
TEMPORARY DESIGN FEQUENCY	2-YEAR
TEMPORARY WATER SURFACE ELEVATION	205.5 UPSTREAM 205.0 DOWNSTREAM

NOTES

1. A WETTED CONDITION MUST BE MAINTAINED FOR SWAMP BROOK THROUGHOUT CONSTRUCTION. PROVIDE A 250 GALLON PER MINUTE PUMP AS SHOWN. SEE SPECIAL PROVISIONS.

STAGE 4 SUGGESTED SEQUENCE

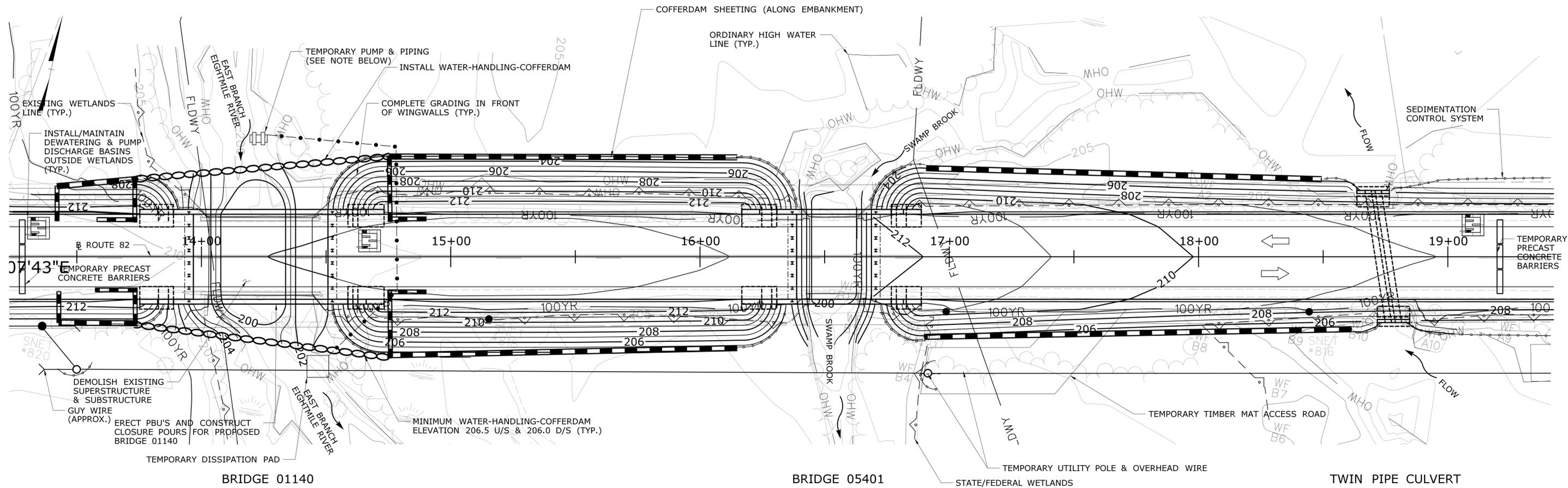
1. INSTALL/MAINTAIN TEMPORARY WATER-HANDLING-COFFERDAM TO CLOSE OFF WATER ACCESS UNDER EXISTING BRIDGE 05401.
2. CONSTRUCT TEMPORARY PUMP DISCHARGE BASINS AND DEWATER WITHIN THE WATER-HANDLING-COFFERDAMS.
3. DEMOLISH SUPERSTRUCTURE OF EXISTING BRIDGE 05401.
4. DEMOLISH SUBSTRUCTURE OF EXISTING BRIDGE 05401.
5. CONSTRUCT PRECAST ABUTMENTS & PRECAST WINGWALLS.
6. GRADE CHANNEL BED BELOW PROPOSED BRIDGE 05401 AS INDICATED.
7. CONSTRUCT SUPERSTRUCTURE.
8. COMPLETE GRADING.
9. REMOVE WATER-HANDLING-COFFERDAM TO RESTORE FLOW THROUGH PROPOSED BRIDGE 05401. INSTALL EROSION & SEDIMENTATION CONTROL AT TOE OF CONSTRUCTED SLOPE.

LEGEND

- OHW — ORDINARY HIGH WATER
- - - STATE/FEDERAL WETLANDS
- FLDWY — FEMA FLOODWAY (APPROXIMATE)
- 100YR — FEMA 100-YEAR FLOOD ELEVATION (CALCULATED)
- TEMPORARY PUMP PIPING
- EROSION & SEDIMENTATION CONTROL

ENVIRONMENTAL PERMIT PLANS
PLAN DATE: NOVEMBER 22, 2019

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REV. DATE REVISION DESCRIPTION SHEET NO.	DRAWING TITLE: STAGING & WATER HANDLING PLAN - 2					



STAGES 5 & 6 - PLAN
SCALE: 1" = 20'

TEMPORARY HYDRAULIC DATA - BRIDGE 01140	
AVERAGE DAILY FLOW (ADF)	30 CFS
AVERAGE SPRING FLOW (ASF)	60 CFS
2-YEAR FREQUENCY DISCHARGE	450 CFS
TEMPORARY DESIGN DISCHARGE	450 CFS
TEMPORARY DESIGN FEQUENCY	2-YEAR
TEMPORARY WATER SURFACE ELEVATION	205.5 UPSTREAM 205.0 DOWNSTREAM

NOTES

1. A WETTED CONDITION MUST BE MAINTAINED FOR EAST BRANCH EIGHTMILE RIVER THROUGHOUT CONSTRUCTION. PROVIDE A 250 GALLON PER MINUTE PUMP AS SHOWN.

STAGES 5 & 6 SUGGESTED SEQUENCE

1. INSTALL/MAINTAIN TEMPORARY WATER-HANDLING-COFFERDAM TO CLOSE OFF WATER ACCESS UNDER EXISTING BRIDGE 01140.
2. CONSTRUCT TEMPORARY PUMP DISCHARGE BASINS AND DEWATER WITHIN THE WATER-HANDLING-COFFERDAMS.
3. DEMOLISH SUPERSTRUCTURE OF EXISTING BRIDGE 01140.
4. DEMOLISH SUBSTRUCTURE OF EXISTING BRIDGE 01140 INCLUDING FULL PIER REMOVAL.
5. GRADE CHANNEL BED BELOW PROPOSED BRIDGE 01140 AS INDICATED.
6. CONSTRUCT BRIDGE.
7. COMPLETE GRADING.
8. REMOVE WATER-HANDLING-COFFERDAM TO RESTORE FLOWS THROUGH PROPOSED BRIDGE 01140. INSTALL EROSION & SEDIMENTATION CONTROL AT TOE OF CONSTRUCTED SLOPE.
9. REMOVE COFFERDAM SHEETING.
10. COMPLETE STAGE 6 ROADWAY WORK.
11. RELOCATE UTILITY POLES TO FINAL LOCATIONS AND REMOVE TEMPORARY TIMBER MATTING.
12. LOAM AND SEED DISTURBED AREAS.
13. REMOVE EROSION AND SEDIMENTATION CONTROLS UPON PERMANENT STABILIZATION.

LEGEND

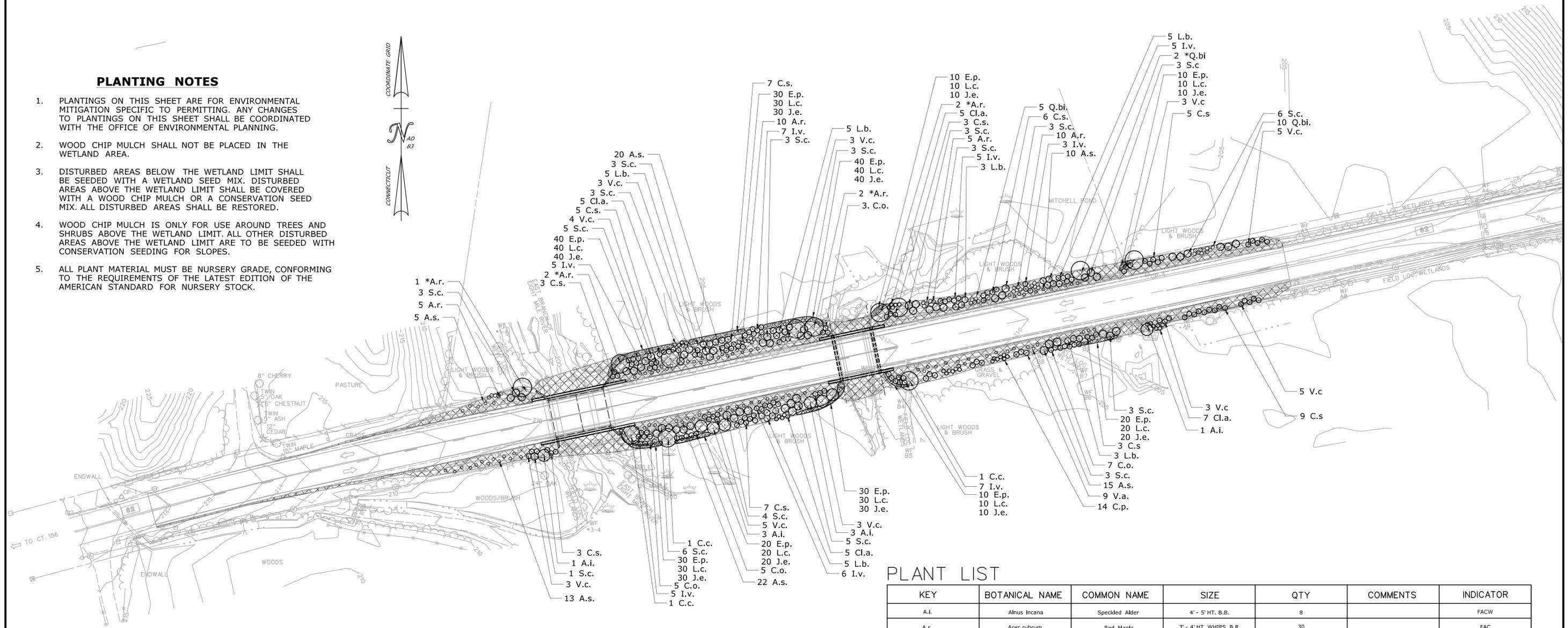
- OHW — ORDINARY HIGH WATER
- - - STATE/FEDERAL WETLANDS
- FLDWY — FEMA FLOODWAY (APPROXIMATE)
- 100YR — FEMA 100-YEAR FLOOD ELEVATION (CALCULATED)
- ● — TEMPORARY PUMP PIPING
- ○ — EROSION & SEDIMENTATION CONTROL

ENVIRONMENTAL PERMIT PLANS
PLAN DATE: NOVEMBER 22, 2019

REV. DATE REVISION DESCRIPTION SHEET NO. Plotted Date: 5/18/2020	DESIGNER/DRAFTER: J. TZOC CHECKED BY: D. JOHNSON SCALE IN FEET 0 20 40 SCALE 1"=20'	STATE OF CONNECTICUT DEPARTMENT OF TRANSPORTATION Filename: ..._SB_MSH_0120-0090_PERMIT_SWHP_3	SIGNATURE/ BLOCK: Dewberry 59 Elm Street, Suite 200 New Haven, CT 06510-2047	PROJECT TITLE: REPLACEMENT OF BRIDGE NOS. 01140 & 05401, ROUTE 82 OVER EAST BRANCH EIGHTMILE RIVER & SWAMP BROOK	TOWN: SALEM	PROJECT NO. 120-090 DRAWING NO. PMT-10 SHEET NO.
					DRAWING TITLE: STAGING & WATER HANDLING PLAN - 3	

PLANTING NOTES

1. PLANTINGS ON THIS SHEET ARE FOR ENVIRONMENTAL MITIGATION SPECIFIC TO PERMITTING. ANY CHANGES TO PLANTINGS ON THIS SHEET SHALL BE COORDINATED WITH THE OFFICE OF ENVIRONMENTAL PLANNING.
2. WOOD CHIP MULCH SHALL NOT BE PLACED IN THE WETLAND AREA.
3. DISTURBED AREAS BELOW THE WETLAND LIMIT SHALL BE SEEDED WITH A WETLAND SEED MIX. DISTURBED AREAS ABOVE THE WETLAND LIMIT SHALL BE COVERED WITH A WOOD CHIP MULCH OR A CONSERVATION SEED MIX. ALL DISTURBED AREAS SHALL BE RESTORED.
4. WOOD CHIP MULCH IS ONLY FOR USE AROUND TREES AND SHRUBS ABOVE THE WETLAND LIMIT. ALL OTHER DISTURBED AREAS ABOVE THE WETLAND LIMIT ARE TO BE SEEDED WITH CONSERVATION SEEDING FOR SLOPES.
5. ALL PLANT MATERIAL MUST BE NURSERY GRADE, CONFORMING TO THE REQUIREMENTS OF THE LATEST EDITION OF THE AMERICAN STANDARD FOR NURSERY STOCK.



SUPPLEMENTAL ITEMS

ITEM NO.	ITEM NAME	QUANTITY
0952051A	CONTROL AND REMOVAL OF INVASIVE VEGETATION	2700 SY
0950040A	CONSERVATION SEEDING FOR SLOPES	1100 SY
0950043A	WETLAND GRASS ESTABLISHMENT	9700 SF
0949000	WOOD CHIP MULCH	100 SY

LEGEND

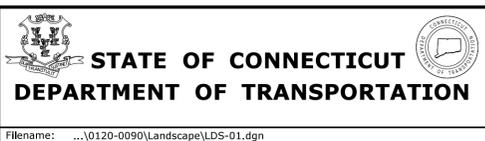
- STATE/ FEDERAL WETLANDS
- STREAM
- ORDINARY HIGH WATER (OHW)
- CONTROL AND REMOVAL OF INVASIVE VEGETATION

PLANT LIST

KEY	BOTANICAL NAME	COMMON NAME	SIZE	QTY	COMMENTS	INDICATOR
A.l.	Alnus incana	Speckled Alder	4' - 5' HT. B.B.	8		FACW
A.r.	Acer rubrum	Red Maple	3' - 4' HT. WHIPS B.R.	30		FAC
*A.r.	Acer rubrum	Red Maple	1 3/4" - 2" CAL. B.B.	7		FAC
A.s.	Andropogon scoparium	Little Bluestem	1 GALLON CONTAINER	85		FACU
C.c.	Carpinus caroliniana	American Hornbeam	8' - 10' HT. B.B.	3		FAC
Cl.a.	Clethra alnifolia	Summersweet	2' - 3' HT. B.B.	22		FAC
C.o.	Cephalanthus occidentalis	Buttonbush	2' - 3' HT. B.B.	20		OBL
C.p.	Comptonia peregrina	Sweetfern	15" - 18" HT. B.B.	14		UPL
C.s.	Cornus sericea	Redtwig Dogwood	24" - 36" HT. CONT.	51		FACW
I.v.	Ilex verticillata	Winterberry	2' - 3' HT. B.B.	43		FACW
L.b.	Lindera benzoin	Spicebush	2' - 3' HT. B.B.	26		FACW
*Q.bi.	Quercus bicolor	Swamp White Oak	2 1/2" - 3" CAL. B.B.	2		FACW
Q.bi.	Quercus bicolor	Swamp White Oak	2' - 3' HT. CONTAINER	15		FACW
S.c.	Sambucus canadensis	Elderberry	24" - 36" HT. CONTAINER	60		FACW
V.a.	Viburnum acerifolium	Mapleleaf Viburnum	2' - 3' HT. B.B.	9		UPL
V.c.	Vaccinium corymbosum	Highbush Blueberry	24" - 36" HT. CONTAINER	40		FACW
0949875A	Wetland Plantings			SEE SPECIAL PROVISION		
E.p.	Eutrochium purpureum	Joe-Pye-Weed	2" PLUG	240		FAC
J.e.	Juncus effusus	Soft Rush	2" PLUG	240		OBL
L.c.	Lobelia cardinalis	Cardinal Flower	2" PLUG	240		OBL

REV.	DATE	REVISION DESCRIPTION	SHEET NO.	Plotted Date: 11/13/2019

DESIGNER/DRAFTER: MM
 CHECKED BY: SF
 SCALE IN FEET
 SCALE 1"=40'



SIGNATURE/BLOCK:
 APPROVED BY:
OFFICE OF ENGINEERING

PROJECT TITLE:
REPLACEMENT OF BRIDGE NOS. 01140 & 05401, ROUTE 82 OVER EAST BRANCH OF THE EIGHTMILE RIVER & SWAMP BROOK

TOWN:
SALEM
 DRAWING TITLE:
PERMIT PLANTING PLAN

PROJECT NO.: 120-090
 DRAWING NO.: PMT-11
 SHEET NO.:

Appendix C – Flood Management Certification

Connecticut Department of Energy and Environmental Protection License*

Flood Management Certification Approval
USACE CT GP - Pre-Construction Notification Approval

Licensee(s):	Connecticut Department of Transportation
Licensee Address(s):	2800 Berlin Turnpike Newington, CT 06131
License Number(s):	202002270-FM 202001839-PCN
Municipality:	Salem
Project Description:	Replacement of Bridge Nos. 01140, 05410 and twin 30” culvert on Route 82.
Project Address/Location:	Route 82 (East Haddam Road) over East Branch of the Eightmile River and Swamp Brook
Waters:	East Branch Eightmile River, Swamp Brook
Authorizing CT Statute(s) and/or Federal Law:	CGS Section 25-68b to h; Section 401 CWA (33 USC 1341)
Applicable Regulations of CT State Agencies:	25-68h-1 to 3, 22a-426-1 to 9
Agency Contact:	Land & Water Resources Division, Bureau of Water Protection & Land Reuse, 860-424-3019
License Expiration:	Five (5) years from the date of issuance of this license or upon expiration of the Department of Army CT General Permit, August 19, 2021
Project Site Plan Set:	11 Sheets of Plans Titled “ <i>Replacement of Bridge NOS. 01140 & 05410 Route 82 Over East Branch Eightmile River & Swamp Brook</i> ”, prepared by Dewberry Engineers Inc., dated July 8, 2019.
License Enclosures:	Compliance Certification Form, LWRD General Conditions, WQC CT GP Conditions

*Connecticut’s Uniform Administrative Procedure Act defines License to include, “*the whole or part of any agency permit, certificate, approval, registration, charter or similar form of permission required by law . . .*”

Authorized Activities:

The Licensee is hereby authorized to conduct the following work as described in application # 202002270 and as depicted on any site plan sheets / sets cited herein:

1. Remove and Replace Bridge Nos. 01140, 05410 and twin 30" culvert as follows:
 - a. install sediment and erosion control structures;
 - b. install sheet pile cofferdam systems and water handling structures for each structure replacement;
 - c. install temporary timber mat access road for temporary utility relocation;
 - d. remove twin 30" corrugated metal pipes and associated headwalls and replace with 30" reinforced concrete pipes with new cast-in-place concrete headwalls;
 - e. remove Bridge No. 01140 and replace with 32' single span with superstructure consisting of prefabricated bridge units (PBUs) supported by precast integral abutments founded on steel piles;
 - f. remove Bridge No. 01140 and replace with 54' single span with superstructure consisting of prefabricated bridge units (PBUs) supported by precast integral abutments founded on steel piles;
 - g. top dress scour countermeasures at proposed bridge abutments within the watercourse with 2 feet of natural streambed materials and a minimum of 1 foot of natural stream bed material for channel regrading.
 - h. remove temporary water handling cofferdams and sediment and erosion control structures; and
 - i. revegetate roadway embankments and reestablish disturbed areas to pre-construction conditions.
2. The following wetland and watercourse impacts are authorized: wetland impacts of 9,075 square feet (permanent) and 8,125 square feet (temporary), watercourse impacts of 4,725 square feet (permanent) and 500 square feet (temporary).

Failure to comply with the terms and conditions of this license shall subject the Licensee and / or the Licensee's contractor(s) to enforcement actions and penalties as provided by law.

This license is subject to the following Terms and Conditions:

1. **License Enclosure(s) and Conditions.** The Licensee shall comply with all applicable terms and conditions as may be stipulated within the License Enclosure(s) listed above.
2. **Water Handling/Pumping.** The Licensee shall utilize a pump with the appropriate capacity to direct flows to the downstream watercourse for Bridge Nos. 01140 and 05410 to ensure a wetted condition, at a minimum base flow throughout the construction of said bridges while cofferdam systems are installed.
3. **Temporary Cofferdam Systems.** Sheet piles utilized to create temporary cofferdam systems shall be removed completely where possible or cut to a height of at least 1-foot below the mudline and abandoned in-place.

General Conditions for Land & Water Resources Division Licenses

- 1. Land Record Filing (for Structures Dredging & Fill, Tidal Wetlands, Certificate of Permission, and Long Island Sound General Permit Licenses only).** The Licensee shall file the Land Record Filing on the land records of the municipality in which the subject property is located not later than thirty (30) days after license issuance pursuant to Connecticut General Statutes (CGS) Section 22a-363g. A copy of the Notice with a stamp or other such proof of filing with the municipality shall be submitted to the Commissioner no later than sixty (60) days after license issuance. If a Land Record Filing form is not enclosed and the work site is not associated with an upland property, no filing is required.
- 2. Contractor Notification.** The Licensee shall give a copy of the license and its attachments to the contractor(s) who will be carrying out the authorized activities prior to the start of construction and shall receive a written receipt for such copy, signed and dated by such contractor(s). The Licensee's contractor(s) shall conduct all operations at the site in full compliance with the license and, to the extent provided by law, may be held liable for any violation of the terms and conditions of the license. At the work site, the contractor(s) shall, whenever work is being performed, have on site and make available for inspection a copy of the license and the authorized plans.
- 3. Work Commencement¹.** Not later than two (2) weeks prior to the commencement of any work authorized herein, the Licensee shall submit to the Commissioner, on the Work Commencement Form attached hereto, the name(s) and address(es) of all contractor(s) employed to conduct such work and the expected date for commencement and completion of such work, if any.
 - For water diversion activities authorized pursuant to 22a-377(c)-1 of the Regulations of Connecticut State Agencies, the Licensee shall also notify the Commissioner in writing two weeks prior to initiating the authorized diversion.
 - For emergency activities authorized pursuant Connecticut General Statutes Section 22a-6k, the Licensee shall notify the Commissioner, in writing, of activity commencement at least one (1) day prior to construction and of activity completion no later than five (5) days after conclusion.
- 4. For Coastal Licenses Only - License Notice.** The Licensee shall post the first page of the License in a conspicuous place at the work area while the work authorized therein is undertaken.
- 5. Unauthorized Activities.** Except as specifically authorized, no equipment or material, including but not limited to, fill, construction materials, excavated material or debris, shall be

¹ The Work Commencement condition and the need for a Work Commencement Form is not applicable to Flood Management Certification approvals.

deposited, placed or stored in any wetland or watercourse on or off-site. The Licensee may not conduct work within wetlands or watercourses other than as specifically authorized, unless otherwise authorized in writing by the Commissioner. Tidal wetlands means “wetland” as defined by section 22a-29 and “freshwater wetlands and watercourses” means “wetlands” and “watercourses” as defined by section 22a-38.

6. **Unconfined Instream Work.** Unless otherwise noted in a condition of the license, the following conditions apply to projects in non-coastal waters:
 - Unconfined instream work is limited to the period June 1 through September 30.
 - Confinement of a work area by cofferdam techniques using sand bag placement, sheet pile installation (vibratory method only), portadam, or similar confinement devices is allowed any time of the year. The removal of such confinement devices is allowed any time of the year.
 - Once a work area has been confined, in-water work within the confined area is allowed any time of the year.
 - The confinement technique used shall completely isolate and protect the confined area from all flowing water. The use of silt boom/curtain or similar technique as a means for confinement is prohibited.
7. **For State Actions Only - Material or Equipment Storage in the Floodplain.** Unless approved by a Flood Management Exemption, the storage of any materials at the site which are buoyant, hazardous, flammable, explosive, soluble, expansive, radioactive, or which could in the event of a flood be injurious to human, animal or plant life, below the elevation of the five-hundred (500) year flood is prohibited. Any other material or equipment stored at the site below said elevation by the Licensee or the Licensee's contractor must be firmly anchored, restrained or enclosed to prevent flotation. The quantity of fuel stored below such elevation for equipment used at the site shall not exceed the quantity of fuel that is expected to be used by such equipment in one day. In accordance with the licensee's Flood Contingency Plan, the Licensee shall remove equipment and materials from the floodplain during periods when flood warnings have been issued or are anticipated by a responsible federal, state or local agency. It shall be the Licensee's responsibility to obtain such warnings when flooding is anticipated.
8. **Temporary Hydraulic Facilities for Water Handling.** If not reviewed and approved as a part of the license application, temporary hydraulic facilities shall be designed by a qualified professional and in accordance with the *Connecticut Guidelines for Soil Erosion and Sediment Control*, the *2004 Connecticut Stormwater Quality Manual*, or the *Department of Transportation's ConnDOT Drainage Manual*, as applicable. Temporary hydraulic facilities may include channels, culverts or bridges which are required for haul roads, channel relocations, culvert installations, bridge construction, temporary roads, or detours.
9. **Excavated Materials.** Unless otherwise authorized, all excavated material shall be staged and managed in a manner which prevents additional impacts to wetlands and watercourses.
10. **Best Management Practices.** The Licensee shall not cause or allow pollution of any wetlands or watercourses, including pollution resulting from sedimentation and erosion. In constructing

or maintaining any authorized structure or facility or conducting any authorized activity, or in removing any such structure or facility, the Licensee shall employ best management practices to control storm water discharges, to prevent erosion and sedimentation, and to otherwise prevent pollution of wetlands and other waters of the State. For purposes of the license, “pollution” means “pollution” as that term is defined by CGS section 22a-423. Best Management Practices include, but are not limited, to practices identified in the *Connecticut Guidelines for Soil Erosion and Sediment Control* as revised, *2004 Connecticut Stormwater Quality Manual*, Department of Transportation’s *ConnDOT Drainage Manual* as revised, and the Department of Transportation Standard Specifications as revised.

11. Work Site Restoration. Upon completion of any authorized work, the Licensee shall restore all areas impacted by construction, or used as a staging area or accessway in connection with such work, to their condition prior to the commencement of such work.

12. Inspection. The Licensee shall allow any representative of the Commissioner to inspect the project location at reasonable times to ensure that work is being or has been conducted in accordance with the terms and conditions of this license.

13. Change of Use. (Applies only if a use is specified within the License “Project Description”)

- a. The work specified in the license is authorized solely for the purpose set forth in the license. No change in purpose or use of the authorized work or facilities as set forth in the license may occur without the prior written approval of the Commissioner. The Licensee shall, prior to undertaking or allowing any change in use or purpose from that which is authorized by this license, request permission from the Commissioner for such change. Said request shall be in writing and shall describe the proposed change and the reason for the change.
- b. A change in the form of ownership of any structure authorized herein from a rental/lease commercial marina to a wholly-owned common interest community or dockominium may constitute a change in purpose as specified in paragraph (a) above.

14. De Minimis Alteration. The Licensee shall not deviate from the authorized activity without prior written approval from the Commissioner. The Licensee may request a de minimis change to any authorized structure, facility, or activity. A de minimis alteration means a change in the authorized design, construction or operation that individually and cumulatively has minimal additional environmental impact and does not substantively alter the project as authorized.

- For diversion activities authorized pursuant to 22a-377(c)-2 of the Regulations of Connecticut State Agencies, a de minimis alteration means an alteration which does not significantly increase the quantity of water diverted or significantly change the capacity to divert water.

15. Extension Request. The Licensee may request an extension of the license expiration date. Such request shall be in writing and shall be submitted to the Commissioner at least thirty (30) days prior to the license expiration. Such request shall describe the work done to date, what work still needs to be completed, and the reason for such extension. It shall be the Commissioner’s sole discretion to grant or deny such request.

- 16. Compliance Certification.** Not later than 90 days after completion of the authorized work, the Licensee shall prepare and submit to the Commissioner the attached Compliance Certification Form. Such Compliance Certification shall be completed, signed, and sealed by the Licensee and a Connecticut Licensed Design Professional. If non-compliance is indicated on the form, or the Commissioner has reason to believe the activities and/or structures were conducted in non-compliance with the license, the Commissioner may require the Licensee to submit as-built plans as a condition of this license.
- 17. Maintenance.** The Licensee shall maintain all authorized structures or work in optimal condition or shall remove such structures or facility and restore the affected waters to their pre-work condition. Any such maintenance or removal activity shall be conducted in accordance with applicable law and any additional approvals required by law.
- 18. No Work After License Expiration.** Work conducted after the license expiration date is a violation of the license and may subject the licensee to enforcement action, including penalties, as provided by law.
- 19. License Transfer.** The license is not transferable without prior written authorization of the Commissioner. A request to transfer a license shall be submitted in writing and shall describe the proposed transfer and the reason for such transfer. The Licensee's obligations under the license shall not be affected by the passage of title to the license site to any other person or municipality until such time as a transfer is approved by the Commissioner.
- 20. Document Submission.** Any document required to be submitted to the Commissioner under the license or any contact required to be made with the Commissioner shall, unless otherwise specified in writing by the Commissioner, be directed to:
- Regulatory Section
Land & Water Resources Division
Department of Energy and Environmental Protection
79 Elm Street
Hartford, Connecticut 06106-5127
860-424-3019
- 21. Date of Document Submission.** The date of submission to the Commissioner of any document required by the license shall be the date such document is received by the Commissioner. The date of any notice by the Commissioner under the license, including but not limited to notice of approval or disapproval of any document or other action, shall be the date such notice is personally delivered or the date three (3) days after it is mailed by the Commissioner, whichever is earlier. Except as otherwise specified in the license, the word "day" as used in the license means calendar day. Any document or action which is required by the license to be submitted or performed by a date which falls on a Saturday, Sunday or a Connecticut or federal holiday shall be submitted or performed on or before the next day which is not a Saturday, Sunday, or a Connecticut or federal holiday.
- 22. Certification of Documents.** Any document, including but not limited to any notice, which is required to be submitted to the Commissioner under the license shall be signed by the Licensee and by the individual or individuals responsible for actually preparing such

document, each of whom shall certify in writing as follows: “I have personally examined and am familiar with the information submitted in this document and all attachments and certify that based on reasonable investigation, including my inquiry of those individuals responsible for obtaining the information, the submitted information is true, accurate and complete to the best of my knowledge and belief, and I understand that any false statement made in this document or its attachments may be punishable as a criminal offense.”

- 23. Accuracy of Documentation.** In evaluating the application for the license, the Commissioner has relied on information and data provided by the Licensee and on the Licensee’s representations concerning site conditions, design specifications and the proposed work, including but not limited to representations concerning the commercial, public or private nature of the work or structures, the water-dependency of said work or structures, its availability for access by the general public, and the ownership of regulated structures or filled areas. If such information proves to be false, deceptive, incomplete or inaccurate, the license may be modified, suspended or revoked, and any unauthorized activities may be subject to enforcement action.
- 24. Limits of Liability.** In granting the license, the Commissioner has relied on all representations of the Licensee, including information and data provided in support of the Licensee’s application. Neither the Licensee’s representations nor the issuance of the license shall constitute an assurance by the Commissioner as to the structural integrity, the engineering feasibility or the efficacy of such design.
- 25. Reporting of Violations.** In the event that the Licensee becomes aware that they did not or may not comply, or did not or may not comply on time, with any provision of this license or of any document incorporated into the license, the Licensee shall immediately notify the agency contact specified within the license and shall take all reasonable steps to ensure that any noncompliance or delay is avoided or, if unavoidable, is minimized to the greatest extent possible. In so notifying the agency contact, the Licensee shall provide, for the agency’s review and written approval, a report including the following information:
- a. the provision(s) of the license that has been violated;
 - b. the date and time the violation(s) was first observed and by whom;
 - c. the cause of the violation(s), if known;
 - d. if the violation(s) has ceased, the duration of the violation(s) and the exact date(s) and times(s) it was corrected;
 - e. if the violation(s) has not ceased, the anticipated date when it will be corrected;
 - f. steps taken and steps planned to prevent a reoccurrence of the violation(s) and the date(s) such steps were implemented or will be implemented; and
 - g. the signatures of the Licensee and of the individual(s) responsible for actually preparing such report.

If the violation occurs outside of normal business hours, the Licensee shall contact the Department of Energy and Environmental Protection Emergency Dispatch at 860-424-3333. The Licensee shall comply with any dates which may be approved in writing by the

Commissioner.

- 26. Revocation/Suspension/Modification.** The license may be revoked, suspended, or modified in accordance with applicable law.
- 27. Other Required Approvals.** License issuance does not relieve the Licensee of their obligations to obtain any other approvals required by applicable federal, state and local law.
- 28. Rights.** The license is subject to and does not derogate any present or future property rights or powers of the State of Connecticut, and conveys no property rights in real estate or material nor any exclusive privileges, and is further subject to any and all public and private rights and to any federal, state or local laws or regulations pertinent to the property or activity affected hereby.
- 29. Condition Conflicts.** In the case where a project specific special condition listed on the license differs from, or conflicts with, one of the general conditions listed herein, the project specific special condition language shall prevail. It is the licensee's responsibility to contact the agency contact person listed on the license for clarification if needed prior to conducting any further regulated activities.

**Section 401 Water Quality Certification Conditions for Department of the Army (Corps of Engineers)
General Permits for the State of Connecticut**

1. **Rights.** This certificate is subject to and does not derogate any present or future property rights or other rights or powers of the State of Connecticut, and conveys no property rights in real estate or material nor any exclusive privileges, and is further subject to any and all public and private rights and to any federal, state, or local laws or regulations pertinent to the property or activity affected hereby. This certification does not comprise the permits or approvals as may be required by Chapters 440, 446i, 446j and 446k of the Connecticut General Statutes.
2. **Expiration of Certificate.** The Section 401 Water Quality Certifications contained herein shall be valid until such time as the Department of the Army General Permits for the State of Connecticut expires or is modified, suspended, revoked or reissued.
3. **Compliance with Certificate.** All work and all activities authorized herein conducted by the permittee at the site shall be consistent with the terms and conditions of this certificate. Any regulated activities carried out at the site, including but not limited to, construction of any structure, excavation, fill, obstruction, or encroachment, that are not specifically identified and authorized herein shall constitute a violation of this certificate and may result in its modification, suspension, or revocation. In carrying out the certified discharge(s) authorized herein, the permittee shall not store equipment or construction material, or discharge any material including without limitation, fill, construction materials or debris in any wetland or watercourse on or off site unless specifically authorized by this certificate. Upon initiation of the activities authorized herein, the permittee thereby accepts and agrees to comply with the terms and conditions of this certificate.
4. **Transfer of Certificate.** This authorization is not transferable without the written consent of the Commissioner.
5. **Reliance on Application.** In evaluating the permittee's application, the Commissioner has relied on information provided by the permittee. If such information subsequently proves to be false, deceptive, incomplete or inaccurate, this certificate may be modified, suspended or revoked.
6. **Best Management Practices.** In constructing or maintaining the activities authorized herein, the permittee shall employ best management practices, consistent with the terms and conditions of this certificate, to control storm water discharges and erosion and sedimentation and to prevent pollution. Such practices to be implemented by the permittee at the site include, but are not necessarily limited to:
 - a. Prohibiting dumping of any quantity of oil, chemicals or other deleterious material on the ground;
 - b. Immediately informing the Commissioner's Oil and Chemical Spill Response Division at (860) 424-3338 (24 hours) of any adverse impact or hazard to the environment, including any discharges, spillage, or loss of oil or petroleum or chemical liquids or solids, which occurs or is likely to occur as the direct or indirect result of the activities authorized herein;
 - c. Separating staging areas at the site from the regulated areas by silt fences or straw/hay bales at all times;
 - d. Prohibiting storage of any fuel and refueling of equipment within twenty-five (25) feet from any wetland or watercourse;

- e. Preventing pollution of wetlands and watercourses in accordance with the document "Connecticut Guidelines for Soil Erosion and Sediment Control" as revised. Said controls shall be inspected by the permittee for deficiencies at least once per week and immediately after each rainfall and at least daily during prolonged rainfall. The permittee shall correct any such deficiencies within 48 hours of said deficiencies being found;
- f. Stabilizing disturbed soils in a timely fashion to minimize erosion. If a grading operation at the site will be suspended for a period of thirty (30) or more consecutive days, the permittee shall, within the first seven (7) days of that suspension period, accomplish seeding and mulching or take such other appropriate measures to stabilize the soil involved in such grading operation. Within seven (7) days after establishing final grade in any grading operation at the site the permittee shall seed and mulch the soil involved in such grading operation or take such other appropriate measures to stabilize such soil until seeding and mulching can be accomplished.
- g. Prohibiting the storage of any materials at the site which are buoyant, hazardous, flammable, explosive, soluble, expansive, radioactive, or which could in the event of a flood be injurious to human, animal or plant life, below the elevation of the five hundred (500) year flood. Any other material or equipment stored at the site below said elevation by the permittee or the permittee's contractor must be firmly anchored, restrained or enclosed to prevent flotation. The quantity of fuel stored below such elevation for equipment used at the site shall not exceed the quantity of fuel that is expected to be used by such equipment in one day.
- h. Immediately informing the Commissioner's Land & Water Resources Division at (860) 424-3019 and the U.S. Army Corps of Engineers at (978) 318-8879, of the occurrence of pollution or other environmental damage resulting from construction or maintenance of the authorized activity or any construction associated therewith in violation of this certificate. The permittee shall, no later than 48 hours after the permittee learns of a violation of this certificate, report same in writing to the Commissioner. Such report shall contain the following information:
 - (i) the provision(s) of this certificate that has been violated;
 - (ii) the date and time the violation(s) was first observed and by whom;
 - (iii) the cause of the violation(s), if known
 - (iv) if the violation(s) has ceased, the duration of the violation(s) and the exact date(s) and times(s) it was corrected;
 - (v) if the violation(s) has not ceased, the anticipated date when it will be corrected;
 - (vi) steps taken and steps planned to prevent a reoccurrence of the violation(s) and the date(s) such steps were implemented or will be implemented;
 - (vii) the signatures of the permittee and of the individual(s) responsible for actually preparing such report, each of whom shall certify said report in accordance with condition 7 of this certificate.

For information and technical assistance, contact the DEEP Land and Water Resources Division at (860) 424-3019.

7. Unconfined Instream Work; Installation and Removal of Confining Structures.

- Unconfined instream work is limited to the period June 1 through September 30.
- Confinement of a work area by cofferdam techniques using sand bag placement, sheet pile installation (vibratory method only), portadam, or similar confinement devices is allowed any time of the year unless specifically prohibited by a permit condition.

- The removal of such confinement devices is allowed any time of the year unless specifically prohibited by a permit condition.
 - The confinement technique used shall completely isolate and protect the confined area from all flowing water. The use of silt boom/curtain or similar technique as a means for confinement is prohibited.
 - Once a work area has been confined, in-water work within the confined area is allowed any time of the year.
8. **Certification of Documents.** Any document, including but not limited to any notice, which is required to be submitted to the Commissioner under this certificate shall be signed by the permittee, a responsible corporate officer of the permittee, a general partner of the permittee, or a duly authorized representative of the permittee and by the individual or individuals responsible for actually preparing such document, each of whom shall certify in writing as follows:

"I have personally examined and am familiar with the information submitted in this document and all attachments and certify that based on reasonable investigation, including my inquiry of those individuals responsible for obtaining the information, the submitted information is true, accurate and complete to the best of my knowledge and belief, and I understand that any false statement made in this document or its attachments may be punishable as a criminal offense in accordance with Section 22a-6 under Section 53a-157 of the Connecticut General Statutes."

9. **Submission of Documents.** The date of submission to the Commissioner of any document required by this certificate shall be the date such document is received by the Commissioner. Except as otherwise specified in this certificate, the word "day" as used in this certificate means the calendar day. Any document or action which falls on a Saturday, Sunday, or legal holiday shall be submitted or performed by the next business day thereafter.

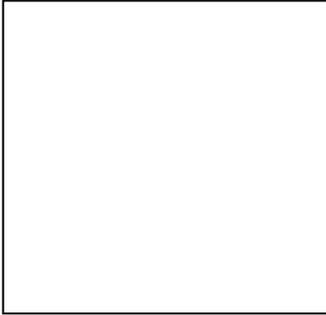
Any document or notice required to be submitted to the Commissioner under this certificate shall, unless otherwise specified in writing by the Commissioner, be directed to:

Director, Land and Water Resources Division
Bureau of Water Protection and Land Reuse
Department of Environmental Protection
79 Elm Street
Hartford, Connecticut 06106-5127



Compliance Certification Form

The following certification must be signed by the licensee working in consultation with a Connecticut-licensed design professional and must be submitted to the address indicated at the end of this form within ninety (90) days of completion of the authorized work.

1. Licensee Name: _____ DEEP License Number(s): _____ Municipality in which project is occurring: _____	
2. Check one: (a) <input type="checkbox"/> "I certify that the final site conditions and / or structures are in general conformance with the approved site plans". Identify and describe any deviations and attach to this form. (b) <input type="checkbox"/> "The final site conditions and / or structures are not in general conformance with the approved site plans. The enclosed "as-built" plans note the modifications".	
3. "I understand that any false statement in this certification is punishable as a criminal offence under section 53a-157b of the General Statutes and under any other applicable law."	
_____ Signature of Licensee	_____ Date
_____ Name of Licensee (print or type)	
_____ Signature of CT-Licensed Design Professional	_____ Date
_____ Name of CT-Licensed Design Professional (print or type)	
_____ Professional License Number (if applicable)	Affix Stamp Here 
<ul style="list-style-type: none"> As-built plans shall include: elevations or tidal datums, as applicable, and structures, including any proposed elevation views and cross sections included in the approved license plans. Such as-built plans shall be the original ones and be signed and sealed by an engineer, surveyor or architect, as applicable, who is licensed in the State of Connecticut. The Licensee will be notified by staff of the Land and Water Resources Division (LWRD) if further compliance review is necessary. Lack of response by LWRD staff does not imply compliance. 	
Submit this completed form to : Regulatory Section Department of Energy and Environmental Protection Land & Water Resources Division 79 Elm Street Hartford, CT 06106-5127	

Appendix D – Stormwater Monitoring Report Form



**Connecticut Department of
Energy & Environmental Protection**
Bureau of Materials Management & Compliance Assurance
Water Permitting & Enforcement Division

**General Permit for the Discharge of Stormwater and Dewatering Wastewaters from
Construction Activities, issued 8/21/13, effective 10/1/13
Stormwater Monitoring Report**

SITE INFORMATION

Permittee: _____
Mailing Address: _____
Business Phone: _____ ext.: _____ Fax: _____
Contact Person: _____ Title: _____
Site Name: _____
Site Address: _____
Receiving Water (name, basin): _____
Stormwater Permit No. <u>GSN</u> _____

SAMPLING INFORMATION (Submit a separate form for each outfall)

Outfall Designation: _____ Date/Time Collected: _____
Outfall Location(s) (lat/lon or map link): _____
Person Collecting Sample: _____
Storm Magnitude (inches): _____ Storm Duration (hours): _____
Size of Disturbed Area at any time: _____

MONITORING RESULTS

Sample #	Parameter	Method	Results (units)	Laboratory (if applicable)
1	Turbidity			
2	Turbidity			
3	Turbidity			
4	Turbidity			

(provide an attachment if more than 4 samples were taken for this outfall)

Avg = _____

STATEMENT OF ACKNOWLEDGMENT

I certify that the data reported on this document were prepared under my direction or supervision in accordance with the General Permit for the Discharge of Stormwater and Dewatering Wastewaters from Construction Activities. The information submitted is, to the best of my knowledge and belief, true, accurate and complete.

Authorized Official: _____
Signature: _____ Date: _____

Please send completed form to:

DEPARTMENT OF ENERGY & ENVIRONMENTAL PROTECTION
BUREAU OF MATERIALS MANAGEMENT AND COMPLIANCE ASSURANCE
79 ELM STREET
HARTFORD, CT 06106-5127
ATTN: NEAL WILLIAMS

Appendix E – Notice of Termination Form



General Permit for the Discharge of Stormwater and Dewatering Wastewaters from Construction Activities

Notice of Termination Form

Please complete and submit this form in accordance with the general permit (DEP-PED-GP-015) in order to ensure the proper handling of your termination. Print or type unless otherwise noted.

Note: Ensure that for commercial and industrial facilities, registrations under the *General Permit for the Discharge of Stormwater Associated with Industrial Activity* (DEP-PED-GP-014) or the *General Permit for the Discharge of Stormwater from Commercial Activities* (DEP-PED-GP-004) have been filed where applicable. For questions about the applicability of these general permits, please call the Department at 860-424-3018.

Part I: Registrant Information

1. Permit number: GSN			
2. Fill in the name of the registrant(s) as indicated on the registration certificate: Registrant:			
3. Site Address: City/Town: _____ State: _____ Zip Code: _____			
4. Date all storm drainage structures were cleaned of construction sediment: Date of Completion of Construction: _____ Date of Last Inspection (must be at least three months after final stabilization pursuant to Section 6(b)(6)(D) of the general permit): _____			
5. Check the post-construction activities at the site (check all that apply):			
<input type="checkbox"/> Industrial	<input type="checkbox"/> Residential	<input type="checkbox"/> Commercial	<input type="checkbox"/> Capped Landfill
<input type="checkbox"/> Other (describe): _____			

Part II: Certification

"I have personally examined and am familiar with the information submitted in this document and all attachments thereto, and I certify that, based on reasonable investigation, including my inquiry of those individuals responsible for obtaining the information, the submitted information is true, accurate and complete to the best of my knowledge and belief. I understand that a false statement made in this document or its attachments may be punishable as a criminal offense, in accordance with Section 22a-6 of the Connecticut General Statutes, pursuant to Section 53a-157b of the Connecticut General Statutes, and in accordance with any other applicable statute."	
_____ Signature of Permittee	_____ Date
_____ Name of Permittee (print or type)	_____ Title (if applicable)

Note: Please submit this Notice of Termination Form to:
STORMWATER PERMIT COORDINATOR
BUREAU OF WATER MANAGEMENT
DEPARTMENT OF ENVIRONMENTAL PROTECTION
79 ELM STREET
HARTFORD, CT 06106-5127

Appendix F – NRCS Soils Mapping

Custom Soil Resource Report for State of Connecticut



Preface

Soil surveys contain information that affects land use planning in survey areas. They highlight soil limitations that affect various land uses and provide information about the properties of the soils in the survey areas. Soil surveys are designed for many different users, including farmers, ranchers, foresters, agronomists, urban planners, community officials, engineers, developers, builders, and home buyers. Also, conservationists, teachers, students, and specialists in recreation, waste disposal, and pollution control can use the surveys to help them understand, protect, or enhance the environment.

Various land use regulations of Federal, State, and local governments may impose special restrictions on land use or land treatment. Soil surveys identify soil properties that are used in making various land use or land treatment decisions. The information is intended to help the land users identify and reduce the effects of soil limitations on various land uses. The landowner or user is responsible for identifying and complying with existing laws and regulations.

Although soil survey information can be used for general farm, local, and wider area planning, onsite investigation is needed to supplement this information in some cases. Examples include soil quality assessments (<http://www.nrcs.usda.gov/wps/portal/nrcs/main/soils/health/>) and certain conservation and engineering applications. For more detailed information, contact your local USDA Service Center (<https://offices.sc.egov.usda.gov/locator/app?agency=nrcs>) or your NRCS State Soil Scientist (http://www.nrcs.usda.gov/wps/portal/nrcs/detail/soils/contactus/?cid=nrcs142p2_053951).

Great differences in soil properties can occur within short distances. Some soils are seasonally wet or subject to flooding. Some are too unstable to be used as a foundation for buildings or roads. Clayey or wet soils are poorly suited to use as septic tank absorption fields. A high water table makes a soil poorly suited to basements or underground installations.

The National Cooperative Soil Survey is a joint effort of the United States Department of Agriculture and other Federal agencies, State agencies including the Agricultural Experiment Stations, and local agencies. The Natural Resources Conservation Service (NRCS) has leadership for the Federal part of the National Cooperative Soil Survey.

Information about soils is updated periodically. Updated information is available through the NRCS Web Soil Survey, the site for official soil survey information.

The U.S. Department of Agriculture (USDA) prohibits discrimination in all its programs and activities on the basis of race, color, national origin, age, disability, and where applicable, sex, marital status, familial status, parental status, religion, sexual orientation, genetic information, political beliefs, reprisal, or because all or a part of an individual's income is derived from any public assistance program. (Not all prohibited bases apply to all programs.) Persons with disabilities who require

alternative means for communication of program information (Braille, large print, audiotape, etc.) should contact USDA's TARGET Center at (202) 720-2600 (voice and TDD). To file a complaint of discrimination, write to USDA, Director, Office of Civil Rights, 1400 Independence Avenue, S.W., Washington, D.C. 20250-9410 or call (800) 795-3272 (voice) or (202) 720-6382 (TDD). USDA is an equal opportunity provider and employer.

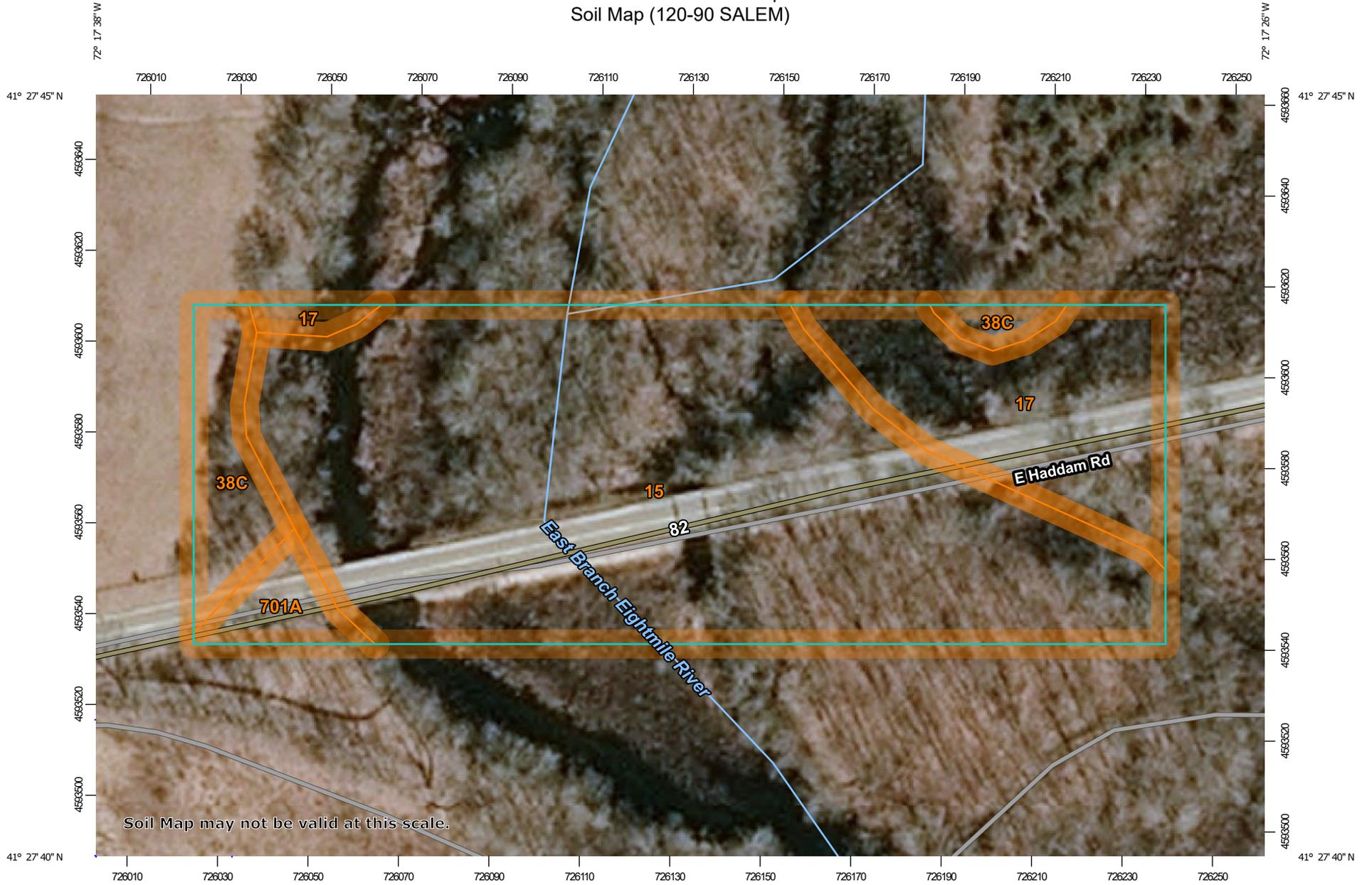
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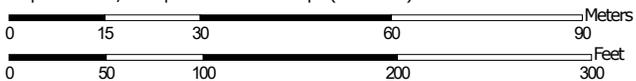
Soil Map

The soil map section includes the soil map for the defined area of interest, a list of soil map units on the map and extent of each map unit, and cartographic symbols displayed on the map. Also presented are various metadata about data used to produce the map, and a description of each soil map unit.

Custom Soil Resource Report
Soil Map (120-90 SALEM)



Map Scale: 1:1,180 if printed on A landscape (11" x 8.5") sheet.



Map projection: Web Mercator Corner coordinates: WGS84 Edge tics: UTM Zone 18N WGS84

MAP LEGEND

Area of Interest (AOI)

 Area of Interest (AOI)

Soils

 Soil Map Unit Polygons

 Soil Map Unit Lines

 Soil Map Unit Points

Special Point Features

 Blowout

 Borrow Pit

 Clay Spot

 Closed Depression

 Gravel Pit

 Gravelly Spot

 Landfill

 Lava Flow

 Marsh or swamp

 Mine or Quarry

 Miscellaneous Water

 Perennial Water

 Rock Outcrop

 Saline Spot

 Sandy Spot

 Severely Eroded Spot

 Sinkhole

 Slide or Slip

 Sodic Spot

 Spoil Area

 Stony Spot

 Very Stony Spot

 Wet Spot

 Other

 Special Line Features

Water Features

 Streams and Canals

Transportation

 Rails

 Interstate Highways

 US Routes

 Major Roads

 Local Roads

Background

 Aerial Photography

MAP INFORMATION

The soil surveys that comprise your AOI were mapped at 1:12,000.

Warning: Soil Map may not be valid at this scale.

Enlargement of maps beyond the scale of mapping can cause misunderstanding of the detail of mapping and accuracy of soil line placement. The maps do not show the small areas of contrasting soils that could have been shown at a more detailed scale.

Please rely on the bar scale on each map sheet for map measurements.

Source of Map: Natural Resources Conservation Service
 Web Soil Survey URL:
 Coordinate System: Web Mercator (EPSG:3857)

Maps from the Web Soil Survey are based on the Web Mercator projection, which preserves direction and shape but distorts distance and area. A projection that preserves area, such as the Albers equal-area conic projection, should be used if more accurate calculations of distance or area are required.

This product is generated from the USDA-NRCS certified data as of the version date(s) listed below.

Soil Survey Area: State of Connecticut
 Survey Area Data: Version 20, Jun 9, 2020

Soil map units are labeled (as space allows) for map scales 1:50,000 or larger.

Date(s) aerial images were photographed: Mar 20, 2019—Mar 27, 2019

The orthophoto or other base map on which the soil lines were compiled and digitized probably differs from the background imagery displayed on these maps. As a result, some minor shifting of map unit boundaries may be evident.

Map Unit Legend (120-90 SALEM)

Map Unit Symbol	Map Unit Name	Acres in AOI	Percent of AOI
15	Scarboro muck, 0 to 3 percent slopes	2.9	72.0%
17	Timakwa and Natchaug soils, 0 to 2 percent slopes	0.7	17.7%
38C	Hinckley loamy sand, 3 to 15 percent slopes	0.3	7.2%
701A	Ninigret fine sandy loam, 0 to 3 percent slopes	0.1	3.1%
Totals for Area of Interest		4.0	100.0%

Map Unit Descriptions (120-90 SALEM)

The map units delineated on the detailed soil maps in a soil survey represent the soils or miscellaneous areas in the survey area. The map unit descriptions, along with the maps, can be used to determine the composition and properties of a unit.

A map unit delineation on a soil map represents an area dominated by one or more major kinds of soil or miscellaneous areas. A map unit is identified and named according to the taxonomic classification of the dominant soils. Within a taxonomic class there are precisely defined limits for the properties of the soils. On the landscape, however, the soils are natural phenomena, and they have the characteristic variability of all natural phenomena. Thus, the range of some observed properties may extend beyond the limits defined for a taxonomic class. Areas of soils of a single taxonomic class rarely, if ever, can be mapped without including areas of other taxonomic classes. Consequently, every map unit is made up of the soils or miscellaneous areas for which it is named and some minor components that belong to taxonomic classes other than those of the major soils.

Most minor soils have properties similar to those of the dominant soil or soils in the map unit, and thus they do not affect use and management. These are called noncontrasting, or similar, components. They may or may not be mentioned in a particular map unit description. Other minor components, however, have properties and behavioral characteristics divergent enough to affect use or to require different management. These are called contrasting, or dissimilar, components. They generally are in small areas and could not be mapped separately because of the scale used. Some small areas of strongly contrasting soils or miscellaneous areas are identified by a special symbol on the maps. If included in the database for a given area, the contrasting minor components are identified in the map unit descriptions along with some characteristics of each. A few areas of minor components may not have been observed, and consequently they are not mentioned in the descriptions, especially where the pattern was so complex that it was impractical to make enough observations to identify all the soils and miscellaneous areas on the landscape.

Custom Soil Resource Report

The presence of minor components in a map unit in no way diminishes the usefulness or accuracy of the data. The objective of mapping is not to delineate pure taxonomic classes but rather to separate the landscape into landforms or landform segments that have similar use and management requirements. The delineation of such segments on the map provides sufficient information for the development of resource plans. If intensive use of small areas is planned, however, onsite investigation is needed to define and locate the soils and miscellaneous areas.

An identifying symbol precedes the map unit name in the map unit descriptions. Each description includes general facts about the unit and gives important soil properties and qualities.

Soils that have profiles that are almost alike make up a *soil series*. Except for differences in texture of the surface layer, all the soils of a series have major horizons that are similar in composition, thickness, and arrangement.

Soils of one series can differ in texture of the surface layer, slope, stoniness, salinity, degree of erosion, and other characteristics that affect their use. On the basis of such differences, a soil series is divided into *soil phases*. Most of the areas shown on the detailed soil maps are phases of soil series. The name of a soil phase commonly indicates a feature that affects use or management. For example, Alpha silt loam, 0 to 2 percent slopes, is a phase of the Alpha series.

Some map units are made up of two or more major soils or miscellaneous areas. These map units are complexes, associations, or undifferentiated groups.

A *complex* consists of two or more soils or miscellaneous areas in such an intricate pattern or in such small areas that they cannot be shown separately on the maps. The pattern and proportion of the soils or miscellaneous areas are somewhat similar in all areas. Alpha-Beta complex, 0 to 6 percent slopes, is an example.

An *association* is made up of two or more geographically associated soils or miscellaneous areas that are shown as one unit on the maps. Because of present or anticipated uses of the map units in the survey area, it was not considered practical or necessary to map the soils or miscellaneous areas separately. The pattern and relative proportion of the soils or miscellaneous areas are somewhat similar. Alpha-Beta association, 0 to 2 percent slopes, is an example.

An *undifferentiated group* is made up of two or more soils or miscellaneous areas that could be mapped individually but are mapped as one unit because similar interpretations can be made for use and management. The pattern and proportion of the soils or miscellaneous areas in a mapped area are not uniform. An area can be made up of only one of the major soils or miscellaneous areas, or it can be made up of all of them. Alpha and Beta soils, 0 to 2 percent slopes, is an example.

Some surveys include *miscellaneous areas*. Such areas have little or no soil material and support little or no vegetation. Rock outcrop is an example.

State of Connecticut

15—Scarboro muck, 0 to 3 percent slopes

Map Unit Setting

National map unit symbol: 2svkt
Elevation: 0 to 1,350 feet
Mean annual precipitation: 36 to 71 inches
Mean annual air temperature: 39 to 55 degrees F
Frost-free period: 140 to 240 days
Farmland classification: Not prime farmland

Map Unit Composition

Scarboro and similar soils: 80 percent
Minor components: 20 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Scarboro

Setting

Landform: Outwash deltas, depressions, drainageways, outwash terraces
Landform position (two-dimensional): Toeslope
Landform position (three-dimensional): Base slope, tread, dip
Down-slope shape: Concave
Across-slope shape: Concave, linear
Parent material: Sandy glaciofluvial deposits derived from schist and/or gneiss and/or granite

Typical profile

Oa - 0 to 8 inches: muck
A - 8 to 14 inches: mucky fine sandy loam
Cg1 - 14 to 22 inches: sand
Cg2 - 22 to 65 inches: gravelly sand

Properties and qualities

Slope: 0 to 3 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Very poorly drained
Runoff class: Negligible
Capacity of the most limiting layer to transmit water (Ksat): Moderately high to high (1.42 to 14.17 in/hr)
Depth to water table: About 0 to 2 inches
Frequency of flooding: None
Frequency of ponding: Frequent
Maximum salinity: Nonsaline (0.0 to 1.9 mmhos/cm)
Available water capacity: Moderate (about 6.1 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 5w
Hydrologic Soil Group: A/D
Ecological site: F144AY031MA - Very Wet Outwash
Hydric soil rating: Yes

Minor Components

Timakwa

Percent of map unit: 10 percent
Landform: Swamps
Landform position (two-dimensional): Toeslope
Landform position (three-dimensional): Base slope, tread, dip
Down-slope shape: Linear, concave
Across-slope shape: Linear, concave
Hydric soil rating: Yes

Walpole

Percent of map unit: 8 percent
Landform: Deltas, outwash terraces, depressions, outwash plains, depressions
Landform position (two-dimensional): Toeslope
Landform position (three-dimensional): Tread, talf, dip
Down-slope shape: Concave
Across-slope shape: Concave
Hydric soil rating: Yes

Deerfield

Percent of map unit: 2 percent
Landform: Outwash plains, terraces
Landform position (three-dimensional): Tread, dip
Down-slope shape: Linear
Across-slope shape: Concave
Hydric soil rating: No

17—Timakwa and Natchaug soils, 0 to 2 percent slopes

Map Unit Setting

National map unit symbol: 2t2qx
Elevation: 0 to 1,420 feet
Mean annual precipitation: 36 to 71 inches
Mean annual air temperature: 39 to 55 degrees F
Frost-free period: 140 to 240 days
Farmland classification: Not prime farmland

Map Unit Composition

Timakwa and similar soils: 45 percent
Natchaug and similar soils: 40 percent
Minor components: 15 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Timakwa

Setting

Landform: Depressions
Landform position (three-dimensional): Tread
Down-slope shape: Concave

Custom Soil Resource Report

Across-slope shape: Concave

Parent material: Herbaceous and woody organic material over sandy and gravelly glaciofluvial deposits

Typical profile

Oa1 - 0 to 12 inches: muck

Oa2 - 12 to 37 inches: muck

2Cg1 - 37 to 47 inches: very gravelly loamy coarse sand

2Cg2 - 47 to 60 inches: gravelly loamy very fine sand

Properties and qualities

Slope: 0 to 2 percent

Depth to restrictive feature: More than 80 inches

Drainage class: Very poorly drained

Runoff class: Negligible

Capacity of the most limiting layer to transmit water (Ksat): Moderately low to high
(0.14 to 14.17 in/hr)

Depth to water table: About 0 to 12 inches

Frequency of flooding: NoneRare

Frequency of ponding: Frequent

Maximum salinity: Nonsaline (0.0 to 1.9 mmhos/cm)

Available water capacity: Very high (about 14.9 inches)

Interpretive groups

Land capability classification (irrigated): None specified

Land capability classification (nonirrigated): 5w

Hydrologic Soil Group: B/D

Ecological site: F144AY042NY - Semi-Rich Organic Wetlands

Hydric soil rating: Yes

Description of Natchaug

Setting

Landform: Depressions, depressions, depressions

Landform position (two-dimensional): Toeslope

Landform position (three-dimensional): Base slope, tread

Down-slope shape: Concave

Across-slope shape: Concave

Parent material: Highly decomposed organic material over loamy glaciofluvial deposits and/or loamy glaciolacustrine deposits and/or loamy till

Typical profile

Oa1 - 0 to 12 inches: muck

Oa2 - 12 to 31 inches: muck

2Cg1 - 31 to 39 inches: silt loam

2Cg2 - 39 to 79 inches: fine sandy loam

Properties and qualities

Slope: 0 to 2 percent

Depth to restrictive feature: More than 80 inches

Drainage class: Very poorly drained

Runoff class: Negligible

Capacity of the most limiting layer to transmit water (Ksat): Moderately low to high
(0.01 to 14.17 in/hr)

Depth to water table: About 0 to 12 inches

Frequency of flooding: RareNone

Frequency of ponding: Frequent

Custom Soil Resource Report

Calcium carbonate, maximum content: 25 percent
Maximum salinity: Nonsaline (0.0 to 1.9 mmhos/cm)
Available water capacity: Very high (about 17.9 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 5w
Hydrologic Soil Group: B/D
Ecological site: F144AY042NY - Semi-Rich Organic Wetlands
Hydric soil rating: Yes

Minor Components

Whitman

Percent of map unit: 7 percent
Landform: Depressions, drainageways
Landform position (two-dimensional): Toeslope
Landform position (three-dimensional): Base slope
Down-slope shape: Concave
Across-slope shape: Concave
Hydric soil rating: Yes

Catden

Percent of map unit: 3 percent
Landform: Kettles, depressions, fens, depressions, depressions, swamps, bogs, marshes
Landform position (three-dimensional): Base slope, tread
Down-slope shape: Concave
Across-slope shape: Concave
Hydric soil rating: Yes

Maybid

Percent of map unit: 3 percent
Landform: Depressions, terraces, drainageways
Landform position (three-dimensional): Dip
Down-slope shape: Concave
Across-slope shape: Concave
Hydric soil rating: Yes

Scarboro

Percent of map unit: 2 percent
Landform: Drainageways, outwash terraces, depressions, outwash deltas
Landform position (two-dimensional): Toeslope
Landform position (three-dimensional): Base slope, tread, dip
Down-slope shape: Concave
Across-slope shape: Linear, concave
Hydric soil rating: Yes

38C—Hinckley loamy sand, 3 to 15 percent slopes

Map Unit Setting

National map unit symbol: 2svmb

Elevation: 0 to 1,290 feet

Mean annual precipitation: 36 to 71 inches

Mean annual air temperature: 39 to 55 degrees F

Frost-free period: 140 to 240 days

Farmland classification: Farmland of statewide importance

Map Unit Composition

Hinckley and similar soils: 85 percent

Minor components: 15 percent

Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Hinckley

Setting

Landform: Moraines, outwash terraces, outwash deltas, kame terraces, outwash plains, kames, eskers

Landform position (two-dimensional): Shoulder, backslope, footslope, toeslope, summit

Landform position (three-dimensional): Nose slope, side slope, crest, head slope, riser, tread

Down-slope shape: Convex, linear, concave

Across-slope shape: Linear, convex, concave

Parent material: Sandy and gravelly glaciofluvial deposits derived from gneiss and/or granite and/or schist

Typical profile

Oe - 0 to 1 inches: moderately decomposed plant material

A - 1 to 8 inches: loamy sand

Bw1 - 8 to 11 inches: gravelly loamy sand

Bw2 - 11 to 16 inches: gravelly loamy sand

BC - 16 to 19 inches: very gravelly loamy sand

C - 19 to 65 inches: very gravelly sand

Properties and qualities

Slope: 3 to 15 percent

Depth to restrictive feature: More than 80 inches

Drainage class: Excessively drained

Runoff class: Very low

Capacity of the most limiting layer to transmit water (Ksat): Moderately high to very high (1.42 to 99.90 in/hr)

Depth to water table: More than 80 inches

Frequency of flooding: None

Frequency of ponding: None

Maximum salinity: Nonsaline (0.0 to 1.9 mmhos/cm)

Custom Soil Resource Report

Available water capacity: Low (about 3.1 inches)

Interpretive groups

Land capability classification (irrigated): None specified

Land capability classification (nonirrigated): 4e

Hydrologic Soil Group: A

Ecological site: F144AY022MA - Dry Outwash

Hydric soil rating: No

Minor Components

Merrimac

Percent of map unit: 5 percent

Landform: Outwash plains, kames, eskers, moraines, outwash terraces

Landform position (two-dimensional): Backslope, footslope, shoulder, toeslope, summit

Landform position (three-dimensional): Side slope, crest, head slope, nose slope, riser, tread

Down-slope shape: Convex

Across-slope shape: Convex

Hydric soil rating: No

Windsor

Percent of map unit: 5 percent

Landform: Eskers, moraines, kame terraces, outwash plains, outwash terraces, outwash deltas, kames

Landform position (two-dimensional): Shoulder, backslope, footslope, toeslope, summit

Landform position (three-dimensional): Crest, head slope, nose slope, side slope, riser, tread

Down-slope shape: Convex, concave, linear

Across-slope shape: Concave, linear, convex

Hydric soil rating: No

Agawam

Percent of map unit: 3 percent

Landform: Outwash deltas, kame terraces, outwash plains, kames, eskers, moraines, outwash terraces

Landform position (two-dimensional): Footslope, backslope, shoulder, toeslope, summit

Landform position (three-dimensional): Nose slope, side slope, crest, head slope, riser, tread

Down-slope shape: Linear, convex, concave

Across-slope shape: Convex, linear, concave

Hydric soil rating: No

Sudbury

Percent of map unit: 2 percent

Landform: Outwash plains, moraines, outwash deltas, outwash terraces, kame terraces

Landform position (two-dimensional): Backslope, footslope

Landform position (three-dimensional): Base slope, tread

Down-slope shape: Concave, linear

Across-slope shape: Linear, concave

Hydric soil rating: No

701A—Ninigret fine sandy loam, 0 to 3 percent slopes

Map Unit Setting

National map unit symbol: 2y07d
Elevation: 0 to 1,260 feet
Mean annual precipitation: 43 to 54 inches
Mean annual air temperature: 45 to 55 degrees F
Frost-free period: 140 to 185 days
Farmland classification: All areas are prime farmland

Map Unit Composition

Ninigret and similar soils: 85 percent
Minor components: 15 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Ninigret

Setting

Landform: Outwash terraces, kames, moraines, outwash plains, kame terraces
Landform position (two-dimensional): Footslope, toeslope
Landform position (three-dimensional): Base slope, tread
Down-slope shape: Linear, convex
Across-slope shape: Concave, convex
Parent material: Coarse-loamy eolian deposits over sandy and gravelly glaciofluvial deposits derived from gneiss, granite, schist, and/or phyllite

Typical profile

Ap - 0 to 8 inches: fine sandy loam
Bw1 - 8 to 16 inches: fine sandy loam
Bw2 - 16 to 26 inches: fine sandy loam
2C - 26 to 65 inches: stratified loamy sand to loamy fine sand

Properties and qualities

Slope: 0 to 3 percent
Depth to restrictive feature: 18 to 38 inches to strongly contrasting textural stratification
Drainage class: Moderately well drained
Runoff class: Very low
Capacity of the most limiting layer to transmit water (Ksat): Moderately low to high (0.14 to 14.17 in/hr)
Depth to water table: About 17 to 39 inches
Frequency of flooding: None
Frequency of ponding: None
Maximum salinity: Nonsaline (0.0 to 1.9 mmhos/cm)
Available water capacity: Low (about 3.4 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 2w
Hydrologic Soil Group: C

Custom Soil Resource Report

Ecological site: F144AY026CT - Moist Silty Outwash
Hydric soil rating: No

Minor Components

Merrimac

Percent of map unit: 5 percent
Landform: Moraines, kames, eskers, outwash terraces, outwash plains
Landform position (two-dimensional): Shoulder, summit
Landform position (three-dimensional): Side slope, crest, tread
Down-slope shape: Convex
Across-slope shape: Convex
Hydric soil rating: No

Agawam

Percent of map unit: 5 percent
Landform: Moraines, outwash terraces, outwash plains, kame terraces, kames
Landform position (two-dimensional): Shoulder, summit
Landform position (three-dimensional): Side slope, crest, tread
Down-slope shape: Convex
Across-slope shape: Convex
Hydric soil rating: No

Tisbury

Percent of map unit: 3 percent
Landform: Outwash terraces, outwash plains, deltas, valley trains
Landform position (three-dimensional): Tread
Down-slope shape: Concave
Across-slope shape: Concave
Hydric soil rating: No

Raypol

Percent of map unit: 2 percent
Landform: Depressions, drainageways
Down-slope shape: Concave
Across-slope shape: Concave
Hydric soil rating: Yes