

## **TABLE OF CONTENTS OF SPECIAL PROVISIONS**

Note: This Table of Contents has been prepared for the convenience of those using this contract with the sole express purpose of locating quickly the information contained herein; and no claims shall arise due to omissions, additions, deletions, etc., as this Table of Contents shall not be considered part of the contract.

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AUGUST 22, 2018  
FEDERAL AID PROJECT NO. 0952(118)  
STATE PROJECT NO. 14-185

REHABILITATION OF BRIDGE NO. 00196, I-95 OVER US ROUTE 1

Town of Branford  
Federal Aid Project No. 0952(118)

The State of Connecticut, Department of Transportation, Standard Specifications for Roads, Bridges, Facilities and Incidental Construction, Form 817, 2016, as revised by the Supplemental Specifications dated January 2018 (otherwise referred to collectively as "ConnDOT Form 817") is hereby made part of this contract, as modified by the Special Provisions contained herein. Form 817 is available at the following DOT website link <http://www.ct.gov/dot/cwp/view.asp?a=3609&q=430362>. The current edition of the State of Connecticut Department of Transportation's "Construction Contract Bidding and Award Manual" ("Manual"), is hereby made part of this contract. If the provisions of this Manual conflict with provisions of other Department documents (not including statutes or regulations), the provisions of the Manual will govern. The Manual is available at the following DOT website link <http://www.ct.gov/dot/cwp/view.asp?a=2288&q=259258>. The Special Provisions relate in particular to the Rehabilitation of Bridge No. 00196, I-95 over US Route 1 in the Town of Branford.

## **CONTRACT TIME AND LIQUIDATED DAMAGES**

In order to minimize the hazard, cost and inconvenience to the traveling public and pollution of the environment, it is necessary to limit the time of construction work, which interferes with traffic as specified in Article 1.08.04 of the Special Provisions.

There will be four assessments for liquidated damages and they will be addressed in the following manner:

1. For this contract, an assessment per day for liquidated damages, at a rate of Four Thousand One Hundred Dollars (\$4,100.00) per day shall be applied to each calendar day the work runs in excess of the Four Hundred Twenty Nine (429) allowed calendar days for the contract
2. For this contract, an assessment per hour for liquidated damages shall be applied to each hour, or any portion thereof, in which the Contractor interferes with normal Interstate 95 traffic operations during the restricted hours given in Article 1.08.04 of the Special Provisions. The liquidated damages shall be as shown in the following tables entitled "Liquidated Damages Per Hour" for each hour, or any portion thereof, in which the Contractor interferes with normal traffic operations during the restricted

hours. These lane use liquidated damages will not apply during the superstructure replacement milestone.

For the purpose of administering this contract, normal I-95 traffic operations are considered interfered with when:

- A. Any portion of the travel lanes is occupied by any personnel, equipment, materials, or supplies including signs.
- B. All available shoulder widths are occupied by any personnel, equipment, materials, or supplies including signs.
- C. Any ramps are fully or partially closed to traffic during the restricted hours at any time except when I-95 traffic is crossed over.
- D. The transition between the planes of pavement surfaces is at a rate of one inch in less than fifteen feet longitudinally.

**LIQUIDATED DAMAGES PER HOUR**

SPN: 014-185

Project No. 014-185 I-95 Southbound 2 Through Lane Section		
If Working Periods Extends Into	A.M. 1 Lane Closure	P.M. 1 Lane Closure
1st Hour of Restrictive Period	\$500	N/A <sup>1</sup>
2 <sup>nd</sup> Hour of Restrictive Period	\$2,000	N/A <sup>1</sup>
3rd Hour or any Subsequent Hour of Restrictive Period	\$6,000	N/A <sup>1</sup>
Project No. 014-185 I-95 Northbound 2 Through Lane Section		
If Working Periods Extends Into	A.M. 1 Lane Closure	P.M. 1 Lane Closure
1st Hour of Restrictive Period	\$15,000	N/A <sup>1</sup>
2 <sup>nd</sup> Hour of Restrictive Period	\$50,000	N/A <sup>1</sup>
3rd Hour or any Subsequent Hour of Restrictive Period	\$70,000	N/A <sup>1</sup>

The above liquidated damages apply to those hours shown on the Limitation of Operations charts designated with a “2” or “E”.

For each hour shown on the Limitation of Operations charts designated with an “E”, liquidated damages of \$500 shall apply for each hour, or part thereof, if all available shoulder widths are not available to traffic.

Liquidated damages in the amount of \$500 shall apply for each hour, or part thereof, that the Contractor interferes with existing traffic operations on any ramps during the non-allowable hours.

<sup>1</sup>There are no daytime lane closures allowed, therefore only A.M. Liquidated Damages are required.



These lane use liquidated damages will not apply during the Superstructure Replacement Milestone. The liquidated damages set forth below for Superstructure Replacement Milestone will apply in lieu of the lane use liquidated damages; however, lane use liquidated damages will be in effect once the Superstructure Replacement Milestone has been completed.

3. **Superstructure Replacement Milestone**

For this contract, an assessment per hour for liquidated damages, at a rate of Ten Thousand Dollars (\$1,000) per hour or portion of an hour that the Milestone is not completed by midnight (12:00 am) of the seventy-seventh day with a maximum liquidated damage assessment of One Hundred Forty Thousand Dollars (\$140,000).

The Contractor shall refer to the “Milestone Liquidated Damages Provisions” that follows for terms and conditions.

4. **IMS Equipment Installations**

For this Contract, an assessment per day for liquidated damages, at a rate of Two Thousand Dollars (\$2,000) per day shall be applied to each calendar day that the CCTV Cameras are not operational. The CCTV Camera Sites included in this Contract are the following:

- (Existing) CCTV Camera Site No. 95S-088
- (Existing) CCTV Camera Site No. 95N-089

The contractor shall refer to the “Notice to Contractor –Installation Qualifications” for terms and conditions.

## **MILESTONE INCENTIVE LIQUIDATED DAMAGES PROVISIONS**

In order to minimize the hazard, cost and inconvenience to the traveling public, and the detriment to the commercial area, it is necessary to limit the time of construction work which interferes with traffic as specified in Article 1.08.04 of the Special Provisions.

For this Contract, Milestone Incentive payments and/or the assessment of Roadway Closure Liquidated Damages are bound to the completion of the work delineated on the Contract plans during the lane closures of Interstate 95 (I-95), U.S. Route 1 (US 1) and the ramps associated with Interchange 55, along with all work incidental thereto. The bridge superstructure, along with the associated substructure work, shall be replaced in two (2) accelerated construction events.

- One half of the bridge superstructure, which carries one direction (bound) of I-95 traffic, shall be fully replaced during the first accelerated construction event.
- The second half of the bridge superstructure, which carries the other direction (bound) of I-95 traffic, shall be fully replaced during the second accelerated construction event.

The accelerated construction events have a single associated Milestone. Traffic detours can only be implemented for the actual removal operations of the existing superstructures and the placement of the new superstructures along with the associated substructure work. The Contractor is allowed a total of two (2) closures of lanes on I-95 and the ramps to complete the superstructure work. The I-95 and ramp closures shall be in accordance with Article 1.08.04. The Contractor will receive an Incentive Payment if the listed Milestone is completed prior to the allowable timeframe as specified in the “Incentive Payment” paragraph below or will be assessed Liquidated Damages if the work is not completed within the allowable time frame for the closure, as specified in the “Liquidated Damages” paragraph below.

**A minimum of 45 calendar days prior to the anticipated closure(s), the Contractor shall furnish to the Engineer for approval, a Critical Path Method (CPM) schedule that details all the hour-by-hour operations necessary to complete all work during the allowed closure time frame.**

The Critical Path Method (CPM) schedule shall include:

- Activity descriptions, activity durations and interdependence between activities, where applicable. The activities shall be described so that the work is readily identifiable and the progress on each activity can be readily measured and monitored during the noted timeframe.
- The anticipated number of shifts, the hours per shift, and the anticipated number of personnel staffed and equipment per shift
- Anticipated submittal and approval dates
- Anticipated material delivery dates

The following shall also be submitted with the CPM schedule, as applicable.

- Description of any special resources, including backup equivalent resources
- Contingency plans for mechanical failure
- M&PT plans

The Contractor must notify the Engineer of the proposed closure date of lanes on I-95, ramps, and US 1 at least forty-five (45) days prior to the closure.

**Milestone:**

The Superstructure Replacement Milestone is defined as the completion of the replacement of both new spans of the superstructure on both halves (bounds) of the bridge. The Superstructure Replacement Milestone must be and can only be achieved one (1) time during the Contract.

The Contract time associated with an Incentive Payment or a Liquidated Damage Payment for the Milestone is seventy-seven (77) consecutive calendar days and shall be known as the "Milestone Time of Completion." A day is defined as a twenty-four (24) hour period of time, which starts at 12:00 A.M. (midnight).

The start of the Contract time and the start of Day 1, associated with an Incentive Payment or a Liquidated Damage, is defined as 12:00 A.M. (midnight) of the day that one (1) or both lanes of traffic, carried on the first half of the superstructure to be replaced, are shifted to the adjacent bridge half, regardless of the actual time the traffic shift begins on that day. The superstructure replacement will be considered complete when two (2) travel lanes are open on each side of the I-95 median, on the replaced superstructure, and all four (4) of the I-95 Interchange 55 ramps are open to traffic.

In order for the new portions of the superstructure to be opened to traffic, the following components must be in place, have reached their minimum required strength and have been approved for service by the Engineer:

- 1) New superstructure supported on permanent bearings on the permanent pier and abutment seats
- 2) Approach slabs across the full width of the roadways
- 3) Link slab and all closure pours
- 4) Permanent bridge parapets and deck median barrier or securely fastened temporary traffic barriers
- 5) Paved approach roadways and I-95 Interchange 55 ramps with suitable pavement transitions (membrane waterproofing and paving of the bridge deck and approach slabs need not be completed for the Milestone)
- 6) Guide railing, including transitions and attachment to the bridge parapet/median barrier or to the temporary traffic barriers
- 7) All temporary or final traffic control appurtenances, including line striping and signage
- 8) All required roadway signage installed and visible to the traveling public
- 9) All signalized intersection operations matching final conditions
  - a) Specific to US 1: All on-ramps/off-ramps shall be open to through traffic

**Incentive Payment:**

One Thousand Dollars (\$1,000) per hour, for each full hour that the Milestone is completed prior to 12:00 A.M. (midnight) of the seventy-eighth (78th) day, as specified above, with a maximum incentive payment of One Hundred Forty Thousand Dollars (\$140,000), which will be paid under Item #0108100A- Lump Sum Incentive Payment (Estimated Cost).

**Liquidated Damages:**

One Thousand Dollars (\$1,000) per hour, for each hour or portion of an hour that the Milestone is not completed by 12:00 A.M. (midnight) of the seventy-eighth (78th) day, as specified above, with a maximum liquidated damage assessment of One Hundred Forty Thousand Dollars (\$140,000).

This aggregate amount will be considered separate from any Liquidated Damages assessed to the Contractor for failure to complete the total Project on time per Article 1.08.09 of this Contract.

For the purposes of administering the above-noted Milestone Incentives and Liquidated Damages, “normal traffic operations” shall be understood to mean:

1. All travel lanes shall be open to through traffic without hindrance of construction equipment, construction signage and temporary barrier. Materials within shoulders shall satisfy the Department's required minimum clearances to travel lanes.
2. All required roadway signage shall be installed and visible to the traveling public.
3. All signalized intersection operations shall match proposed conditions.
4. Specific to I-95: The transition between the planes of pavement surfaces is at a rate less than one (1) inch vertically per fifteen (15) feet longitudinally.
5. Specific to US 1: All on-ramps/off-ramps shall be open to through traffic, therefore, returning complete functionality of Interchange No. 55 between I-95 and US 1.

**Milestone Time of Completion Conditions**

The Engineer will determine the actual Milestone Time of Completion. For purposes of calculation and determination of entitlement to Incentive payments or assessment of Liquidated Damages hereunder, the Milestone Time of Completion has been established for the Contract, and said Time will not be adjusted thereafter for any reasons, cause or circumstance, regardless of fault on the part of any party.

Under these provisions 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 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 the Milestone Time of Completion for the purpose of determining whether or not any Milestone Incentive payment is due to, or any Liquidated Damages are due from, the Contractor, or of calculating the amount of these.

**Milestone Incentive Payment Terms and Conditions**

**A minimum of 45 calendar days prior to the anticipated closure(s), the Contractor shall furnish to the Engineer for approval a Critical Path Method (CPM) schedule that details all the hour-by-hour operations necessary to complete the above described work for both Milestones.** The schedule shall include activity descriptions, activity durations, and interdependence between activities, where applicable. The activities are to be described so that the work is readily identifiable and the progress on each activity can be readily measured and monitored during the noted timeframe. The Contractor must also provide the anticipated number of shifts, the hours per shift, and the anticipated number of personnel staffed per shift.

The Department will pay to the Contractor a Lump Sum Incentive Payment under Item No. 0108100A, as specified above, based on the actual time of completion of the Milestone, if the Milestone is achieved in less time than the Milestone Time of Completion. The Engineer will determine the amount of any appropriate payment(s) to be made in this regard, subject to the conditions set forth hereinabove. For purposes of calculation and determination of entitlement to Incentive payments hereunder, the Milestone Incentive Time of Completion has been established for the Contract, and said Time will not be adjusted thereafter for any reasons, cause or circumstance, regardless of fault on the part of any party.

Further, any and all costs or detrimental effects incurred by the Contractor in accelerating the work in an attempt to achieve the Milestone before the Milestone Time of Completion that may be due the Contractor, 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 Contractor's sole means, if any, for recovering such acceleration costs from the State shall be the Milestone Incentive Payment that will be due if the pertinent work is completed to the satisfaction of the Engineer prior to the Milestone Time of Completion.

If the Contractor elects to take advantage of the Milestone Incentive Payment provisions, and if any portion of said provisions conflicts with any other provision of the Contract, the Contract shall be interpreted in accordance with these additional Milestone Incentive Payment provisions:

(1) To take advantage of the milestone incentive payment provisions, the Contractor must complete the pertinent work and obtain written verification from the Engineer that the actual Milestone related work is accepted, and that the time of completion was before the specified Milestone Time of Completion.

(2) Within 30 days of receiving such verification of the actual time of completion, the Contractor must provide written notification to the administrating District Engineer that the Contractor elects to receive payment(s) under these provisions. A copy of the Engineer's verification of the acceptance of the work and the pertinent actual time of completion must be enclosed with the notice to the District Engineer. The Contractor's written notice shall include the following language:

"waive and release the State from any and all claims, causes of action, issues, demands, disputes, matters or controversies of any nature or kind, known or

unknown, present or potential, which the Contractor, his employees, agents or successors may have, may have had or ever may have against the Department, its officials, employees, consultants, or its other agents or representatives, in connection with the Contract or the Project, including, but not limited to, claims regarding Project work performed or deleted, construction orders, supplemental agreements, delays, disruptions, differing site conditions, utility conflicts, design changes or defects, time extensions, extra work, right-of-way issues, permitting issues, actions of suppliers or subcontractors or other contractors or third parties, shop drawing review or rejection, expansion of the physical Project limits, weather conditions, weekend or holiday cessation of Project activities, restrictions of working hours, suspensions of the Contractor's operations, extended or unabsorbed home office or jobsite overhead, lost profits, markups on subcontractor work, acceleration costs, and any other direct or indirect costs, and any other adverse impacts, events, conditions or circumstances or potential damages, relating to or arising out of the Contract or the Project through the date of this letter. This waiver and release and acknowledgement of satisfaction shall be all-inclusive and absolute, except for any routine adjustment by the Department of final quantity estimates."

If the Contractor does not, (1) prior to the Milestone Time of Completion, complete the described Milestone Contract work and obtain written verification from the Engineer of the acceptance and actual time of completion of said work, or (2) within thirty (30) days of said written verification, give the required written notice to the District Engineer of its election to receive incentive payment under the Contract, then the Contractor shall have no right to any payment under these Milestone Incentive payment provisions.

Without regard to any verification by the Engineer that pertinent Contract work has been completed and accepted, and without regard to whether or not any Milestone Incentive has been elected or earned under these provisions, the Contractor shall remain responsible for all Contract work and the continued maintenance thereof until such date as the Department formally accepts all work under the Contract in accordance with Article 1.08.14 of this Contract.

**Milestone Liquidated Damages Terms and Conditions:**

Whether or not the Contractor elects to take advantage of the Milestone Incentive payment provisions, the Milestone Liquidated Damage provisions will apply to all circumstances in which the Engineer does not verify in writing that the pertinent Contract work has been completed on or before the Milestone Time of Completion.

If the Contractor does not complete the pertinent work on or before the Milestone Time of Completion, the Department will deduct from monies otherwise owed to the Contractor the Liquidated Damages, as specified above, based on the actual time of completion of the Milestone. The Engineer will determine the amount of liquidated damages to be assessed, made in this regard, subject to the conditions set forth hereinabove.

## **NOTICE TO CONTRACTOR – ACCELERATED BRIDGE CONSTRUCTION**

It is the Department's intent that work delineated on the Contract plans during the lane closures of Interstate 95 (I-95), U.S. Route 1 (US 1) and the ramps associated with Interchange 55, along with all work incidental thereto will be completed during a maximum Seventy-Seven (77) calendar day accelerated construction sequence. The design and suggested construction sequence are predicated upon a construction method that is shown and described within the Contract Plans and Specifications. The Contractor will be expected to schedule multiple, extended shifts, extra manpower, and equipment to complete the bridge construction sequence shown in the Contract Plans.

The Contractor can choose to utilize the suggested sequence or develop their own approach, and propose a method to accomplish the bridge construction utilizing a staging or sequence other than that which is indicated in the Contract Documents. It is required that the Contractor must carefully study the site, the schedule restraints and logistical requirements in relation to their proposed means and methods to ensure the work can be accomplished as described within the timeframe and schedules allowed.

## **NOTICE TO CONTRACTOR – ELECTRONIC ENGINEERING DATA (EED)**

The EED is an assembly of engineering data files that were used to produce the Contract plans.

**Electronic Engineering Data (EED) is provided for information purposes only. In case of conflict between the EED and the Contract plans and specifications, the contract plans and specifications shall govern.** The EED has been reviewed by the Department for quality control purposes, but it is the Contractor's responsibility to build the Project per the contract plans and specifications.

The EED is being provided to the Engineer for GPS/RTS inspection. The Contractor may use the EED to assist in bidding, layout and Automated Machine Control/Guidance.

The EED includes geospatially-correct 2D CAD files and may include horizontal and vertical alignment data files, 3D surface model files (break-line features and triangles) and a preference file. The data is being provided in two formats:

- Native Format
  - Bentley MicroStation CAD files (dgn)
  - Bentley SS2 InRoads Alignment Files (alg)
  - Bentley SS2 InRoads Digital Terrain Models (dtm)
  - Bentley SS2 InRoads Preference File (xin)
- Converted Format (for use in GPS/RTS Site equipment)
  - AutoCAD CAD files (dxf)
  - Alignment files (xml)
  - Surface Models (xml)

For a complete list of EED files, see the EED file manifest (PDF) located in the EED\_XXXX-XXXX.zip file (XXXX-XXXX is the project number) which is posted with the contract PS&E's on the State Contracting portal.



## **NOTICE TO CONTRACTOR – ENVIRONMENTAL INVESTIGATIONS**

Environmental site investigations have been conducted that involved the sampling and laboratory analysis of soil and groundwater collected from various locations and depths within the Project limits. The results of these investigations indicated the presence of detectable concentrations of semi-volatile organic compounds (SVOCs) and RCRA-8 metals in the soils, and RCRA-8 metals in the groundwater within proposed construction areas in exceedance of Connecticut Department of Energy and Environmental Protection (CT DEEP) numeric criteria. The CT DEEP groundwater classification beneath the site is GA. Based on these findings, two (2) AOECs exist within the proposed Project limits. The presence of these compounds at these concentrations will require the handling of soils excavated from these areas to be restricted as described herein. All material excavated from within the AOECs that cannot be reused in the same AOEC are to be brought to the designated soil reuse area located within the Project limits (along the I-95 northbound embankment directly north of the bridge). Additionally, all groundwater encountered within the Project limits is considered an AOEC and will require handling in accordance with Item No. 0204213A - Handling Contaminated Groundwater.

The Contractor is hereby notified that soils requiring special management or disposal procedures will be encountered during various construction activities conducted within the Project limits. Therefore, the Contractor will be required to implement appropriate health and safety measures for all construction activities to be performed within the AOECs. These measures shall include, but are not limited to, air monitoring, engineering controls, personal protective equipment and decontamination, equipment decontamination and personnel training. **WORKER HEALTH AND SAFETY PROTOCOLS WHICH ADDRESS POTENTIAL AND/OR ACTUAL RISK OF EXPOSURE TO SITE SPECIFIC HAZARDS IS SOLELY THE RESPONSIBILITY OF THE CONTRACTOR.**

All suitable material excavated within AOECs shall be utilized as fill/backfill within the same AOEC in accordance with the following conditions: (1) such soil is deemed to be structurally suitable for use as fill by the Engineer; (2) such soil is not placed below the water table; (3) the DEEP groundwater classification of the area where the soil is to be reused as fill does not preclude said reuse; and (4) such soil is not placed in an area subject to erosion. Soils are to be reused in this fashion prior to the use of other soils and/or fill before relocation of any excess material to the designated soil reuse area.

The Sections which shall be reviewed by the Contractor include, but are not limited to, the following:

- Item No. 0101000A - Environmental Health and Safety
- Item No. 0204213A – Handling Contaminated Groundwater

The Contractor is alerted to the fact that a Department environmental consultant will be on site for excavation and dewatering activities within the AOECs, to collect soil and groundwater samples (if necessary), and to observe site conditions for the State.

Information pertaining to the results of the environmental investigations discussed can be found in the documents listed below. The results contained in the environmental investigation reports listed below show levels of various contaminants that the Contractor may encounter during construction. Actual levels found during construction may vary and such variations will not be considered a change in condition provided the material can still be relocated to the designated soil reuse area, as determined by the Engineer. These documents shall be available for review electronically.

- Task 210 Subsurface Site Investigation, Rehabilitation of Bridge No. 00196 – Interstate 95 Over U.S. Route 1, Branford Connecticut, HRP Associates Inc., March 23, 2018

## **NOTICE TO CONTRACTOR – EXISTING IMS**

The Contractor is herein made aware of existing Incident Management System (IMS) conduit and appurtenances located along I-95 Northbound, on Bridge No. 00196 parapet, and along East Main Street in the vicinity of the project area.

The Contractor will be responsible for locating, verifying the location of and protecting all IMS below and above the ground. Prior to the start of construction, the Contractor shall contact “Call Before You Dig” and all utility within the towns along the project corridor. The Contractor shall also contact Robert Kennedy (860-594-3458) of ConnDOT Highway Operations at to mark out IMS conduit and appurtenances.

In areas adjacent to existing incident management system equipment, the Contractor is required to hand excavate. Any damage caused to the IMS conduit/equipment will be the responsibility of the Contractor, and will be replaced by the Contractor at the Contractor’s expense, as directed by the Engineer. Mark out of the IMS will not relieve the Contractor of responsibility for repair of damage caused by the Contractor or the Contractor’s sub-contractors.

**NOTICE TO CONTRACTOR – GLOBAL POSITIONING SYSTEM (GPS)  
COORDINATES FOR SIGNS**

The Contractor shall obtain and provide to the Engineer sign installation data, including Global Positioning System (GPS) latitude and longitude coordinates, for all new State owned and maintained signs. The Engineer shall forward the sign data to the Division of Traffic Engineering for upload into the Highway Sign Inventory and Maintenance Management Program (SIMS). Sign data submissions or questions relating to SIMS or GPS shall be sent to DOT-SignInventory@ct.gov. Refer to the special provision for Section 12.00 General Clauses For Highway Signing.

## **NOTICE TO CONTRACTOR – INSTALLATION QUALIFICATIONS FOR COMPUTERIZED TRAFFIC SIGNAL SYSTEM (CTSS) EQUIPMENT**

All management, construction, installation, and inspection services shall be performed by individuals who have performed the same job function on at least two (2) previously completed construction and installation communication projects of comparable size and complexity.

### **Approval of Fiber-Optic Cable Installation, Splicing and Testing:**

Each Contractor or Subcontractor performing the work involved with installing, splicing and testing of cable and electronic communication systems shall provide references and resumes of staff that shall meet the following requirements:

Satisfactory completion of at least three (3) fiber-optic based communication projects in the last five (5) years. Experience shall be in related fiber optic systems for installers involving single-mode cables in excess of three (3) miles (4.8 kilometers).

The Contractor shall provide a list of each fiber-optic based communications project and/or intelligent transportation system project which the Contractor has performed, including a description of each project, the location of each project, inclusive dates of when the work was performed on each project, and a contact reference for each project listed. Each of the referenced projects shall include completing a minimum of three (3) single-mode, optical fiber cable fusion splices, and installation of at least twenty-five (25) optical connectors on single-mode optical fibers. As a minimum, the contact reference shall include an individual's name, training certificates (including updated licenses), title, and current telephone number.

All Contractor personnel involved in the placing, splice preparation and splicing of fiber optic cable shall meet or exceed the above referenced installation qualifications and shall be approved by the Office of Highway Design. Under no circumstance will unqualified, unapproved Contractor personnel be allowed to work on the CTSS Equipment.

### **Approval of ITS Systems Integrator:**

The proposed ITS Systems Integrator performing the work described in these Special Provisions which are involved with supplying, installing, configuring and testing of electronic communication systems for the Traffic signal cabinet, shall provide a printed document (nine copies) that contains the proposed ITS Systems Integrator's experience in the areas noted below, as well as references and resumes for staff proposed to perform the project work. The document should clearly indicate how the proposed ITS Systems Integrator meets the following requirements:

- Experience involving at least seven (7) ITS system integration projects with overall system responsibility and accountability, each employing at least 8 traffic signal sites or ITS camera sites.
- Knowledge and experience with video encoder compression equipment involving at least ten sites, comprising video compression algorithms including but not limited to: H.264, MPEG2, MPEG4, and MJPEG used for traffic signal or highway transportation purposes.
- Experience using various communication test equipment including: Fiber Optic Spectrum Analyzer, OTDR, BERT, Protocol Analyzer, and Oscilloscope.
- Demonstrate a general working knowledge of serial communications interfaces such as RS-232, RS-422, RS-485, RS-530, and RS-449.
- Demonstrate extensive experience configuring Ethernet layer 2 and layer 3 managed Ethernet switches including but not limited to: TCP/IP routing schemes, Rapid Spanning Tree Protocol, link aggregation protocols, VLAN configurations, and Quality of Service.

**The document for the CTSS Equipment Fiber-Optic Cable Installation, Splicing and Testing Qualifications and ITS Systems Integrator shall be submitted for approval within ten (10) days of the Contract Award to:**

Mr. John F. Korte  
Connecticut Department of Transportation  
Bureau of Highway Operations  
2800 Berlin Turnpike P.O. Box 317456  
Newington, Connecticut 06131-7546

These requirements shall apply to the following contract item installations:

- Optical Fiber Cable, Single Mode, Loose Buffered Tube Cable, 6-Fiber, 36-Fiber
- Fiber Optic Cable Splice Enclosures (Signal)
- Optical Fiber Termination Patch Panel
- 10/100/1000 Base – T Ethernet Switch

**The Contractor shall not start work on the CTSS Equipment until the Contractor receives approval from the Department. This document shall be submitted to the department for review and approval before any CTSS Equipment project work may proceed.**

## **NOTICE TO CONTRACTOR – INSTALLATION QUALIFICATIONS**

All management, construction, installation, and inspection services shall be performed by individuals who have performed the same job function on at least two previously completed construction and installation communication projects of comparable size and complexity.

### **Approval of ITS Equipment Installer:**

Each Contractor or Subcontractor performing the work involved with the installation of Intelligent Transportation System (ITS) equipment related to the Incident Management System shall provide references and resumes of staff that shall meet the following requirements:

Satisfactory completion of at least three (3) projects in the last three (3) years that includes the installation of each of the ITS equipment identified below.

- 100 mm Multiduct Conduit
- Pullboxes
- Camera Lowering Devices
- Camera Assemblies
- Traffic Management System Cabinets (TMSC)
- Traffic Flow Monitors (TFM) and TFM Poles
- Variable Message Signs (VMS) and VMS Controller Cabinets

The Contractor shall provide a list of each ITS project which the Contractor has performed, including a description of each project, the location of each project, inclusive dates of when the work was performed on each project, and a contact reference for each project listed.

This document shall be submitted to ConnDOT for review and approval before any Incident Management System project work may proceed.

### **Approval of Fiber-Optic Cable Installation, Splicing and Testing:**

Each Contractor or Subcontractor performing the work involved with installing, splicing and testing of cable and electronic communication systems and installing detection and video systems, shall provide references and resumes of staff that shall meet the following requirements:

Satisfactory completion of at least three (3) fiber-optic based communication projects in the last three years. Experience shall be in related fiber optic systems for installers involving single-mode cables in excess of 10 kilometers.

The Contractor shall provide a list of each fiber-optic based communications project and/or intelligent transportation system project which the Contractor has performed, including a description of each project, the location of each project, inclusive dates of when the work was performed on each project, and a contact reference for each project listed. Each of the referenced projects shall include completing a minimum of three (3), multifiber, single-mode, optical fiber cable fusion splices, and installation of at least 25 optical connectors on single-mode optical fibers. As a minimum, the contact reference shall include an individual's name, training certificates (including updated licenses), title, and current telephone number.

This document shall be submitted to ConnDOT for review and approval before any Incident Management System project work may proceed.

#### **Approval of ITS Systems Integrator:**

The Prime Contractor or qualified proposed ITS Systems Integrator Subcontractor performing the work described in these Special Provisions which are involved with supplying, installing, configuring and testing of electronic communication systems and video systems for the Incident Management System, shall provide a printed document (nine copies) that contains the proposed ITS Systems Integrator's experience in the areas noted below, as well as references and resumes for staff proposed to perform the project work. The document should clearly indicate how the proposed ITS Systems Integrator meets the following requirements:

- Experience involving at least seven (7) ITS system integration projects with overall system responsibility and accountability, each employing at least 8 camera sites used for highway transportation purposes. A minimum of 7 years experience in ITS system integration.
- Design and installation of at least 200 point-to-point optical digital video links used for highway transportation purposes.
- A minimum of two (2) projects using video matrix switchers with a minimum size of 240 inputs and 64 outputs of analog video used for highway transportation purposes.
- Installation of video compression equipment involving at least ten sites, comprising video compression algorithms including but not limited to: H.261, MPEG1, MPEG2, MPEG4, and MJPEG used for highway transportation purposes.
- Experience using various applicable test equipment including: Fiber Optic Spectrum Analyzer, OTDR, BERT, Protocol Analyzer, and Oscilloscope.



- Installation of a minimum of 40 digital video encoder and decoder devices.
- Ability to respond within 2 hours travel by car to Central Office located at ConnDOT, 2800 Berlin Turnpike, Newington CT.
- Provision of 24x7x365 maintenance available with technicians fully trained in ITS related equipment.
- Demonstrate a general working knowledge of specifications RS-170 and RS-250C.
- Demonstrate a general working knowledge of communications protocols utilized in the CCTV industry.
- Demonstrate a general working knowledge of physical communications interfaces such as RS-232, RS-422, RS-485, RS-530, and RS-449.
- Demonstrate extensive working knowledge of Ethernet physical topologies TCP/IP routing schemes, metro ring and link aggregation protocols, VLAN configurations, and Quality of Service configuration and setup.
- Have working experience in configuring Nortel Sonet equipment.

**The document for the ITS Equipment Installer, Fiber-Optic Cable Installation, Splicing and Testing Qualifications and ITS Systems Integrator shall be submitted for approval within ten (10) days of the Contract Award to:**

Mr. John F. Korte  
Connecticut Department of Transportation  
Bureau of Engineering and Highway Operations  
2800 Berlin Turnpike P.O. Box 317456  
Newington, Connecticut 06131-7546

These requirements shall apply to the following contract item installations:

- Optical Fiber Cable, Single Mode, Loose Buffered Tube Cable, 6-Fiber, 12-Fiber, and 72-Fiber
- Fiber Optic Cable Splice Closures
- Repair Fiber Optic Cable
- Traffic Management System Cabinets
- Traffic Management System Mini-Hub Cabinets
- Video equipment, including cameras and mountings

- Modify Existing Operations Center Control System
- Modify Existing Mini-hub Cabinet
- Optical Video/Data Transmitter and Receiver
- 10/100 Ethernet Switch
- Terminal Server
- Port Sharing Device
- Ethernet Media Converter
- Video and Graphics Wall Equipment
- Multi-Channel Fiber Optic Video Multiplexer/Demultiplexer
- Modify Existing Main Fiber Hub
- Single Mode Fiber Optic Directional Coupler
- Traffic Flow Monitor
- 10/100 Ethernet Router

**The Contractor shall not start work on the Incident Management System until the Contractor receives approval from the Office of Highway Operations.**

The Incident Management System shall be maintained in normal working operation at all times.

In the event that the Contractor needs to remove an Incident Management System device from service, the Contractor shall notify Mr. Robert Kennedy at the Newington Operations Center (860) 594-3458 at least ten (10) working days prior to any scheduled work operation. An Incident Management System device shall consist of CCTV cameras, camera cabinets, mini-hub cabinets, Traffic Flow Monitors, Variable Message Signs, Highway Advisory Radio site equipment and fiber optic cable including any associated fiber optic communications plant equipment.

All Project related scheduled work that will require the downtime of the Incident Management System, such as the splicing of the fiber optic trunkline cable, shall be performed on a non-holiday weekend as specified in Section 1.08 Prosecution and Progress - Incident Management System and as approved by Mr. Robert Kennedy, Newington Operations Center. The scheduled work performed on the approved non-holiday weekend shall be completed in a fifteen (15) hour work window. The Contractor shall identify the work that will be performed during this work window as well as a list of the approved staff to be performing work on the Incident Management System. Any deviation in the fifteen (15) hour work window must be approved by the Newington Operations Center staff.

Prior to the scheduled start of work on the Incident Management System, the Contractor shall contact the Bridgeport Operations Center to determine if there are any on-going incidents on the highway system. The Incident Management System will not be removed from service until any on-going incidents on the highway system are cleared and approval is granted by the Newington Operations Center staff.

All Contractor personnel involved in the placing, splice preparation and splicing of fiber optic cable shall meet or exceed the above referenced installation qualifications and shall be approved by the Office of Highway Operations. Under no circumstance will unqualified, unapproved Contractor personnel be allowed to work on the Incident Management System.

## **NOTICE TO CONTRACTOR – PRE-BID QUESTIONS AND ANSWERS**

Questions pertaining to DOT advertised construction projects must be presented through the CTDOT Pre-Bid Q and A Website. The Department cannot guarantee that all questions will be answered prior to the bid date. **PLEASE NOTE - at 9:00 am Monday (i.e. typical Wednesday Bid Opening) the project(s) being bid will be closed for questions, at which time questions can no longer be submitted through the Q and A Website.**

**Answers may be provided by the Department up to 12:00 noon, the day before the bid. At this time, the Q and A for those projects will be considered final, unless otherwise stated and/or the bid is postponed to a future date and time to allow for further questions and answers to be posted.**

If a question needs to be asked the day before the bid date, please contact the Contracts Unit staff and email your question to [dotcontracts@ct.gov](mailto:dotcontracts@ct.gov) immediately.

Contractors must identify their company name, contact person, contact email address and phone number when asking a question. The email address and phone number will not be made public.

The questions and answers (if any) located on the Q and A Website are hereby made part of the bid/contract solicitation documents (located on the State Contracting Portal), and resulting contract for the subject project(s). It is the bidder's responsibility to monitor, review, and become familiar with the questions and answers, as with all bid requirements and contract documents, prior to bidding. By signing the bid proposal and resulting contract, the bidder acknowledges receipt of, and agrees to the incorporation of the final list of Q and A, into the contract document.

Contractors will not be permitted to file a future claim based on lack of receipt, or knowledge of the questions and answers associated with a project. All bidding requirements and project information, including but not limited to contract plans, specifications, addenda, Q and A, Notice to Contractors, etc., are made public on the State Contracting Portal and/or the CTDOT website.

## **NOTICE TO CONTRACTOR – PROPRIETARY ITEMS**

The Contractor is hereby notified that the following items shall be furnished by the specific manufacturer:

<u>Item No.</u>	<u>Item Description</u>	<u>Manufacturer</u>
1112285A	Thermal Video Detector Camera Assembly	GRIDSMART Technologies
1112286A	360 Degree Camera Assembly	GRIDSMART Technologies
1112289A	360 Degree Closed Loop System Video Detection Processor	GRIDSMART Technologies
1113604A	Optical Fiber Cable – Single Mode, Loose Buffer Tube Cable, 6 Fiber	Corning Incorporated
1113618A	Optical Fiber Cable – Single Mode, Loose Buffer Tube Cable, 36 Fiber	Corning Incorporated
1113621A	Optical Fiber Cable – Single Mode, Loose Buffer Tube Cable, 72 Fiber	Corning Incorporated
1108826A	Optical Fiber Termination Patch Panel	Corning Cable Systems

**NOTICE TO CONTRACTOR – PROTECTION OF EXISTING UTILITIES AND COORDINATION WITH UTILITY COMPANIES**

Existing utilities shall be maintained during construction as noted on the plans and as coordinated with the Utilities. The Contractor shall verify the location of underground, structure mounted and overhead utilities. Construction work within the vicinity of utilities shall be performed in accordance with current safety regulations.

The Contractor is notified that, before and during the project, there are several ongoing utility relocations that are adjacent to and within the project limits. These projects include the relocation of existing utilities, and the installation of new facilities. The Contractor's activities may overlap the activities of the contractors engaged in the relocation projects, as well as the activities of Utility company personnel. Representatives of the various Utility companies shall be allowed access to the site at all times.

A sequencing of utility relocation is shown in the contract plans. This sequence will be followed by all Utility companies involved. It is recommended that the Contractor base his bid on the Utility Relocation Staging shown in the plans. Refer to NOTICE TO CONTRACTOR – UTILITY GENERATED SCHEDULE for utility relocation related scheduling information.

The Contractor shall completely coordinate his operations with the affected Utility companies and/or agencies, and ensure that his work is coordinated with that of the other Utility contractors. The coordination of the work is the complete responsibility of the Contractor. When the work required under his contract is in conflict with work being carried out by another contractor or agency, it is the responsibility of the Contractor to notify the Engineer immediately of the conflict, so that the situation can be assessed.

**The Contractor shall notify “Call Before You Dig”, telephone 1-800-922-4455 for the location of underground utilities, in accordance with Section 16-345 of the Regulations of the Department of Utility Control.**

Contractors are cautioned that it is their responsibility to verify locations, conditions, and field dimensions of all existing features, as actual conditions may differ from the information shown on the plans or contained elsewhere in the specifications. Verifications may require the excavation of exploratory test pits. As-Built plans will be prepared for all utilities relocated during the course of this project and will be shared with the Contractor.

The Contractor shall be liable for all damages or claims received or sustained by any persons, corporations or property in consequence of damage to the existing utilities, their appurtenances, or other facilities caused directly or indirectly by the operations of the Contractor.

Any damage to any existing private or public utility, as a result of the Contractor's operations, shall be repaired to the Utility's and the Engineer's satisfaction at no cost to the State, the Town or the Utility, including all materials, labor, etc., required to complete the repairs.

During the proposed excavation and roadway work on U.S. Route 1, the cover over the existing underground utilities will be reduced. The Contractor shall have the location of the underground utilities marked out prior to and following the excavation. The Contractor's attention is directed to the requirements of Article 1.07.13 - Contractor's Responsibility for Adjacent Property and Services.

Prior to opening an excavation, effort shall be made to determine whether underground installations, i.e. sewer, electric, gas, etc. will be encountered and, if so, where such underground installations are located. When the excavation approaches the estimated location of such installation, the exact location shall be determined by careful probing or hand digging and when it is uncovered, proper supports shall be provided for the existing installation. Utility companies shall be contacted and advised of proposed work prior to the start of actual excavation.

The Contractor shall perform all work in such a manner that will protect each Utility Company's facilities from damage. This may include excavation by hand methods as well as modified compaction methods when working close to underground utilities. The Contractor is responsible for coordinating their work with each Utility sufficiently in advance of the work so that the Utility can schedule their work crews. At a minimum, the Contractor shall notify the Utility's representatives specified in Article 1.07.13, thirty (30) calendar days prior to any scheduled excavation so as not to cause any delay to his anticipated progress.

## **NOTICE TO CONTRACTOR – RECENT REVISIONS**

The Contractor is hereby notified that the following Traffic Engineering Special Provisions have been revised:

### Section 10.00 – General Clauses for Highway Illumination and Traffic Signal Projects

- Updated as-built plan requirements

#### 1105xxxA – X\_Way\_X\_Section Traffic Signal:

- Changed the color of housing, brackets, and hardware
- Clarified color of housing door and visor.
- Backplates:
  - changed to louvered
  - changed retroreflective strip sheeting type

#### 1106xxxA – X\_Way\_Pedestrian Signal:

- Changed the color of housing, brackets, and hardware
- Clarified color of housing door and visor

#### 1107007A – Pedestrian Pushbutton and Sign (Piezo)

- Changed the color of housing, brackets, and hardware

#### 1107011A – Accessible Pedestrian Signal and Detector (Type A)

- Changed the color of housing, brackets, and hardware
- Changed the sign size to 9” x 15”

#### 1112286A – 360 Degree Camera Assembly

#### 1112288A – IP Video Detection Camera Assembly

- Added installation best practices guide

The Contractor is hereby notified that Traffic Engineering’s following guide sheets are included:

#### TR-1105\_01 – Traffic Signals and Cable Assignments

- Revised grounding note for span and other minor revisions

#### TR-1114\_01 – Bonding and Utility Pole Attachment Details, Sign Hanger, “Y” Clamp Detail

- Revised wood pole grounding details, added ground rod.



**NOTICE TO CONTRACTOR – SPAN WIRES, SPAN POLES AND SPAN POLE FOUNDATIONS**

The Contractor is notified that the Contract includes special provisions for the span wire, steel span pole, and span pole foundation items that require the submittal of working drawings and calculations for each span wire structure configuration.

## **NOTICE TO CONTRACTOR – TRAFFIC SIGNALS**

The Contractor is hereby notified that certain conditions pertaining to the installation of new signals and maintenance of traffic signal operations are required when relevant, as part of this contract.

### **Qualified/Unqualified Workers**

#### **U.S. Department of Labor**

**Occupational Safety & Health Administration (OSHA) [www.osha.gov](http://www.osha.gov)**

**Part Number 1910**

**Part Title Occupational Safety & Health Administration**

**Subpart S**

**Subpart Title Electrical**

**Standard Number 1910.333**

**Title Selection and use of work practices**

**Completion of this project will require Contractor employees to be near overhead utility lines. All workers and their activities when near utility lines shall comply with the above OSHA regulations. In general, unqualified workers are not allowed within 10 feet of overhead, energized lines. It is the contractor's responsibility to ensure that workers in this area are qualified in accordance with OSHA regulations.**

**The electric distribution company is responsible to provide and install all necessary anchors and guy strands on utility poles. It is the Contractors responsibility to coordinate with the utility company to ensure proper placement of the anchor.**

The Controller Unit (CU) shall conform to the current edition of the Functional Specifications for Traffic Control Equipment. The Functional Specifications require the CU meet NEMA Standard Publication No. TS2-1992 Type 2. The Functional Specifications are available on the Departments' web site <http://www.ct.gov/dot/site/default.asp>, click on "Doing Business with CONNDOT", under Engineering Resources click on "Traffic Engineering", Scroll down to Traffic Documents click on "Functional\_Specifications\_for\_Traffic\_Control\_Equip.pdf".

Utility poles cannot be double loaded without proper guying.

The contractor will be held liable for all damage to existing equipment resulting from his or his subcontractor's actions. A credit will be deducted from monies due the Contractor for all maintenance calls responded to by Department of Transportation personnel.

All existing traffic appurtenances, in particular steel span poles, controller cabinets and pedestals shall be removed from the proposed roadway prior to excavation. The Contractor shall work with the utility companies to either relocate or install all traffic signal appurtenances prior to the roadway reconstruction.

The Contractor must install permanent or temporary spans in conjunction with utility company relocations. He then must either install the new signal equipment and controller or relocate the existing equipment.

The 30 Day Test on traffic control equipment, as specified in Section 10.00, Article 10.00.10 - TESTS, will not begin until all tests required are performed.

## **NOTICE TO CONTRACTOR – USE OF COMMUTER PARKING LOT**

The State-owned commuter parking lot on U.S. Route 1 (East Main Street) at I-95 Exit 55 will be available for the Contractor's use for the duration of the Project construction. The Contractor must comply with the following requirements in order to use the commuter lot for purposes such as a laydown area, staging area, stockpile area or location for the construction field office.

The Contractor shall place temporary signs at the commuter lot driveway, two weeks prior to the date approved by the Engineer, notifying the public that the lot will be closed. The sign message shall include the approved parking lot closure date. The Contractor may not occupy the lot prior to the approved date and prior to the signs being in place for the required duration.

The Contractor must leave the parking lot in the same or better condition than it was prior to occupying it, following the completion of its use. The Contractor is responsible for performing a condition survey of all parking lot elements other than the pavement and pavement markings (i.e. bituminous curbing, light standards, signs, chain link fence) prior to the commuter lot closure. Any parking lot elements that are damaged during the Project construction shall be replaced in-kind by the Contractor at no additional cost to the State.

The Contractor shall mill and repave the entire paved area of the parking lot in accordance with the details shown in the plans. The Contractor shall restripe the parking lot to match the parking space configuration and striping that exists at the start of the Project construction.

Paving, striping and other parking lot repair work must be completed and accepted by the Engineer before the parking lot can be reopened to the public. The parking lot must be reopened to the public and all temporary appurtenances (i.e. equipment, materials, temporary signs), placed in the parking lot by the Contractor during construction, must be removed before the end of the calendar days for the Project.

## **NOTICE TO CONTRACTOR – VERIFICATION OF PLAN DIMENSIONS AND FIELD MEASUREMENTS**

The Contractor is responsible for verifying all dimensions before any work is begun. Dimensions of the existing structures shown on the plans are for general reference only; they are not guaranteed. The Contractor shall take all field measurements necessary to assure proper fit of the finished work and shall assume full responsibility for their accuracy. When shop drawings and/or working drawings based on field measurements are submitted for approval and/or review, the field measurements shall also be submitted for reference by the reviewer.

In the field, the Contractor shall examine and verify all existing and given conditions and dimensions with those shown on the plans. If field conditions and dimensions differ from those shown on the plans, the Contractor shall use the field conditions and dimensions and make the appropriate changes to those shown on the plans as approved by the Engineer. All field conditions and dimensions shall be so noted on the drawings submitted for approval.

There shall be no claim made against the Department by the Contractor for work pertaining to modifications required by any difference between actual field conditions and those shown by the details and dimensions on the contract plans. The Contractor will be paid at the unit price bid for the actual quantities of materials used or for the work performed, as indicated by the various items in the contract.

## **NOTICE TO THE CONTRACTOR – IMS INSTALLATION**

The Contractor is alerted that no service interruption of the Incident Management System (IMS), resulting from the Contractors operations will be allowed. The existing IMS conduit system (pullboxes, manholes, conduit and fiber optic cable) are located along I-95 Northbound and on Bridge No. 00196.

In order to maintain an uninterrupted service of the existing IMS infrastructure, the Contractor will install new trunkline conduit under U.S. Route 1 and pull new fiber trunkline from Existing Manhole 55.02 to Existing Manhole 55.48.

### **New IMS Installation:**

The Contractor shall install as much of the new IMS conduit and service conduit as practical to minimize the downtime of the existing Incident Management System (Camera 95S-088 and Camera 95N-089). The work associated with the new IMS conduit and the installation of the fiber optic trunkline cable shall conform to the requirements of Notice to Contractor – Installation Qualifications and Section 1.08.04 Prosecution and Progress, Limitations of Operations - Incident Management System.

The work associated with the installation of the IMS conduit, electric service conduit, fiber optic cable and electric service cable includes the following:

### **Initial Conduit Installation:**

- Install 4 inch multiduct RMC under U.S. Route 1 (East Main Street) from Existing Pullbox 55.29 to Existing Pullbox 55.26.
- Install 72 Fiber Optic Trunkline Cable from Existing Manhole 55.02 to Existing Manhole 55.48 by way of newly installed 4 inch multiduct RMC under U.S. Route 1.
- Install service cabinet foundation
- Install 2 inch RMC in trench from service cabinet foundation to an area by Handhole "A".

### **"Downtime" Conduit, Fiber Cable and Splicing Operation:**

After the work described in "Conduit Installation" is complete, the Contractor shall notify the Department that they would like to schedule the "downtime" of the IMS fiber cable as described in the special provision "Notice to Contractor – Installation Qualifications". The Contractor shall contact the Bridgeport Highway Operations Center at (203) 696-2690 before the Contractor shall be permitted to disconnect the existing fiber optic trunkline cable.

### **Fiber Optic Trunkline Cable Relocation:**

- Cut over splices in Manhole 55.02 and Manhole 55.48 from existing 72 fiber optic trunkline to the new 72 fiber optic trunkline.
- Remove existing 72 fiber optic trunkline from Manhole 55.02 to Manhole 55.48.

- Remove CCTV 95S-088 service cable from service cabinet to CCTV 95S-088 camera cabinet.
- Install Type II Handhole “A”. Connect 2 inch RMCs to Handhole “A”.
- Relocate CCTV 95S-088 service cabinet.
- Install existing CCTV 95S-088 service cable from CCTV 95S-088 camera cabinet to relocated CCTV 95S-088 service cabinet.

\* \* \* \* \*

The Contractor shall exercise extreme caution during all stages of the work. In the event of damage to the IMS system, the Contractor shall immediately notify the Engineer.

The Contractor is responsible for accurately locating the existing conduit carrying fiber optic cable as it is affected by his work. The Contractor shall contact Mr. Robert A. Kennedy of Conn. DOT Highway Operations (860-594-3458) at least forty-eight (48) hours prior to locating mainline fiber optic conduit.

The Contractor is hereby notified that hand digging may be required to accurately locate the existing IMS conduit. The Contractor shall also be responsible for maintaining and protecting the existing IMS conduit and trunk fiber optic cable at all times and during all phases of the Contractors work operations.

The Contractor shall notify the Engineer prior to the start of his work and shall be responsible for all coordination with the Department. The Engineer shall be present during any work involving the conduit carrying fiber-optic cable. The Contractor shall allow the Engineer complete access to the work.

## **NOTICE TO CONTRACTOR – HAZARDOUS MATERIALS INVESTIGATIONS**

Limited hazardous materials site investigations have been conducted at Bridge No. 00196, I-95 over Route 1, and Traffic Signal Int. Nos. 14-233 & 14-237 in Branford, Connecticut. The scope of inspections were limited to the representative components projected for impact.

Results of the survey identified lead paint to be present on the structural steel/metal bridge components of Bridge No. 00196. The bridge railings were identified as galvanized (unpainted). At Intersection Nos. 14-233 & 14-237 detectable amounts of lead were identified on the yellow & green traffic signals themselves and crosswalk push buttons. No detectable amounts of lead in paint were found on the metal grey controller cabinets of Int. Nos. 14-233 & 14-237. All traffic span poles were either wood or galvanized (unpainted). All crosswalk pedestals were galvanized (unpainted).

Results obtained from TCLP waste stream sampling and analysis for leachable lead from the paint on the structural steel/metal bridge components characterized the paint waste stream at Bridge No. 00196 as CTDEEP/RCRA hazardous waste. The projected paint waste debris associated with both the yellow & green traffic signals themselves and the yellow & green crosswalk push buttons were characterized as non-hazardous, non-RCRA waste. Also, since no detectable amounts of lead were present on painted metal surfaces of the metal controller cabinets any paint waste generated would be classified as non-hazardous, non-RCRA waste.

All steel and metal generated from work tasks (painted or not) shall be segregated and recycled as scrap metal at a scrap metal recycling facility. The recycling of scrap metal (regardless of lead paint concentration) is exempt from USEPA RCRA and CTDEEP Hazardous Waste Regulation.

At Bridge No. 00196, suspect asbestos containing rocker pad caulking and expansion joint caulking were sampled and found to be non-ACM.

No hazardous/regulated items, bird/pigeon guano accumulations or items of bloodborne pathogens (BBP) concern were observed in accessible areas of Bridge No. 00196.

Potential universal waste (UW) and Connecticut Regulated Waste (CRW) items associated with the traffic lights themselves, crosswalk signal hoods/buttons and control cabinets (i.e. Hg lamps/PCB ballasts and/or printed circuit boards) are also likely present at the Intersection Nos. 14-233 & 14-237.

The Contractor is hereby notified that these hazardous materials requiring special management or disposal procedures will be encountered during various construction activities conducted within the project limits. The Contractor will be required to implement appropriate health and safety measures for all construction activities impacting these materials. These measures shall include, but are not limited to, air monitoring, engineering controls, personal protective equipment and decontamination, equipment decontamination and personnel training. **WORKER HEALTH**



AND SAFETY PROTOCOLS WHICH ADDRESS POTENTIAL AND/OR ACTUAL RISK OF EXPOSURE TO SITE SPECIFIC HAZARDS ARE SOLELY THE RESPONSIBILITY OF THE CONTRACTOR.

The Department, as Generator, will provide an authorized representative to sign all manifests and waste profile documentation required by disposal facilities for disposal of hazardous materials.

The Sections which shall be reviewed by the Contractor include, but are not limited to, the following:

- Item No. 0020903A – Lead Compliance for Miscellaneous Exterior Tasks

The Contractor is alerted to the fact that a Department environmental consultant may be on site for abatement and related activities, to collect environmental samples (if necessary), and to observe site conditions for the State.

Information pertaining to the results of the limited hazardous materials investigation discussed can be found in the document listed below. This document shall be available for review electronically.

- HazMat Inspection Letter, Bridge No. 00196 & Traffic Int. Nos. 14-233 & 14-237, Branford, CT, February 5, 2018.

## **NOTICE TO CONTRACTOR – UTILITY GENERATED SCHEDULE**

Section 1.08.03 of the Contract special provisions contains utility related scheduling information. This information was provided to the Connecticut Department of Transportation (Department) by the utility companies regarding their identified work on this project.

The utility scheduling information is provided to assist the Contractor in scheduling its activities. However, the Department does not ensure its accuracy and Section 1.05.06 of the Standard Specifications still is in force.

The utility scheduling information shall be incorporated into the Contractor's pre-award schedule in accordance with the Department's Bidding and Award Manual and Section 1.05.08 of the Contract.

After award, the Contractor shall conduct a utility coordination meeting or meetings to obtain contemporaneous scheduling information from the utilities prior to submitting its baseline schedule to the Department in accordance with Section 1.05.08 of the Contract.

The Contractor shall incorporate the contemporaneous utility scheduling information into its baseline schedule submittal. The baseline schedule shall include Contractor predecessor and successor activities to the utility work in such detail as acceptable to the Engineer.

rev. 5/20/2013		<b>UTILITY WORK SCHEDULE</b>	
CTDOT Project Number:	14-185	Town:	Branford
Project Description:	Rehabilitation of bridge No. 00196 - Interstate 95 over U.S. Route 1		
CTDOT Utilities Engineer:	Kimery Nervais, CME		
Phone:	860-290-4100	Email:	KNervais@cmeengineering.com
Utility Company:	Eversource Energy		
Prepared By:	Dan Bettencourt	Date Prepared:	1/23/2018
Phone:	860-447-5739	Email:	Daniel.Bettencourt@nu.com
<b>Scope of Work</b>			
<p>The following is a description of all utility work planned to be completed in conjunction with the CTDOT project. The narrative describes all work to be carried out by the utility or its contractor, including temporary and permanent work required by the project as well as any additional utility infrastructure work the utility intends on performing within the project limits during the construction of the project.</p>			
<p><b>PERMANENT UTILITY RELOCATIONS</b> - In order to meet the CDOT's requirement to relocate 1 underground high voltage electric cable, under I-95 Bridge 00196 over Rt. 1, Eversource Energy, ESE, will install 2 precast manholes on Rt. 1 n/o &amp; s/o the I-95 overpasses. Conduit will be installed between manholes and riser poles north &amp; south of the I-95 bridge. Manholes will be approx 235' apart and 6-6" concrete encased conduits will be installed between them. Conduit will be extended from each ESE manhole to 2 new riser poles: 1 each on north and south sides of I-95. In addition ESE will install 450' of conduit supplied by Lighttower and Comcast, between riser poles north and south of I-95. Prior to the civil work, Frontier to install new stub poles 6435S, 6436S, 6441S and relocate poles 6435, 6436, 6437, 6438, 6439, 6440 and 7246 approx 20' East. Frontier to relocate pole 6441 and 6443 approx 2' East. Frontier to replace pole 5731 in place. ESE to relocate pole NN 18' West. ESE to pull in new underground cable in new duct, manholes and up riser poles. Several overhead sections of wire north and south of I-95 need to be replaced in order to accomodate the new riser poles. Once the new wires have been installed and the new UG facilites energized, the existing 190' of underground electric cable and conduit under the I-95 bridge, will be removed.</p>			
<b>Special Considerations and Constraints</b>			
<p>The following describes the limiting factors that must be planned for in the scheduling and performance of the utility work. For example, restrictions on cut-overs, outages, limitations on customer service interruptions (e.g. nights, weekends, holidays), seasonal and environmental shutdown periods, long lead material procurements, etc..</p>			
<p>Core bore drilling may be required if ledge is encountered.  Roady way trenching will be required to rebuild the underground feed from riser poles to manholes.  Final grade at poles 6437, 6438, 6439 and 6440 must be adjusted to allow bucket truck and crane access. Caution must be used when lowering the grade over the existing Eversource duct line in order to minimize exposure.</p>			

## UTILITY WORK SCHEDULE

CTDOT Project Number: 14-185

Utility Company: Eversource Energy

Prepared By: Dan Bettencourt

Total Calendar Days: 66

### Schedule

The following schedule identifies each major activity of utility work in sequential order to be performed by the utility or its contractor. The location of each activity of work is identified by the baseline stationing on the CTDOT plans. All activities identify the predecessor activity which must be completed before a utility work activity may progress. The duration provided is the number of calendar days required to complete the utility work activity based on historical information and production rates.

Location (Station to Station)	Description of Utility Work Activity	Predecessor Activity	Duration (calendar days)
12+00 to 21+50	Electric Co. to install 1 pole and anchor when within 1 foot of final grade	Clearing, grubbing, fill / cuts completed	1
12+00 to 21+50	Electric Co. to install manholes and duct line for electric and communications	Communications Co. to install 11 poles and anchors	32
12+00 to 21+50	Eversource Frame poles, install guying, arrange outage, install new overhead conductors	Electric Co. completes civil work	17
12+00 to 21+50	Electric Co. to pull in new underground cable	Electric Co. completes overhead work	10
12+00 to 21+50	Electric Co. to remove old underground cable and conduit	Electric Co. completes underground work	5
12+00 to 21+50	Communications begin shift work	Electric Co. completes all work	?
12+00 to 21+50	Electric Co. to remove 1 pole butt	Communications Co. completes work	1

<b>UTILITY WORK SCHEDULE Rev 08 02 2016</b>	
CTDOT Project Number: 14-185	Town: Branford, CT
Project Description: Bridge No. 00196 Branford_RWA	
CTDOT Utilities Engineer: CME	
Phone:	Email:
Utility Company: South Central Connecticut Regional Water	
Prepared By: Elaine Sistare, CDM Smith	Date Prepared: 6/6/2018
Phone: 860-808-2266	Email: sistareec@cdmsmith.com
<b>Scope of Work</b>	
The following is a description of all utility work planned to be completed in conjunction with the CTDOT project. The narrative describes all work to be carried out by the utility or its contractor, including temporary and permanent work required by the project as well as any additional utility infrastructure work the utility intends on performing within the project limits during the construction of the project.	
<p><b>PART 1 20-INCH LOOP AT SYLVIA STREET</b></p> <ul style="list-style-type: none"> <li>- The Part 1 preparation and final construction components, including test pits, trench excavation, erosion control, temporary and final paving, are the water main Contractor's responsibility.</li> <li>- Install 20-inch interconnection at Sylvia Street with Tapping Sleeve and valve (live tap). Install 20-inch DI Pipe, 20x10 Tee, 10-inch gate valve and connect to existing 10-inch main on Windmill Hill Road; and 20x20 Tee, 20-inch gate valve and connect to existing 20-inch main on Windmill Hill Road. Install 20-inch line stop to connect 20-inch loop (live tap). Following disinfection, pressure testing and acceptance by RWA, reinstate blow off, and activate 20-inch loop. Install final pavement and complete work in the area.</li> </ul> <p><b>PART 2 INSTALL NEW 20-INCH ON RTE 1 AT I95 INTERCHANGE</b></p> <ul style="list-style-type: none"> <li>- Coordinate with DOT Contractor for work area, laydown, excavation of existing grade, treatment of dewatering discharge, disposal of unusable soil, rock removal and final pavement. DOT Contractor will partially prepare water main route by modifying existing grade to lower to DOT final grade along water main route.</li> <li>- Perform test pits at locations of the new tapping sleeves. Restrain all joints within specified distances. Install 20-inch line stop and tapping sleeve and valve at east side of bridge (live tap). Install 20-inch main and install hydrant and water standpipe at bridge, including 30-inch sleeve at highway crossing. Install 20-inch line stop and tapping sleeve and valve at west side of bridge near commuter lot (live tap). Following disinfection, pressure testing and acceptance by RWA, activate 20-inch main. Coordinate and utilize line stops and install caps and thrust blocks adjacent to new</li> </ul>	
<b>Special Considerations and Constraints</b>	
The following describes the limiting factors that must be planned for in the scheduling and performance of the utility work. For example, restrictions on cut-overs, outages, limitations on customer service interruptions (e.g. nights, weekends, holidays), seasonal and environmental shutdown periods, long lead material procurements, etc..	
The water main diameter is 20-inch, with tapping sleeve and valves and line stops at that diameter having approximately 12-16 week material lead time. All water main installation work, at both Sylvia Street and the Rte 1 I95 Interchange, are expected to be during night hours.	

**UTILITY WORK SCHEDULE Rev 3/2015**

CTDOT Project Number: 14-185  
 Utility Company: South Central Connecticut Regional Water Authority (RWA or SCCR)  
 Prepared By: Elaine Sistare, CDM Smith Total Working Days: 31

**Schedule**

The following schedule identifies each major activity of utility work in sequential order to be performed by the utility or its contractor. The location of each activity of work is identified by the baseline stationing on the CTDOT plans. All activities identify the predecessor activity which must be completed before a utility work activity may progress. The duration provided is the number of working days required to complete the utility work activity based on historical information and production rates.

Location (Station to Station)	Description of Utility Work Activity	Predecessor Activity	Duration (working days)
Sylvia Street	PART 1 SYLVIA STREET: Water main installation and connection to existing, pavement.	None	7
13+00 to 18+50	PART 2 RTE 1 AT I95 INTERCHANGE: Water main installation and connection to existing.	Sylvia Street water main. DOT complete Span 3 excavation and soil nail wall.	24

<b>UTILITY WORK SCHEDULE</b> Rev 08 02 2016			
CTDOT Project Number:	14-185	Town:	Branford
Project Description: Rehabilitation of Bridge #00196, I-95 over Rt 1			
CTDOT Utilities Engineer: Sohrab Afrazi			
Phone:	860-594-3262	Email:	sohrab.afrazi@ct.gov
Utility Company: Frontier Communications			
Prepared By:	Marino Limauro	Date Prepared:	2/20/2018
Phone:	203-771-3110	Email:	marino.a.limauro@ftr.com
Scope of Work			
<p>The following is a description of all utility work planned to be completed in conjunction with the CTDOT project. The narrative describes all work to be carried out by the utility or its contractor, including temporary and permanent work required by the project as well as any additional utility infrastructure work the utility intends on performing within the project limits during the construction of the project.</p>			
<p>This project involves the relocation of Fronties Communication's outside plant facilities at I-95 Bridge #00196 over Rt 1 in Branford, CT. All work on this time line is dependant on weather, storms, work load and customer high speed data circuit turndowns. All calendar days and work days are approximate. Frontier will relocate (2) poles on the Northwest side of Rt 1 and (11) poles on the Southeast side of Rt 1. Eversource will relocate (1) pole on the Northwest side of Rt 1. Frontier will also relocate (2) existing aerial cables into the underground that currently is attached to the bridge. The Frontier Conduit Group will place the new conduits required to relocate the existing aerial cables as well as lower the existing underground duct structure to allow for the elevation changes to Rt 1. All utility companies will be responsible for relocating their own facilities and also attaching to the new poles and guying. A seperate estimate will be provided for all conduit structure work. Services to all existing Frontier customers will remain intact throughout the duration of this project.</p>			
Special Considerations and Constraints			
<p>The following describes the limiting factors that must be planned for in the scheduling and performance of the utility work. For example, restrictions on cut-overs, outages, limitations on customer service interruptions (e.g. nights, weekends, holidays), seasonal and environmental shutdown periods, long lead material procurements, etc..</p>			
<p>* Regarding high speed special circuits to our customers, this part of Frontier's work is dependent on getting permission and a schedule from our customers for these turndowns and may take up to three months to change over. Overtime and afterhours service may be required to complete high speed data service cut-overs. Also if there are any natural or unnatural disasters that happen within Frontier, crews will be expected to help restore services in the affected area and will return once all services are restored.</p>			

## UTILITY WORK SCHEDULE Rev 3/2015

CTDOT Project Number: 14-185

Utility Company: Frontier Communications

Prepared By: Marino Limauro

Total Working Days: 35

### Schedule

The following schedule identifies each major activity of utility work in sequential order to be performed by the utility or its contractor. The location of each activity of work is identified by the baseline stationing on the CTDOT plans. All activities identify the predecessor activity which must be completed before a utility work activity may progress. The duration provided is the number of working days required to complete the utility work activity based on historical information and production rates.

Location (Station to Station)	Description of Utility Work Activity	Predecessor Activity	Duration (working days)
11+00 to 19+00	Place (2) new pole on East Main St (Rt 1)	All grades within +/-6", curb lines, taking lines, ect. Marked clearly in the field.	3
11+00 to 19+00	Place (2) new anchor and shift attachments on new poles	All utilities must be complete shifting their attachments.	2
11+00 to 19+00	Place new UG copper cable	New conduit and lateral placement by FTR must be completed.	4
11+00 to 19+00	Place new UG fiber cable		2
11+00 to 19+00	Splice and cutover aerial cables to underground.		18
11+00 to 19+00	Remove aerial copper and fiber cables	*cut-over of all working circuits must be complete	5
11+00 to 19+00	Remove old pole and push brace		1



**UTILITY WORK SCHEDULE** Rev 3/2015

CTDOT Project Number: 14-185  
 Utility Company: Frontier Communications  
 Prepared By: Marino Limauro Total Working Days: 41

**Schedule**

The following schedule identifies each major activity of utility work in sequential order to be performed by the utility or its contractor. The location of each activity of work is identified by the baseline stationing on the CTDOT plans. All activities identify the predecessor activity which must be completed before a utility work activity may progress. The duration provided is the number of working days required to complete the utility work activity based on historical information and production rates.

Location (Station to Station)	Description of Utility Work Activity	Predecessor Activity	Duration (working days)
10+00 to 21+50	Place 11 new poles on East Main St (Rt 1)	All grades within +/-6", curb lines, taking lines, ect. Marked clearly in the field.	14
10+00 to 21+50	Place 11 new anchors on East Main St (Rt 1)		6
10+00 to 21+50	Shift attachments on 11 new poles	All utilities must be complete shifting their attachments.	6
10+00 to 21+50	Place new guying on 11 poles		6
10+00 to 21+50	Place new stubs at P6440 & P6441 and reconn all working lines.	*cut-over all working circuits	2
10+00 to 21+50	Remove 12 old poles		4
10+00 to 21+50	Remove 10 anchors and guying		3

## UTILITY WORK SCHEDULE

CTDOT Project Number: 14-185

Utility Company: Frontier

Prepared By: Joe Calvo

Total Calendar Days: 37

### Schedule

The following schedule identifies each major activity of utility work in sequential order to be performed by the utility or its contractor. The location of each activity of work is identified by the baseline stationing on the CTDOT plans. All activities identify the predecessor activity which must be completed before a utility work activity may progress. The duration provided is the number of calendar days required to complete the utility work activity based on historical information and production rates.

Location (Station to Station)	Description of Utility Work Activity	Predecessor Activity	Duration (calendar days)
10+90-11+50	Lateral from MH#88 to pole#6435	Must be done in stage 1	3
17+90-18+60	Lateral from MH#89 to pole#6440	Must be done in stage 1	4
20+40	move existing underground service from old pole to new pole#6441	Must be done in stage 1	1
10+90-17+90	Place new ducts 6-4" from MH#88 to MH#89 in roadway extra depth required	stage 2 and after new water main has been placed. Must coordinate with state contr.	10
13+50-18+20	Break out and lower ex. Duct bank & cables 1' to 3' & remove recently aban. Water main	Stage 2 must coordinate with state contractor with traffic control	10
17+90	Rebuilding and lowering of MH#89 extra depth required also reracking of cables	Stage 2 must coordinate with state contractor with traffic control	7
17+80	The abandonment of MH#89T & removal of roof, frame & cover	Stage 2 must coordinate with state contractor with traffic control	2

rev. 5/20/2013		<b>UTILITY WORK SCHEDULE</b>	
CTDOT Project Number:	14-185	Town:	Branford
Project Description:	Bridge 00196, I95 over RTE 1		
CTDOT Utilities Engineer:			
Phone:	860-290-4100	Email:	Kstanek@cmeengineering.com
Utility Company:	Southern Connecticut Gas Co.		
Prepared By:	Bruce Reynolds	Date Prepared:	2/1/2017
Phone:	203-795-7885	Email:	breynolds@soconngas.com
<b>Scope of Work</b>			
The following is a description of all utility work planned to be completed in conjunction with the CTDOT project. The narrative describes all work to be carried out by the utility or its contractor, including temporary and permanent work required by the project as well as any additional utility infrastructure work the utility intends on performing within the project limits during the construction of the project.			
<p>Install 3-way tees at STA. 13+00 and 19+75. Relay 675'-8" steel high pressure main with 675' of 8" plastic high pressure main in same location from STA. 13+00 to 19+75 due to depth concerns. Abandon 675'-8" steel high pressure main from STA. 13+00 to 19+75. Renew high pressure service to #365 E. Main St.</p>			
<b>Special Considerations and Constraints</b>			
The following describes the limiting factors that must be planned for in the scheduling and performance of the utility work. For example, restrictions on cut-overs, outages, limitations on customer service interruptions (e.g. nights, weekends, holidays), seasonal and environmental shutdown periods, long lead material procurements, etc..			
The 8" steel high pressure main is a major feed line to towns in eastern part of gas system.			

## UTILITY WORK SCHEDULE

CTDOT Project Number: 14-185

Utility Company: Southern Connecticut Gas Co.

Prepared By: Bruce Reynolds

Total Calendar Days: 23

### Schedule

The following schedule identifies each major activity of utility work in sequential order to be performed by the utility or its contractor. The location of each activity of work is identified by the baseline stationing on the CTDOT plans. All activities identify the predecessor activity which must be completed before a utility work activity may progress. The duration provided is the number of calendar days required to complete the utility work activity based on historical information and production rates.

Location (Station to Station)	Description of Utility Work Activity	Predecessor Activity	Duration (calendar days)
13+00	Install 3-way stop-off tee	alignment and grade provided by contractor	1
19+75	Install 3-way stop-off tee	alignment and grade provided by contractor	1
13+00-19+75	Install approx. 675 of 8" plastic high pressure main.	alignment and grade provided by contractor	18
13+00-19+75	Abandon 675 of 8" steel high pressure main.	8" plastic high pressure main installation	2
18+00	Renew service to #65 E. Main St.	8" plastic high pressure main installation	1

<b>UTILITY WORK SCHEDULE Rev 3/2015</b>			
CTDOT Project Number:	14-185	Town:	BRANFORD
Project Description:	REHAB OF BRIDGE NO.00196		
CTDOT Utilities Engineer:	KIMERY NERVAIS		
Phone:	(860)290-4100 x 1153	Email:	knervais@cmeengineering.com
Utility Company:	CROWN CASTLE FIBER		
Prepared By:	TERENCE J SHEA	Date Prepared:	1/31/2018
Phone:	(203)649-3905	Email:	terence.shea@crowncastle.com
<b>Scope of Work</b>			
<p>The following is a description of all utility work planned to be completed in conjunction with the CTDOT project. The narrative describes all work to be carried out by the utility or its contractor, including temporary and permanent work required by the project as well as any additional utility infrastructure work the utility intends on performing within the project limits during the construction of the project.</p>			
<p>Crown Castle Fiber's work will consist of placing new cable in conduit under bridge and connect at existing splice points on East Main St (RT 1). Cables will be cut over and old cable removed. A 30 day customer notification is necessary before any splicing can take place.</p>			
<b>Special Considerations and Constraints</b>			
<p>The following describes the limiting factors that must be planned for in the scheduling and performance of the utility work. For example, restrictions on cut-overs, outages, limitations on customer service interruptions (e.g. nights, weekends, holidays), seasonal and environmental shutdown periods, long lead material procurements, etc..</p>			
<p>PLEASE NOTE THAT ANY TIME FRAME GIVEN AS A START TIME OR DURATION OF WORK CAN BE AFFECTED BY MANY FACTORS INCLUDING, BUT NOT LIMITED TO, MAKE READY WORK, OTHER UTILITIES, PERMIT APPLICATIONS, CHANGES IN SCOPE, INCLEMENT WEATHER, HOLIDAYS AND EMERGENCY SITUATIONS.</p>			



<b>UTILITY WORK SCHEDULE Rev 08 02 2016</b>			
CTDOT Project Number:	14-185	Town:	BRANFORD
Project Description: Replacing Bridge over exit 55 - Utility Relocation			
CTDOT Utilities Engineer: Kimery Nerais			
Phone:	860-290-4100	Email:	Knervais@cmeengineering.com
Utility Company: COMCAST			
Prepared By:	K. BOLEN	Date Prepared:	2/21/2018
Phone:	475-227-0347	Email:	kenny_bolen2@comcast.com
<b>Scope of Work</b>			
<p>The following is a description of all utility work planned to be completed in conjunction with the CTDOT project. The narrative describes all work to be carried out by the utility or its contractor, including temporary and permanent work required by the project as well as any additional utility infrastructure work the utility intends on performing within the project limits during the construction of the project.</p>			
<p>Forced relocation of strand, coax, risers, and service drops relating to the construction work for the new bridge and construction at exit 55 - Delash Fiber - Relocate overhead services to new UG routing under bridge - Splice new service drops - Pole X's - Install risers and riser guards - Police Detial and Aerial Crew Set Up.</p>			
<b>Special Considerations and Constraints</b>			
<p>The following describes the limiting factors that must be planned for in the scheduling and performance of the utility work. For example, restrictions on cut-overs, outages, limitations on customer service interruptions (e.g. nights, weekends, holidays), seasonal and environmental shutdown periods, long lead material procurements, etc..</p>			

**UTILITY WORK SCHEDULE Rev 3/2015**

CTDOT Project Number: 14-185

Utility Company: Comcast.

Prepared By: K. Bolen

Total Working Days: 10

**Schedule**

The following schedule identifies each major activity of utility work in sequential order to be performed by the utility or its contractor. The location of each activity of work is identified by the baseline stationing on the CTDOT plans. All activities identify the predecessor activity which must be completed before a utility work activity may progress. The duration provided is the number of working days required to complete the utility work activity based on historical information and production rates.

Location (Station to Station)	Description of Utility Work Activity	Predecessor Activity	Duration (working days)
NA	Delash Fiber - Coax - Remove strand - Remove Risers - Service Drops - Amps - Service taps	Upon completeion of new service poles - UG construction by Eversource	4
NA	Pole Shifts - Establash temp services if needed - Rod Rope & Pull Fiber - Ovelash fiber coax & splice.	Upon completeion of new service poles - UG construction by Eversource	5
NA	Proof system		1



**NOTICE TO CONTRACTOR – CONSTRUCTION CONTRACTOR**  
**DIGITAL SUBMISSIONS**

Upon execution of the Contract, the Contractor acknowledges and agrees that contractual submittals for this Project shall be submitted and handled through a system of paperless electronic means as outlined in the special provision for Section 1.05 herein.

Shop drawings, working drawings, and product data shall be created, digitally signed and delivered by the Contractor in accordance with the Department's [Contractor Digital Submission Manual](#) (CDSM). Other deliverables that are required by other special provisions shall be similarly submitted.

Access credentials will be provided to the Contractor by the Department.

The Department will provide the Contractor with a list of email addresses that are to be used for each submittal type.

The Department shall not be held responsible for delays, lack of processing or response to submittals that do not follow the specified guidelines in the CDSM.

**NOTICE TO CONTRACTOR – CONTRACT DURATION**

The Contractor is hereby notified that this is not to be considered an ordinary project by any means and that due to the inconvenience to the traveling public that it causes, extra manpower, equipment and workshifts may be required to complete the work in accordance within the specified contract time.

## **NOTICE TO CONTRACTOR – FEDERAL WAGE DETERMINATIONS (Davis Bacon Act)**

The following Federal Wage Determinations are applicable to this Federal- Aid contract and are hereby incorporated by reference. During the bid advertisement period, it is the bidder’s responsibility to obtain the latest Federal wage rates from the US Department of Labor website, as may be revised 10 days prior to bid opening. Any revisions posted 10 days prior to the bid opening shall be the wage determinations assigned to this contract.

<b>Check Applicable WD# (DOT Use Only)</b>	<b>WD#</b>	<b>Construction Type</b>	<b>Counties</b>
<b>X</b>	CT1	Highway	Fairfield, Litchfield, Middlesex, New Haven, Tolland, Windham
	CT2	Highway	New London
	CT3	Highway	Hartford
	CT5	Heavy Dredging (Hopper Dredging)	Fairfield, Middlesex, New Haven, New London
	CT6	Heavy Dredging	Statewide
	CT13	Heavy	Fairfield
	CT14	Heavy	Hartford
	CT15	Heavy	Middlesex, Tolland
	CT16	Heavy	New Haven
	CT17	Heavy	New London
	CT26	Heavy	Litchfield, Windham
	CT18	Building	Litchfield
	CT19	Building	Windham
	CT20	Building	Fairfield
	CT21	Building	Hartford
	CT22	Building	Middlesex
	CT23	Building	New Haven
	CT24	Building	New London
	CT25	Building	Tolland
	CT4	Residential	Litchfield, Windham
	CT7	Residential	Fairfield
	CT8	Residential	Hartford
	CT9	Residential	Middlesex
	CT10	Residential	New Haven
	CT11	Residential	New London
	CT12	Residential	Tolland

The Federal wage rates (Davis-Bacon Act) applicable to this Contract shall be the Federal wage rates that are current on the US Department of Labor website (<http://www.wdol.gov/dba.aspx>) as may be revised 10 days prior to bid opening. The Department will no longer physically include revised Federal wage rates in the bid documents or as part of addenda documents. These applicable Federal wage rates will be incorporated in the final contract document executed by both parties.

If a conflict exists between the Federal and State wage rates, the higher rate shall govern.

To obtain the latest Federal wage rates, go to the US Department of Labor website (link above). Under Davis-Bacon Act, choose “Selecting DBA WDs” and follow the instruction to search the latest wage rates for the State, County and Construction Type.

GENERAL

## **NOTICE TO CONTRACTOR – ALL-INCLUSIVE DRAINAGE**

### **ADDED SECTIONS:**

#### **2.86 – DRAINAGE TRENCH EXCAVATION**

#### **ROCK IN DRAINAGE TRENCH EXCAVATION**

#### **5.86 – CATCH BASINS, MANHOLES AND DROP INLETS**

#### **6.86 – DRAINAGE PIPES**

#### **DRAINAGE PIPE ENDS**

This Contract contains the above-noted Special Provisions for all-inclusive drainage, developed to replace the following Sections in their entireties:

- Section 5.07 – *Catch Basins, Manholes and Drop Inlets*
- Section 6.51 – *Culverts*
- Section 6.52 – *Culvert Ends*

The Section 5.86 and 6.86 items include excavation and bedding material in the drainage structure, pipe and pipe end unit prices.

Section 2.05 *Trench Excavation* may be included for miscellaneous trenching, where necessary, but will not be used with all-inclusive drainage items.

Other Standard Specifications, Supplemental Specifications or Special Provisions may contain references to Articles or Subarticles from previous versions of Sections 5.07, 6.51 and 6.52 which are no longer valid.

The following Standard Specifications Sections or Supplements contain references to Articles or Subarticles from Section 2.05 which shall remain in effect:

- Section 2.06 – *Ditch Excavation*
- Section 5.06 – *Retaining Walls, Endwalls and Steps*
- Section 7.51 – *Underdrains and Outlets*
- Section 10.01 – *Trenching and Backfilling*

‘Rock in Drainage Trench Excavation’ is now defined in Section 2.86. ‘Rock in Trench Excavation’ will remain in Section 2.05 and may be used with trenching not associated with all-inclusive drainage items.

**Any references to Articles beginning with “5.07,” “6.51,” or “6.52” shall refer to the pertinent topic or materials in the new Special Provisions contained herein.**

**NOTICE TO CONTRACTOR – MINIMUM CONCRETE COMPRESSIVE STRENGTH**

The concrete strength or allowable design stress specified in the General Notes is for design purposes only. The minimum compressive strength of concrete in constructed components shall comply with the requirements of Section 6.01 Concrete for Structures.

**NOTICE TO CONTRACTOR – USE OF STATE POLICE OFFICERS**

The Department will reimburse services of State Police Officers as a direct payment to the Department of Emergency Services and Public Protection. Payment for State Police Officers must be approved by the Engineer. Any State Police Officers used by the Contractor for its convenience is the responsibility of the Contractor. A separate payment item for State Police Officers is not included in this Contract.

Any costs associated with coordination and scheduling of State Police Officers shall be included in the lump sum bid price for Item No. 0971001A – Maintenance and Protection of Traffic.

## **NOTICE TO CONTRACTOR – PROCUREMENT OF MATERIALS**

Upon award, the Contractor shall proceed with shop drawings, working drawings, procurement of materials, and all other submittals required to complete the work in accordance with the contract documents.

## **NOTICE TO CONTRACTOR – UTILITY SPECIFICATIONS**

The contractor is hereby notified that all utility specifications contained elsewhere herein shall be made a part of this contract, and that the contractor shall be bound to comply with all requirements of such specifications. The requirements and conditions set forth in the subject specifications shall be binding on the contractor just as any other specification would be.



## **SECTION 1.02 – PROPOSAL REQUIREMENTS AND CONDITIONS**

### **Article 1.02.04 – Examination of Plans, Specifications, Special Provisions and Site of Work:**

*Replace the third sentence of the last paragraph with:*

The Department cannot ensure a response to inquiries received later than ten (10) days prior to the original scheduled opening of the related bid.

## **SECTION 1.05 – CONTROL OF THE WORK**

*Replace Article 1.05.02 with the following:*

### **1.05.02—Contractor Submittals, Working Drawings, Shop Drawings, Product Data, Submittal Preparation and Processing - Review Timeframes, Department’s Action:**

**1. Contractor Submittals:** The plans provided by the Department show the details necessary to give a comprehensive idea of the construction contemplated under the Contract. The plans will generally show the location, character, dimensions, and details necessary to complete the Project. If the plans do not show complete details, they will show the necessary dimensions and details, which when used along with the other Contract documents, will enable the Contractor to prepare working drawings, shop drawings or product data necessary to complete the Project.

The Contractor shall prepare submittals as Portable Document Format (PDF) files. The Contractor is also required to acquire, maintain access and use the Department’s document management system for delivery of submittals. The format, digital signing requirements, delivery processes and document tracking procedures shall be performed in accordance with this specification and the [Contractor’s Digital Submission Manual](#) (CDSM).

The submittals shall be sent to the Department’s reviewer(s), sufficiently in advance of the work detailed, to allow for their review in accordance with the review periods as specified herein (including any necessary revisions, resubmittal, and final review), and acquisition of materials, without causing a delay of the Project.

**2. Working Drawings:** When required by the Contract or when ordered to do so by the Engineer, the Contractor shall prepare and submit the working drawings, signed, sealed and dated by a qualified Professional Engineer licensed to practice in the State of Connecticut, for review. The drawings shall be delivered sufficiently in advance of the work detailed, to allow for their review in accordance with the review periods specified herein (including any necessary revisions, resubmittal, and final review).

There will be no direct payment for furnishing any working drawings, procedures or supporting calculations, but the cost thereof shall be considered as included in the general cost of the work.

The Contractor shall supply to the Assistant District Engineer a certificate of insurance in accordance with 1.03.07 at the time that the working drawings for the Project are submitted.

The Contractor’s designer, who prepares the working drawings, shall secure and maintain at no direct cost to the State a Professional Liability Insurance Policy for errors and omissions in the minimum amount of \$2,000,000 per error or omission. The Contractor’s designer may elect to obtain a policy containing a maximum \$250,000 deductible clause, but if the Contractor’s designer should obtain a policy containing such a clause, they shall be liable to the extent of at least the deductible amount. The Contractor’s designer shall obtain the appropriate and proper

endorsement of its Professional Liability Policy to cover the indemnification clause in this Contract, as the same relates to negligent acts, errors or omissions in the Project work performed by them. The Contractor's designer shall continue this liability insurance coverage for a period of

- (i) 3 years from the date of acceptance of the work by the Engineer, as evidenced by a State of Connecticut, Department of Transportation form entitled "Certificate of Acceptance of Work," issued to the Contractor; or
- (ii) 3 years after the termination of the Contract, whichever is earlier, subject to the continued commercial availability of such insurance.

**3. Shop Drawings:** When required by the Contract, or when ordered to do so by the Engineer, the Contractor shall prepare and deliver shop drawings to the Designer for review. Review timeframes and submission locations are as specified herein.

There will be no direct payment for furnishing any shop drawings, but the cost thereof shall be considered as included in the general cost of the work.

**4. Product Data:** When required by the Contract, or when ordered to do so by the Engineer, the Contractor shall prepare and deliver product data.

The Contractor shall submit the product data in a single submittal for each element or group of elements of construction.

The Contractor shall mark each copy of the product data submittal to show applicable choices and options. Where product data includes information on several products that are not required, copies shall be marked to indicate the applicable information. Product data shall include the following information and confirmation of conformance with the Contract to the extent applicable: manufacturer's printed recommendations, compliance with recognized trade association standards, compliance with recognized testing agency standards, application of testing agency labels and seals, notation of coordination requirements, Contract item number, and any other information required by the individual Contract provisions.

There will be no direct payment for furnishing any product data, but the cost thereof shall be considered as included in the general cost of the work.

**5. Submittal Preparation and Processing – Review Timeframes:** The Contractor shall allow 30 calendar days for submittal review by the Department, from the date receipt is acknowledged by the Department's reviewer. For any submittals marked with "Revise and Resubmit" or "Rejected," the Department is allowed an additional 20 calendar days for review of any resubmissions.

An extension of Contract time will not be authorized due to the Contractor's failure to transmit submittals sufficiently in advance of the work to permit processing.

The furnishing of shop drawings, working drawings or product data, or any comments or

suggestions by the Designer or Engineer concerning shop drawings, working drawings or product data, shall not relieve the Contractor of any of its responsibility for claims by the State or by third parties, as per 1.07.10.

The furnishing of the shop drawings, working drawings and product data shall not serve to relieve the Contractor of any part of its responsibility for the safety or the successful completion of the Project construction.

**6. Department's Action:** The Designer or Engineer will review each submittal, mark each with a self-explanatory action stamp, and return the stamped submittal promptly to the Contractor. The Contractor shall not proceed with the part of the Project covered by the submittal until the submittal is marked "No Exceptions Noted" or "Exceptions as Noted" by the Designer or Engineer. The Contractor shall retain sole responsibility for compliance with all Contract requirements. The stamp will be marked as follows to indicate the action taken:

- a. If submittals are marked "No Exceptions Noted," the Designer or Engineer has not observed any statement or feature that appears to deviate from the Contract requirements. This disposition is contingent on being able to execute any manufacturer's written warranty in compliance with the Contract provisions.
- b. If submittals are marked "Exceptions as Noted" the considerations or changes noted by the Department's Action are necessary for the submittal to comply with Contract requirements. The Contractor shall review the required changes and inform the Designer or Engineer if they feel the changes violate a provision of the Contract or would lessen the warranty coverage.
- c. If submittals are marked "Revise and Resubmit," the Contractor shall revise the submittals to address the deficiencies or provide additional information as noted by the Designer or Engineer. The Contractor shall allow an additional review period as specified in 1.05.02-5.
- d. If submittals are marked "Rejected," the Contractor shall prepare and submit a new submittal in accordance with the Designer's or Engineer's notations. The resubmissions require an additional review and determination by the Designer or Engineer. The Contractor shall allow an additional review period as specified in 1.05.02-5.

## **SECTION 1.06 – CONTROL OF MATERIALS**

### **Article 1.06.01 - Source of Supply and Quality:**

Add the following:

#### **Traffic Signal Items:**

For the following traffic signal items the contractor shall submit a complete description of the item, shop drawings, product data sheets and other descriptive literature which completely illustrates such items presented for formal review. Such review shall not change the requirements for a certified test report and materials certificate as may be called for. All documents shall be grouped into one separate file for each group of items as indicated by the Roman numerals below (for example, one pdf file for all of the pedestal items). The documents for all of the traffic signal items shall be submitted at one time, unless otherwise allowed by the engineer.

1008115– 2” Rigid Metal Conduit in Trench

1008117- 3” Rigid Metal Conduit in Trench

1102002 – 8’ Aluminum Pedestal

1102008 – 4’-4” Aluminum Pedestal

1102014 – 20’ Aluminum Pedestal

1105001A – 1-Way, 1-Section Span Wire Traffic Signal

1105003A – 1-Way, 3-Section Span Wire Traffic Signal

1106001A – 1-Way Pedestrian Signal Pole Mounted

1106003A – 1-Way Pedestrian Signal Pedestal Mounted

1106004A – 2-Way Pedestrian Signal Pedestal Mounted

1107011A – Accessible Pedestrian Signal and Detector (TypeA)

1108665A- 10/100/1000 Base – T Ethernet Switch

1108826A- Optical Fiber Termination Patch Panels

1111600A – Extension Bracket

1112242A – Fiber Optic Cable Splice Enclosure (Signal)

1112284A- Vehicle Detection Monitor

1112285A – Thermal Video Detector Assembly

1112286A- 360 Degree Camera Assembly

1112287A- 360 Degree Video Detection Processor

1113102 – 5 Conductor No. 14 Cable  
1113103 – 7 Conductor No. 14 Cable  
1113104 – 9 Conductor No. 14 Cable  
1113125 – 25 Conductor No. 14 Cable  
1113552A- Detector Cable (Optical) (Modified)  
1113604A- Optical Fiber Cable – Single Mode Loose Buffer Tube Cable, 6 Fiber  
1113618A- Optical Fiber Cable – Single Mode Loose Buffer Tube Cable, 36 Fiber  
1113725A- 23 AWG 4 Twisted Pair Category 6 Cable  
1113901- Camera Cable  
1114101 – Messenger Wire

**Illumination Items:**

For the following materials the Contractor shall submit a complete description of the item consisting of the latest manufacturer shop drawing(s) which completely illustrates the material presented for formal approval. The submitted shop drawing(s) shall clearly call-out all material and operational properties for the item specific to the project. Such approval shall not change the requirements for a certified test report and materials certificate as may be called for.

Light Standards	Precast Foundation
Conductors	Service Items
Luminaires	Temporary Illumination Unit
Conduit	Aerial Cable
Cable in Duct	Handhole
Fuses and Fuse Holders	Junction Box

Required product data sheets for all items listed above shall be submitted in one package at the same time. Please note: the list of items above is a “general” list of items. Certain items listed may or may not be present in a specific project. Please consult the Detailed Estimate sheet for project specific items.

**Incident Management System Items:**

For the following items required for the Incident Management System, the Contractor shall submit a complete description of the item, together with either in paper (hard copy) form or in an electronic portable document format (.pdf) one (1) copy of shop drawings, cuts, data sheets and other descriptive literature which completely illustrates such items presented for formal approval. Such approval shall not change the requirements for a certified test report, and materials certificate as may be called for.

Approval of the Shop Drawings and product data sheets shall not change the requirements for a certified test report, materials certificate and certificate of compliance as may be called for.

Shop drawings shall be submitted on 8-1/2 inch by 11 inch sheets, 11 inch by 17 inch sheets or on 24 inch by 36 inch standard plan sheets. Shop drawings and data sheets shall be required for, but not limited to the following

- |   |  |
|---|--|
| Structural supports                         | Conductors                             |
| Hand holes and covers                       | Fiber Optic Cable                      |
| Pullboxes and pullbox covers                | Fiber Patch Cords                      |
| Fiber Optic Modems                          | Fiber Optic Connectors                 |
| Camera power supply                         | Fiber Optic Splice Enclosures          |
| Traffic Flow Monitors                       | Optical Fiber Termination Patch Panels |
| Cast Iron Handhole Cover                    | Optical Video/Data Transmitter         |
| Cast Iron Junction Box                      | Optical Video/Data Receiver            |
| Fiberglass Junction Box                     | Network Customer Service Unit          |
| Traffic Management System Cabinets          | Video encoders and de-coders           |
| Traffic Management System Mini-hub Cabinets | Surge Panels                           |
| Auxiliary Termination Cabinets              | Ethernet switch                        |
| Transformers                                | Ethernet Port Sharing Device           |
| Steel CCTV Poles                            | Cat 6 Cable                            |
| Camera Lowering Device Assembly             | CCTV Coax Cable                        |
| Remote Control Flashing Lights              | Coax Cable Connectors                  |
| Service Cabinets                            | CCTV Twisted Pair cable                |
| Meter Sockets                               | CCTV Twisted pair connectors           |
| Surface Mounted Conduit and Appurtenances   | RJ 45 and RJ 48 Connectors             |
- Conduit, pulling tape, supports, brackets, hangers, clamps and any hardware involved with the supports and including complete fabrication details.  
Field fastener details including chemical and mechanical anchors  
Camera Assembly. Schematics of the wiring between the camera and the equipment cabinet shall also be provided.  
Camera Video Cables, Data Cables, Power Cables and Connectors  
Modify Existing Operations Center Control System including all materials, schematics, diagrams and drawings.  
Motorists Aid Variable Message Signs, cabinets, cables, diagrams, schematics etc.

**Article 1.06.05 - Shipping Materials:** Add the following:

**Incident Management System Items:**

All vehicles transporting materials on highways and bridges in the State shall comply with all the vehicle regulations of the Connecticut General Statutes and regulations of Connecticut State Agencies as they apply to vehicle length, width, height and weight.

Any vehicle, either loaded or unloaded, will not be allowed to travel across any bridge or on any highway when such vehicle exceeds the legal limits or posted limits of such bridge or highway without a permit. The owner of the vehicle must apply to the Department for a permit for such travel, as provided in the statutes.

The General Statutes include the following limitations:

Vehicle Width (Section 14-262(a)(1)) - The width of a vehicle and combination vehicle and trailer, including its load, is limited to 8.5 ft. (2,590 mm), without a permit.

Vehicle Length (Section 14-262(c)) - The length of the semitrailer portion of a tractor-trailer unit, including its load, is limited to 48 ft. (14,630 mm), without a permit.

Vehicle Height (Section 14-264) - The height of a vehicle, with its load, is limited to 13.5 ft. (4,110 mm), without a permit.

Vehicle Weight (Section 14-267a(b)(7)) - The gross vehicle weight (weight of vehicle including its load) is limited to 80,000 lbs. (36,280 kg) on 5 axles for vehicles with a 51 ft. (15,540 mm) wheelbase, without a permit.

Axle Weights of Vehicles (Section 14-267a) – For the above five axle vehicle, weight on a single axle may not exceed 22,400 lbs. (10,160 kg) or in the case of axles spaced less than 6 ft. (1,828 mm) apart, 18,000 lbs. (8,160 kg).

On Department projects, in accordance with the Commissioner's policy, any member or component, either temporary or permanent, that measures 120 ft. (36,570 mm) or less and weighs no greater than 120,000 lbs. (54,430 kg), is transportable via an authorized permit route established by the Department provided the individual axle weights on the vehicle and trailer transporting the member or component do not exceed 20,000 lbs. (9,070 kg).

Members and components, shown in the contract documents, that exceed the above length and weight limits have been reviewed by the Department's Oversize and Overweight Permits Section and are transportable via an authorized permit route established by the Department provided the individual axle weights on the vehicle and trailer transporting the member or component do not exceed 20,000 lbs. (9,070 kg).

All permits to transport materials are subject to shipping times established by the Department's Oversize and Overweight Permits Section.

Applications for permits, required to transport materials, shall be submitted a minimum of two weeks prior to their required use, to the Department's Oversize and Overweight Permits Sections.

#### **Article 1.06.07 - Certified Test Reports and Materials Certificate.**

Add the following:

##### **Traffic Signal Items:**

- 1) For the materials in the following Traffic Signal items, a Certified Test Report will be required confirming their conformance to the requirements set forth in these plans or specifications or both. Should the consignee noted on a Certified Test Report be other than the Prime Contractor, then Materials Certificates shall be required to identify the shipment.

Steel Span Pole Anchor Bolts  
Steel Span Poles



Optical Fiber Cable  
Fiber Optic Cable Connectors

- 2) For the materials in the following Traffic Signal items, a Materials Certificate will be required confirming their conformance to the requirements set forth in these plans or specifications or both.

Aluminum Pedestals  
Steel Span Poles  
Traffic Signal Housings and Hardware  
Pedestrian Signals Housing and Hardware  
Accessible Pedestrian Signal & Detector  
Traffic Signal Controller Unit  
Traffic Controller Cabinet  
Controller Unit  
Solid State Time Switch  
Solid State Load Switch  
Conflict Monitor  
Solid State Flasher  
Flash Transfer Relay

Optical Pre-Emption Equipment  
Phase Selector  
Detector (Type)  
Pre-Emption System Chassis  
Detector Cable (Optical)  
Video Vehicle Detection  
Camera Assembly  
Camera Extension Bracket  
Video Detector Processor  
Camera Cable  
Monitor  
Cable Closure  
Auxiliary Equipment Cabinet  
Optical Fiber Cable  
Fiber Optic Cable Connectors  
10/100/1000 Base – T Ethernet Switch  
Optical Fiber Termination Patch Panels  
Fiber Optic Cable Splice Enclosure (Signal)

**Illumination Items:**

- 1) For the materials in the following Illumination items, a Certified Test Report will be required confirming their conformance to the requirements set forth in these plans or specifications or both. Should the consignee noted on a Certified Test Report be other than the Prime Contractor, then Materials Certificates shall be required to identify the shipment.

Light Standards

Anchor Bolts

- 2) For the materials in the following Illumination items, a Materials Certificate will be required confirming their conformance to the requirements set forth in these plans or specifications or both.

Light Standards  
Conductors  
Cable in Duct

Luminaires  
Anchor Bolts

**Incident Management System (IMS) Items:**

- 1) For the materials in the following Incident Management System items, a Materials Certificate will be required confirming their conformance to the requirements set forth in these plans or specifications or both.

Structural Steel (Poles and Sign Supports)	Rigid Metal Conduit
Structural Tubing	Anchor Bolts
Galvanizing (certifying compliance with ASTM)	Conduit hangers, supports, clamps
Zinc Rich Primer	Handholes
Neoprene Gasket	Cast Iron Junction Box
Polyurethane Sealant	Pull Box
Grounding Rods	Pull Box Cover
Copper Wire	Lowering Device Assembly
	Fiber Optic Cable
	Fiber Optic Cable Connectors

- 2) For the materials in the following Incident Management System items, a Certified Test Report will be required confirming their conformance to the requirements set forth in these plans or specifications or both.

Anchor Bolt and Hardware	Service Cabinet
Structural Steel (Poles and Sign Supports)	Transformer
Structural Tubing	Camera Cables
Welds	Structural Steel (Poles)
Conduit	Fiber Optic Cable
	Fiber Optic Cable Connectors

## **SECTION 1.07 – LEGAL RELATIONS AND RESPONSIBILITIES**

### **Article 1.07.10 - Contractor's Duty to Indemnify the State against Claims for Injury or Damage:**

*Add the following after the only paragraph:*

“It is further understood and agreed by the parties hereto, that the Contractor shall not use the defense of Sovereign Immunity in the adjustment of claims or in the defense of any suit, including any suit between the State and the Contractor, unless requested to do so by the State.”

### **Article 1.07.11 Opening of Section of project to Traffic or Occupancy:**

*Add the following sentence to the last paragraph:*

“In cases in which guiderail is damaged by the traveling public, repair or replacement will be reimbursable as contained elsewhere herein.”

### **Article 1.07.13 - Contractor's Responsibility for Adjacent Property, Facilities and Services is supplemented as follows:**

The following company and representative shall be contacted by the Contractor to coordinate the protection of their utilities on this project 30 days prior to the start of any work on this project involving their utilities:

Mr. Gerard McDonald  
District 3 Electrical Supervisor  
Milford, Connecticut  
(203) 882 2033

Mr. Lawrence J. Marcik, Jr. P.E.  
Project Engineer  
Southern Central Connecticut Regional Water  
Authority  
90 Sargent Drive  
New Haven, CT 06511-5966  
(203) 401 6709  
[lmarcik@rwater.com](mailto:lmarcik@rwater.com)

Mr. Jim Bitzas  
Sr. Manager of West New England  
Comcast of Connecticut, Inc.  
1110 East Mountain Road  
Westfield, MA, CT 01085  
(413) 562 9923 Ext. 5783252  
(617) 279 7485  
[jim\\_bitzas@cable.comcast.com](mailto:jim_bitzas@cable.comcast.com)

Mr. Thomas Woronik  
Supervisor – Construction Engineering  
Eversource  
22 East High Street  
East High Street, CT 06424  
(860) 267 3891  
[Thomas.Woronik@eversource.com](mailto:Thomas.Woronik@eversource.com)

Ms. Lynne DeLucia  
Manager – Engineering and Construction  
Frontier Communications  
1441 North Colony Road  
Meriden, CT 06450-4101  
(203) 238 5000  
(860) 967 4389  
[Lynne.m.anastasio@ftr.com](mailto:Lynne.m.anastasio@ftr.com)

Mr. Eric Clark  
Manager Fiber Construction  
Crown Castle Fiber  
1781 Highland Avenue  
Cheshire, CT 06410  
(203) 649 3904

GENERAL

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The following Department representative shall be contacted by the Contractor to coordinate an inspection of the service entrance into the controller/flasher cabinet for controllers within the State right-of-way, when ready for inspection, release, and connection of electrical service. The local Building Department shall be contacted for electrical service inspections for controllers located on Town roads located within the respective municipality.

Mr. Michael LeBlanc  
Property & Facilities  
Department of Transportation  
Newington, CT 06111  
860-594-2238  
e-mail: [Michael.LeBlanc@ct.gov](mailto:Michael.LeBlanc@ct.gov)

Please provide the electrical service request number provided by the power company. This is a Work Request (WR) Number provided by Eversource (formerly Northeast Utilities [CL&P]). For State-owned traffic signals in CL&P territory, contact the Department's Traffic Electrical Unit to obtain the WR Number.

## **SECTION 1.08 – PROSECUTION AND PROGRESS**

Article 1.08.03 - Prosecution of Work:

Add the following:

The Contractor will not be allowed to install traffic signal or pedestrian heads until the controllers are on hand and ready for installation. Once installation of this equipment commences, the Contractor shall complete this work in a most expeditious manner.

The Contractor shall notify the Engineer on construction projects, or the district permit agent on permit jobs, when all traffic signal work is completed. This will include all work at signalized intersections including loop replacements, adjusting existing traffic signals or any relocation work including handholes. The project engineer or district permit agent will notify the Division of Traffic Engineering to coordinate a field inspection of all work. Refer to Section 10.00 – General Clauses For Highway Illumination And Traffic Signal Projects, Article 10.00.10 and corresponding special provision.

The Contractor shall notify the Traffic Signal Lab at Telephone (860) 258-0346 or (860) 258-0349 forty five (45) days prior to starting work on computer controlled signalized intersections only. This notice will initiate work to be completed by others. The Contractor shall be responsible for any timely updates that need to be reported to this Unit for the successful coordination of work by others.

### **Road Closure Readiness Packages**

The Contractor shall also develop and submit Road Closure Readiness Packages with the stage construction plans. The purpose of this plan package is to ensure that all resources are in place prior to the closure and to eliminate possible delays. The information included in this package contains but is not limited to:

- Schedule of Submittals
- Material Acceptance and Delivery Dates
- Confirmation of materials for required construction
- Detailed sequence of activities including staffing, and shift times
- Description of any special resources
- MPT Coordination

The Contractor shall not proceed with the implementation of a stage of the project without the applicable notice to proceed from the Department.

The Notice to Proceed will be issued following approval or approval with conditions by the Department of the applicable Stage Construction Plans and Readiness Package as outlined below.

The stage construction plans and readiness packages shall be submitted to the Department a minimum of 45 days prior to the anticipated start of the applicable road closure period, which the Department will review and provide comments. A minimum of 14 calendar days prior to the anticipated closure date, the Contractor shall provide a confirmation report to the Department detailing how the Contractor has addressed all Department comments and pending items for the readiness plan. 5 business days prior to the start of the road closure, the Contractor shall meet

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with the Department to review any outstanding readiness items and coordinate final details for the implementation of the road closure.

**Article 1.08.04 – Limitations of Operations:** Limitations of Operations is amended by the following:

### **INCIDENT MANAGEMENT SYSTEM**

The Contractor will not be allowed to perform any work that will disrupt the normal operation of the Incident Management System (IMS) as follows:

- On Monday through Friday from 5:00 a.m. to 9:00 p.m.
- On Saturday and Sunday.
- On the day before or after any of the Legal Holidays listed below:

New Years Day

Good Friday

Memorial Day

Independence Day

Labor Day

Thanksgiving Day

Christmas Day

- On the Saturday, Sunday and Monday following Thanksgiving Day.
- On the Friday, Saturday and Sunday immediately preceding any of the above Legal holidays celebrated on a Monday.
- On the Saturday, Sunday and Monday immediately following any of the above Legal holidays celebrated on a Friday.

In order to maintain continuous operation of the Incident Management System, the Contractor shall adhere to the requirements in the special provision “Notice to Contractor – Installation Qualifications” and “Notice to Contractor – IMS Installation”.

### **TIME RESTRICTIONS**

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 that will interfere with the described traffic operations on all project roadways as follows:

## Interstate 95

### On the following State observed Legal Holidays:

New Year's Day  
Good Friday, Easter\*  
Memorial Day  
Independence Day  
Labor Day  
Thanksgiving Day\*\*  
Christmas Day

The following restrictions also apply:

On the day before and the day after any of the above Legal Holidays.

On the Friday, Saturday and Sunday immediately preceding any of the above Holidays celebrated on a Monday.

On the Saturday, Sunday and Monday immediately following any of the above Holidays celebrated on a Friday.

\* From 6:00 a.m. the Thursday before the Holiday to 8:00 p.m. the Monday after the Holiday.

\*\* From 6:00 a.m. the Wednesday before the Holiday to 8:00 p.m. the Monday after the Holiday.

### During all other times

The Contractor shall maintain and protect traffic as shown on the accompanying "Limitation of Operations" charts, which dictate the minimum number of lanes that must remain open for each day of the week.

The Contractor will be allowed to halt Route I-95 traffic for a period not to exceed 10 minutes to perform necessary work for the purpose of lifting or demolition operations, as approved by the Engineer, between 12:01 a.m. and 5:00 a.m. on all non-Holiday days.

**Limitation of Operations Chart  
Minimum Number of Lanes to Remain Open**

Route: I-95 Southbound Location: Exit 55 Number of Through Lanes: 2								Route: I-95 Northbound Location: Exit 55 Number of Through Lanes: 2							
Hour Beginning	Mon	Tue	Wed	Thu	Fri	Sat	Sun	Hour Beginning	Mon	Tue	Wed	Thu	Fri	Sat	Sun
Mid	1	1	1	1	1	1	1	Mid	1	1	1	1	1	1	1
1 AM	1	1	1	1	1	1	1	1 AM	1	1	1	1	1	1	1
2 AM	1	1	1	1	1	1	1	2 AM	1	1	1	1	1	1	1
3 AM	1	1	1	1	1	1	1	3 AM	1	1	1	1	1	1	1
4 AM	1	1	1	1	1	1	1	4 AM	1	1	1	1	1	1	1
5 AM	1	1	1	1	1	1	1	5 AM	1	1	1	1	1	1	1
6 AM	E	E	E	E	E	1	1	6 AM	E	E	E	E	E	1	1
7 AM	E	E	E	E	E	2	1	7 AM	E	E	E	E	E	2	1
8 AM	E	E	E	E	E	2	2	8 AM	E	E	E	E	E	2	2
9 AM	2	2	2	2	2	2	2	9 AM	2	2	2	2	2	2	2
10 AM	2	2	2	2	2	2	2	10 AM	2	2	2	2	2	2	2
11 AM	2	2	2	2	2	2	2	11 AM	2	2	2	2	2	2	2
Noon	2	2	2	2	2	2	2	Noon	2	2	2	2	2	2	2
1 PM	2	2	2	2	2	2	2	1 PM	2	2	2	2	2	2	2
2 PM	2	2	2	2	2	2	2	2 PM	2	2	2	2	2	2	2
3 PM	E	E	E	E	E	2	2	3 PM	E	E	E	E	E	2	2
4 PM	E	E	E	E	E	2	2	4 PM	E	E	E	E	E	2	2
5 PM	E	E	E	E	E	2	2	5 PM	E	E	E	E	E	2	2
6 PM	2	2	2	2	2	2	2	6 PM	2	2	2	2	2	2	2
7 PM	2	2	2	2	2	2	2	7 PM	2	2	2	2	2	2	2
8 PM	2	2	2	2	2	2	2	8 PM	2	2	2	2	2	2	2
9 PM	1	1	2	2	2	2	2	9 PM	1	1	1	2	2	2	1
10 PM	1	1	1	1	1	2	2	10 PM	1	1	1	1	2	1	1
11 PM	1	1	1	1	1	1	1	11 PM	1	1	1	1	1	1	1

**E = maintain existing traffic operations = all available travel lanes, including exit only lanes, climbing lanes, and lanes added during construction, and all available shoulder widths, including shoulder width added during construction, shall be open to traffic during this period**



### **I-95 Ramps**

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

The Contractor will be allowed to halt traffic for a period not to exceed 10 minutes to perform necessary work to remove and install traffic patterns, mobilization of equipment and deliver materials, as approved by the Engineer, between 12:01 a.m. and 5:00 a.m. on all non-Holiday days.

The Contractor will be allowed to close the Route I-95 Exit 55 northbound and southbound on/off ramps and detour traffic to perform necessary work as specified in the contract plans. The detour shall not exceed the number of days given for the Superstructure Replacement Milestone as defined in the Milestone Incentive Liquidated Damages Provision.

The Contractor shall notify the Engineer at least 14 days in advance of the start of the closure.

### **U.S. Route 1**

Monday through Friday between 6:00 a.m. and 7:00 p.m.  
Saturday and Sunday between 10:00 a.m. and 6:00 p.m.

The Contractor will be allowed to halt US Route 1 traffic for a period not to exceed 20 minutes to perform necessary work for structure demolition and erection of prefabricated bridge units (PBUs), as approved by the Engineer, between 12:01 a.m. and 5:00 a.m. on all non-Holiday days.

### **All Other Roadways**

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 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.

## **SEQUENCE OF OPERATIONS**

The Contractor shall conform to the Sequence of Operations listed herein and as shown on the Maintenance and Protection of Traffic Construction Plans or as directed by the Engineer. Work

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in any stage of the construction may commence only with prior establishment of the applicable provisions of the “Maintenance and Protection of Traffic” and prior approval of the Engineer.

In the event of an Engineer approved deviation from the sequence of operations, the Contractor shall immediately notify all Utility Companies on this Contract of any such change.

## **STAGE 1**

- **U.S. Route 1:**

**Lane Configuration-** Maintain existing through lanes, turn lanes and shoulders in each direction.

**Construction Sequence**

- Utility work (performed by Contractor and by others) as outlined in the Notice to Contractor – Utility Generated Schedule.
- Construct retaining walls between Stations 15+50 and 17+25 NB and Stations 14+75 and 16+75 SB.
- Construct temporary roadway surface between new wall and existing bridge piers in each direction.

## **STAGE 2**

- **U.S. Route 1:**

**Lane Configuration-** Maintain one through lane with turn lane (where shown) in each direction.

**Construction Sequence**

- Shift U.S. Route 1 traffic to the newly constructed pavement between existing piers and abutments.
- Construct center pier.

- **Interstate 95:**

**Lane Configuration-** Maintain two through lanes in each direction.

**Construction Sequence**

The following construction activities shall not commence until start of second construction season (Spring 2020).

- Close left shoulders in each direction.
- Install temporary concrete barriers within work areas of existing median.
- Remove existing median barrier and install new precast barrier within crossover limits.

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- Remove existing concrete median in areas shown to facilitate crossover.
- Place temporary pavement as necessary to accommodate crossover traffic.

### **STAGE 3**

- **U.S. Route 1:**

**Lane Configuration-** Maintain one through lane with turn lane (where shown) in each direction.

**Construction Sequence**

- Construct new, lowered roadway.
- Complete the relocation of IMS and other utilities prior to start of crossover.

- **Interstate 95:**

**Lane Configuration-** Maintain two through lanes in each direction.

**Construction Sequence**

- Shift I-95 NB traffic to SB side via crossover.
- Demolish existing NB bridge structure and pier sections.
- Modify existing abutment seats to accommodate new superstructure and complete center pier construction.
- Install the four, Span 1 PBUs which sit on the south abutment and center pier. 20 minute closures of Route 1 shall be required during lifting operations.
- Install the four remaining Span 2 PBUs. 20 minute closures of Route 1 shall be required during lifting operations.
- Pour link slab and longitudinal closure pours. 20 minute closures of Route 1 shall be required during concrete pouring operations.
- Complete abutment backwall modifications and approach slab construction.
- Form and pour permanent concrete barrier curbs at median and parapet locations.

### **STAGE 4**

- **U.S. Route 1:**

**Lane Configuration-** Maintain one through lane in each direction.

**Construction Sequence**

- Construct any remaining portion of new pier and areas of roadway as shown on plans.

- **Interstate 95:**

**Lane Configuration-** Maintain two through lanes in each direction.

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**Construction Sequence**

- Shift all traffic to NB side via crossover.
- Proceed with operations to construct SB bridge as outlined in Stage 3 above.

**STAGE 5/6**

- **U.S. Route 1:**

**Lane Configuration-** Maintain one through lane in each direction.

**Construction Sequence**

- Construct any remaining portion of new, lowered roadway.

- **Interstate 95:**

**Lane Configuration-** Maintain two through lanes in each direction.

**Construction Sequence**

- Construct permanent concrete median barriers which were removed to facilitate the crossover of traffic during Stages 3 and 4 via shoulder closures.

**Final Completion**

- **I-95 and U.S. Route 1:**

At the end of Stage 6 and utilizing the Traffic Control Plans in the MPT specifications, install final pavement top course, final pavement markings and signing.

## **SECTION 2.86 – DRAINAGE TRENCH EXCAVATION, ROCK IN DRAINAGE TRENCH EXCAVATION**

### **2.86.01—Description**

### **2.86.03—Construction Methods**

### **2.86.04—Method of Measurement**

### **2.86.05—Basis of Payment**

**2.86.01—Description:** Drainage trench excavation consists of the excavation necessary for the proper installation of drainage structures, pipes, pipe ends and any other incidental drainage items.

It shall include earth and rock excavation, removal of existing pipes, dewatering, backfill, and disposal of materials; to the trench limits described herein, to the dimensions shown on the plans, or as directed by the Engineer.

#### **Classifications:**

- (1) **Drainage Trench Excavation** will include only the excavation necessary for the construction of the drainage items and the removals specified above.
- (2) **Rock in Drainage Trench Excavation**, insofar as it applies to drainage trench excavation, shall be defined as **1/2 cubic yard or more** in volume of the following obstructions removed from the limits of the drainage trench:
  - (a) rock in definite ledge formation
  - (b) boulders, or portions of boulders
  - (c) cement masonry structures
  - (d) concrete or reinforced concrete structures
  - (e) reinforced concrete pipe
  - (f) subsurface concrete pavement or concrete base

The removal shall be as indicated or directed from within the limits defined in 2.86.03 for drainage trench excavation.

#### **2.86.03—Construction Methods:**

##### **(1) Drainage Trench Excavation Limits:**

*Horizontal Limits:* Trench widths for pipes, pipe ends, pipe-arches, and drainage structures shall be as follows:

- (a) 2 feet greater than the nominal inside diameter of circular pipe or nominal inside span of elliptical pipe or pipe-arch for such diameters or spans of less than 30 inches
- (b) 3 feet greater than the nominal inside diameter of circular pipe or the nominal inside span of elliptical pipe or pipe-arch for such diameters or spans that are 30 inches or greater
- (c) 4 feet greater than the nominal inside diameter or nominal horizontal inside span for pipe-arches fabricated from structural plates
- (d) 2 feet beyond the neat lines of all exterior or foundation walls of drainage structures

*Vertical Limits:* Trench depths shall extend vertically as follows:

- (a) From the bottom of the trench to the bottom of the roadway excavation, or in areas away from roadway excavation, to the top of existing ground surface.

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(b) Where drainage pipe is to be laid in a fill area, the embankment shall be placed and compacted to a minimum elevation 12 inches above the top of the proposed pipe, whereupon the drainage trench excavation shall be performed and the pipe installed.

- (2) **Drainage Trench Excavation:** Drainage trench excavation shall be made in conformity with the requirements of the plans, or as directed by the Engineer. The Contractor shall furnish and employ such shores, braces, pumps, or ancillary equipment as needed for the proper protection of property, proper completion of the work, as well as safety of the public and employees of both the Contractor and the Department. All bracing and shoring shall be removed when no longer required for the construction or safety of the work. When required, the Contractor shall provide or have on the Site at all times any OSHA certification for equipment to be used, per 1.07.07. For support of trenches greater than 10 feet in depth, working drawings shall be submitted, in accordance with 1.05.02. The Contractor shall control erosion and sedimentation at trench locations and ensure that pumped water from the drainage excavation is discharged in accordance with the requirements of 1.10.

Where a firm foundation is not encountered at the grades established due to unsuitable material, such as soft, spongy, or unstable soil, the unsuitable material shall be removed and replaced with approved backfill, thoroughly compacted in lifts not to exceed 6 inches, for the full trench width. The Engineer shall be notified prior to removal of the unsuitable material in order to determine the depth of removal necessary.

After the excavation is complete, the Contractor shall notify the Engineer and no drainage structure or material shall be placed in the excavated area until the Engineer has approved the depth of excavation and the character of the foundation material.

- (3) **Rock in Drainage Trench Excavation:**

- (a) Rock in Drainage Trench Excavation - Ledge: When rock in definite ledge form is encountered, the Contractor shall excavate a minimum of 12 inches below the bottom of the proposed pipe or drainage structure; and this depth shall be filled with bedding material (as specified in M.08.03-1) below the proposed pipe; or granular fill (as specified in M.02.01) below the proposed drainage structure, which shall be thoroughly compacted in lifts not to exceed 6 inches.
- (b) Rock in Drainage Trench Excavation - Boulders: When boulders are encountered, the Contractor shall remove them from the trench and if backfill is required, the void shall be filled with bedding material, surplus excavated material (as specified in 2.02.03-8) or granular fill which shall be thoroughly compacted in lifts not to exceed 6 inches.
- (c) Rock in Drainage Trench Excavation –Structures: When cement masonry, concrete or reinforced concrete structures are encountered within the drainage trench limits, the Contractor shall remove the structure in its entirety or as directed by the Engineer, and if backfill is required, the void shall be filled with bedding material, surplus excavated material or granular fill which shall be thoroughly compacted in lifts not to exceed 6 inches.

- (4) **Backfill:** Suitable material excavated from the drainage trench shall be used as backfill material prior to consideration of using any other source of backfill. Backfill material used shall be of a quality satisfactory to the Engineer and shall be free from large or frozen lumps, wood and other extraneous material. Rock fill or stones larger than 5 inches shall not be placed within 1 foot of the drainage structure or pipe. The grading shall be

completed to the lines shown on the plans, or as ordered, by refilling to the required elevation with approved material, placed in layers not to exceed 6 inches in depth after compaction, which shall be thoroughly compacted with equipment approved by the Engineer.

All surplus or unsuitable material shall be removed and disposed of as directed. Should additional material be required for backfilling, it may be obtained from the Project surplus excavation in accordance with 2.02.03-8 or from borrow pits, gravel pits, or elsewhere as directed by the Engineer.

#### **2.86.04—Method of Measurement:**

**Drainage Trench Excavation:** Drainage trench excavation will not be measured for payment.

If granular fill or borrow is required to replace unsuitable material it will be measured for payment as directed by the Engineer.

**Rock in Drainage Trench Excavation:** If any material meeting the definition of Rock in Drainage Trench Excavation is encountered, the Contractor shall strip it of sufficient overlying material to allow for proper measurement and shall then notify the Engineer that the rock surface is ready for measurement. If the Contractor fails to give such notice, the Engineer will presume that the measurements taken at the time the Engineer first saw the material in question will give the true quantity of excavation.

Rock in Drainage Trench Excavation will be measured according to the classification provided in 2.86.01 and within the drainage trench excavation limits provided in 2.86.03.

For the removal of underground obstructions, as classified in 2.86.01-2, the measurement shall be the actual volume of rock removed (1/2 cubic yard or more) as approved by the Engineer.

Rock in Drainage Trench Excavation will not be measured for payment in fills.

Bedding Material or other suitable fill, as specified in 2.86.03(3), used to fill voids after rock is excavated will not be measured for payment.

#### **2.86.05—Basis of Payment:**

**Drainage Trench Excavation:** There will be no direct payment for drainage trench excavation required for the installation of drainage pipes, pipe ends, catch basins, drop inlets, manholes, and other drainage structures, or any other incidental drainage work including materials, tools, equipment and labor necessary to complete the drainage trench excavation in conformity with the plans or as directed by the Engineer.

There will be no direct payment for backfill or disposal of surplus material necessary for the satisfactory completion of this work.

There will be no direct payment made for shoring, bracing, dewatering, or for material or equipment necessary for the satisfactory completion of the work.

Where called for on the plans to install temporary earth retaining systems for the support of existing facilities, pavement, utilities, or for other constraints, payment will be made in accordance with such items in the Contract.

If granular fill or borrow is used to replace unsuitable material, payment will be made at the respective Contract unit prices, or in the absence of such items in the Contract, as Extra Work in accordance with 1.04.05.

**Rock in Drainage Trench Excavation:** When rock, conforming to the description in 2.86.01 is encountered within the limits of drainage trench excavation, its removal will be classified and

paid for at the Contract unit price per cubic yard for "Rock in Drainage Trench Excavation 0' – 10' Deep," or "Rock in Drainage Trench Excavation 0' – 20' Deep," as the case may be.

Those portions of drainage trench excavation classified and paid for as "Rock in Drainage Trench Excavation" of the various depths will be the actual volumes of rock excavated within the limits for drainage trench excavation, at the applicable bottom depth price.

Where no item or items for "Rock in Drainage Trench Excavation" at the applicable depth appear in the proposal and rock is encountered in drainage trench excavation, its removal will be paid for as Extra Work in accordance with 1.04.05.

When excavation is necessary in fill, no such excavation will be paid for as "Rock in Drainage Trench Excavation."

**When excavation is necessary for any purpose other than drainage-related items, no such excavation will be paid under this item.**

Bedding material or any other suitable material used to fill voids vacated by excavated rock will not be paid for but shall be included in the unit price per cubic yard for "Rock in Drainage Trench Excavation."

Pay Item	Pay Unit
Rock in Drainage Trench Excavation 0' - 10' Deep	c.y.
Rock in Drainage Trench Excavation 0' - 20' Deep	c.y.



## **SECTION 4.06 BITUMINOUS CONCRETE**

Section 4.06 is being deleted in its entirety and replaced with the following:

### **4.06.01—Description**

### **4.06.02—Materials**

### **4.06.03—Construction Methods**

### **4.06.04—Method of Measurement**

### **4.06.05—Basis of Payment**

**4.06.01—Description:** Work under this section shall include the production, delivery, placement, and compaction of an uniform textured, non-segregated, smooth bituminous concrete pavement to the grade and cross section shown on the plans.

The terms listed below as used in this specification are defined as:

Bituminous Concrete: A composite material consisting of prescribed amounts of asphalt binder, and aggregates. Asphalt binder may also contain additives engineered to modify specific properties and/or behavior of the composite material. References to bituminous concrete apply to all of its forms, such as those identified as hot-mix asphalt (HMA), or polymer-modified asphalt (PMA).

Bituminous Concrete Plant (Plant): A structure where aggregates and asphalt binder are combined in a controlled fashion into a bituminous concrete mixture suitable for forming pavements and other paved surfaces.

Course: A continuous layer (a lift or multiple lifts) of the same bituminous concrete mixture placed as part of the pavement structure.

Density Lot: The total tonnage of all bituminous concrete placed in a single lift and as defined in Article 4.06.03.

Disintegration: Erosion or fragmentation of the pavement surface which can be described as polishing, weathering-oxidizing, scaling, spalling, raveling, or formation of potholes.

Dispute Resolution: A procedure used to resolve conflicts between the Engineer and the Contractor's test results that may affect payment.

Hot Mix Asphalt (HMA): A bituminous concrete mixture typically produced at 325°F.

Job Mix Formula (JMF): A recommended aggregate gradation and asphalt binder content to achieve the required mixture properties.

Lift: An application of a bituminous concrete mixture placed and compacted to a specified thickness in a single paver pass.

Percent Within Limits (PWL): The percentage of the lot falling between the Upper Specification Limit (USL) and the Lower Specification Limit (LSL).

Polymer-Modified Asphalt (PMA): A bituminous concrete mixture containing a polymer modified asphalt binder and using a qualified warm mix technology.

Production Lot: The total tonnage of a bituminous concrete mixture from a single source that may receive an adjustment.

Production Sub Lot: Portion of the production lot typically represented by a single sample.

Quality Assurance (QA): All those planned and systematic actions necessary to provide ConnDOT the confidence that a Contractor will perform the work as specified in the Contract.

Quality Control (QC): The sum total of activities performed by the vendor (Producer, Manufacturer, and Contractor) to ensure that a product meets contract specification requirements.

Superpave: A bituminous concrete mix design used in mixtures designated as “S\*” Where “S” indicates Superpave and \* indicates the sieve related to the nominal maximum aggregate size of the mix.

Segregation: A non-uniform distribution of a bituminous concrete mixture in terms of gradation, temperature, or volumetric properties.

Warm Mix Asphalt (WMA) Technology: A qualified additive or technology that may be used to produce a bituminous concrete at reduced temperatures and/or increase workability of the mixture.

**4.06.02—Materials:** All materials shall conform to the requirements of Section M.04.

**1. Materials Supply:** The bituminous concrete mixture must be from one source of supply and originate from one Plant unless authorized by the Engineer.

**2. Recycled Materials:** Reclaimed Asphalt Pavement (RAP), Crushed Recycled Container Glass (CRCG), Recycled Asphalt Shingles (RAS), or crumb rubber (CR) from recycled tires may be incorporated in bituminous concrete mixtures in accordance with Project Specifications.

**4.06.03—Construction Methods:**

**1. Material Documentation:** All vendors producing bituminous concrete must have Plants with automated vehicle-weighting scales, storage scales, and material feeds capable of producing a delivery ticket containing the information below.

- a. "State of Connecticut" printed on ticket.
- b. Name of producer, identification of Plant, and specific storage silo if used.
- c. Date and time.
- d. Mixture Designation; Mix type and level Curb mixtures for machine-placed curbing must state "curb mix only".
- e. If WMA Technology is used, the additive name and dosage rate or water injection rate must be listed.
- f. Net weight of mixture loaded into the vehicle (When RAP and/or RAS is used the moisture content shall be excluded from mixture net weight).
- g. Gross weight (equal to the net weight plus the tare weight or the loaded scale weight).
- h. Tare weight of vehicle (Daily scale weight of the empty vehicle).
- i. Project number, purchase order number, name of Contractor (if Contractor other than Producer).
- j. Vehicle number - unique means of identification vehicle.
- k. For Batch Plants, individual aggregate, recycled materials, and virgin asphalt max/target/min weights when silos are not used.
- l. For every mixture designation the running daily total delivered and sequential load number.

The net weight of mixture loaded into the vehicle must be equal to the cumulative measured weights of its components.

The Contractor must notify the Engineer immediately if, during production, there is a malfunction of the weight recording system in the automated Plant. Manually written tickets containing all required information will be allowed for no more than one hour.

The State reserves the right to have an inspector present to monitor batching and /or weighing operations.

**2. Transportation of Mixture:** The mixture shall be transported in vehicles that are clean of all foreign material, excessive coating or cleaning agents, and, that have no gaps through which mixture might spill. Any material spilled during the loading or transportation process shall be quantified by re-weighing the vehicle. The Contractor shall load vehicles uniformly so that segregation is minimized. Loaded vehicles shall be tightly covered with waterproof covers acceptable to the Engineer. Mesh covers are prohibited. The cover must minimize air infiltration. Vehicles found not to be in conformance shall not be loaded.

Vehicles with loads of bituminous concrete being delivered to State projects must not exceed the statutory or permitted load limits referred to as gross vehicle weight (GVW). The Contractor shall furnish a list and allowable weights of all vehicles transporting mixture.

The State reserves the right to check the gross and tare weight of any vehicle. If the gross or tare weight varies from that shown on the delivery ticket by more than 0.4 percent, the Engineer will recalculate the net weight. The Contractor shall correct the discrepancy to the satisfaction of the Engineer.

If a vehicle delivers mixture to the project and the delivery ticket indicates that the vehicle is overweight, the load may not be rejected but a "Measured Weight Adjustment" will be taken in accordance with Article 4.06.04.

Vehicle body coating and cleaning agents must not have a deleterious effect on the mixture. The use of solvents or fuel oil, in any concentration, is prohibited for the coating of vehicle bodies.

For each delivery, the Engineer shall be provided a clear, legible copy of the delivery ticket.

**3. Paving Equipment:** The Contractor shall have the necessary paving and compaction equipment at the project site to perform the work. All equipment shall be in good working order and any equipment that is worn, defective or inadequate for performance of the work shall be repaired or replaced by the Contractor to the satisfaction of the Engineer. During the paving operation, the use of solvents or fuel oil, in any concentration, is prohibited as a release agent or cleaner on any paving equipment (i.e., rollers, pavers, transfer devices, etc.).

Refueling or cleaning of equipment is prohibited in any location on the project where fuel or solvents might come in contact with paved areas or areas to be paved. Solvents used in cleaning mechanical equipment or hand tools shall be stored off of areas paved or to be paved.

Pavers: Each paver shall have a receiving hopper with sufficient capacity to provide for a uniform spreading operation and a distribution system that places the mix uniformly, without segregation. The paver shall be equipped with and use a vibratory screed system with heaters or burners. The screed system shall be capable of producing a finished surface of the required evenness and texture without tearing, shoving, or gouging the mixture. Pavers with extendible screed units as part of the system shall have auger extensions and tunnel extenders as necessary. Automatic screed controls for grade and slope shall be used at all times unless otherwise authorized by the Engineer. The controls shall automatically adjust the screed to compensate for irregularities in the preceding course or existing base. The controls shall maintain the proper transverse slope and be readily adjustable, and shall operate from a fixed or moving reference such as a grade wire or floating beam.

Rollers: All rollers shall be self-propelled and designed for compaction of bituminous concrete. Roller types shall include steel-wheeled, pneumatic or a combination thereof. Rollers that operate in a dynamic mode shall have drums that use a vibratory or oscillatory system or combination of. Vibratory rollers shall be equipped with indicators for amplitude, frequency and speed settings/readouts to measure the impacts per foot during the compaction process. Oscillatory rollers shall be equipped with frequency indicators. Rollers can operate in the dynamic mode using the oscillatory system on concrete structures such as bridges and catch basins if at the lowest frequency setting.

Pneumatic tire rollers shall be equipped with wide-tread compaction tires capable of exerting an average contact pressure from 60 to 90 pounds per square inch uniformly over the surface. The Contractor shall furnish documentation to the Engineer regarding tire size; pressure and loading

to confirm that the proper contact pressure is being developed and that the loading and contact pressure is uniform for all wheels.

**Lighting:** For paving operations, which will be performed during hours of darkness, the paving equipment shall be equipped with lighting fixtures as described below, or with an approved equal. Lighting shall minimize glare to passing traffic. The lighting options and minimum number of fixtures are listed in Tables 4.06-1 and 4.06-2:

**TABLE 4.06-1: Minimum Paver Lighting**

Option	Fixture Configuration	Fixture Quantity	Requirement
1	Type A	3	Mount over screed area
	Type B (narrow) or Type C (spot)	2	Aim to auger and guideline
	Type B (wide) or Type C (flood)	2	Aim 25 feet behind paving machine
2	Type D Balloon	2	Mount over screed area

**TABLE 4.06-2: Minimum Roller Lighting**

Option	Fixture Configuration*	Fixture Quantity	Requirement
1	Type B (wide)	2	Aim 50 feet in front of and behind roller
	Type B (narrow)	2	Aim 100 feet in front of and behind roller
2	Type C (flood)	2	Aim 50 feet in front of and behind roller
	Type C (spot)	2	Aim 100 feet in front of and behind roller
3	Type D Balloon	1	Mount above the roller

\*All fixtures shall be mounted above the roller.

Type A: Fluorescent fixture shall be heavy-duty industrial type. Each fixture shall have a minimum output of 8,000 lumens. The fixtures shall be mounted horizontally, and be designed for continuous row installation.

Type B: Each floodlight fixture shall have a minimum output of 18,000 lumens.

Type C: Each fixture shall have a minimum output of 19,000 lumens.

Type D: Balloon light: Each balloon light fixture shall have a minimum output of 50,000 lumens, and emit light equally in all directions.

**Material Transfer Vehicle (MTV):** A MTV shall be used when placing a bituminous concrete surface course as indicated in the contract documents.

The MTV must be a vehicle specifically designed for the purpose of delivering the bituminous concrete mixture from the delivery vehicle to the paver. The MTV must continuously remix the bituminous concrete mixture throughout the placement process.

The use of a MTV will be subject to the requirements stated in Article 1.07.05- Load Restrictions. The Engineer may limit the use of the vehicle if it is determined that the use of the MTV may damage highway components, utilities, or bridges. The Contractor shall submit to the Engineer at time of pre-construction the following information:

- The make and model of the MTV.
- The individual axle weights and axle spacing for each piece of paving equipment (haul vehicle, MTV and paver).
- A working drawing showing the axle spacing in combination with all pieces of equipment that will comprise the paving echelon.

**4. Test Section:** The Engineer may require the Contractor to place a test section whenever the requirements of this specification or Section M.04 are not met.

The Contractor shall submit the quantity of mixture to be placed and the location of the test section for review and approval by the Engineer. The same equipment used in the construction of a passing test section shall be used throughout production.

If a test section fails to meet specifications, the Contractor shall stop production, make necessary adjustments to the job mix formula, Plant operations, or procedures for placement and compaction. The Contractor shall construct test sections, as allowed by the Engineer, until all the required specifications are met. All test sections shall also be subject to removal as set forth in Article 1.06.04.

**5. Transitions for Roadway Surface:** Transitions shall be formed at any point on the roadway where the pavement surface deviates, vertically, from the uniform longitudinal profile as specified on the plans. Whether formed by milling or by bituminous concrete mixture, all transition lengths shall conform to the criteria below unless otherwise specified.

Permanent Transitions: Defined as any gradual change in pavement elevation that remains as a permanent part of the work.

A transition shall be constructed no closer than 75 feet from either side of a bridge expansion joint or parapet. All permanent transitions, leading and trailing, shall meet the following length requirements:

- a) Posted speed limit is greater than 35 MPH: 30 feet per inch of elevation change.
- b) Posted speed limit is 35 MPH or less: 15 feet per inch of elevation change.

In areas where it is impractical to use the above described permanent transition lengths the use of a shorter permanent transition length may be permitted when approved by the Engineer.

**Temporary Transitions:** A temporary transition is defined as a transition that does not remain a permanent part of the work. All temporary transitions shall meet the following length requirements:

- a) Posted speed limit is greater than 50 MPH
  - (1) Leading Transitions = 15 feet per inch of vertical change (thickness)
  - (2) Trailing Transitions = 6 feet per inch of vertical change (thickness)
- b) Posted speed limit is 40, 45, or 50 MPH
  - (1) Leading and Trailing = 4 feet per inch of vertical change (thickness)
- c) Posted speed limit is 35 MPH or less
  - (1) Leading and Trailing = 3 feet per inch of vertical change (thickness)

**Note:** Any temporary transition to be in-place over the winter shutdown period or during extended periods of inactivity (more than 14 calendar days) shall conform to the greater than 50 MPH requirements shown above.

**6. Spreading and Finishing of Mixture:** Prior to the placement of the mixture, the underlying base course shall be brought to the plan grade and cross section within the allowable tolerance.

Immediately before placing a bituminous concrete lift, a uniform coating of tack coat shall be applied to all existing underlying pavement surfaces and on the exposed surface of a wedge joint. Such surfaces shall be clean and dry. Sweeping or other means acceptable to the Engineer shall be used.

The mixture shall not be placed whenever the surface is wet or frozen.

The Engineer may verify the mixture temperature by means of a probe or infrared type of thermometer. The Engineer may reject the load based on readings from a probe type thermometer and the specify temperature in the quality control plan (QCP) for placement.

**Tack Coat Application:** The tack coat shall be applied by a pressurized spray system that results in uniform overlapping coverage at an application rate of 0.03 to 0.05 gallons per square yard for a non-milled surface and an application rate of 0.05 to 0.07 gallons per square yard for a milled surface. For areas where both milled and un-milled surfaces occur, the tack coat shall be an application rate of 0.03 to 0.05 gallons per square yard. The Engineer must approve the equipment and the method of measurement prior to use. The material for tack coat shall not be heated in excess of 160°F and shall not be further diluted.

Tack coat shall be allowed sufficient time to break prior to any paving equipment or haul vehicles driving on it.

The Contractor may request to omit the tack coat application between bituminous concrete layers that have not been exposed to traffic and are placed during the same work shift. Requests to omit tack coat application on the exposed surface of a wedge joint will not be considered.

**Placement:** The mixture shall be placed and compacted to provide a smooth, dense surface with a uniform texture and no segregation at the specified thickness and dimensions indicated in the plans and specifications.

When unforeseen weather conditions prevent further placement of the mixture, the Engineer is not obligated to accept or place the bituminous concrete mixture that is in transit from the Plant.

In advance of paving, traffic control requirements shall be set up, maintained throughout placement, and shall not be removed until all associated work including density testing is completed.

The Contractor shall inspect the newly placed pavement for defects in the mixture or placement before rolling is started. Any deviation from standard crown or section shall be immediately remedied by placing additional mixture or removing surplus mixture. Such defects shall be corrected to the satisfaction of the Engineer.

Where it is impractical due to physical limitations to operate the paving equipment, the Engineer may permit the use of other methods or equipment. Where hand spreading is permitted, the mixture shall be placed by means of suitable shovels and other tools, and in a uniformly loose layer at a thickness that will result in a completed pavement meeting the designed grade and elevation.

**Placement Tolerances:** Each lift of bituminous concrete placed at a specified thickness shall meet the following requirements for thickness and area. Any pavement exceeding these limits shall be subject to an adjustment or removal. Lift tolerances will not relieve the Contractor from meeting the final designed grade. Lifts of specified non-uniform thickness, i.e. wedge or shim course, shall not be subject to thickness and area adjustments.

- a) Thickness- Where the average thickness of the lift exceeds that shown on the plans beyond the tolerances shown in Table 4.06-3, the Engineer will calculate the thickness adjustment in accordance with Article 4.06.04.

**TABLE 4.06-3: Thickness Tolerances**

Mixture Designation	Lift Tolerance
S1	+/- 3/8 inch
S0.25, S0.375, S0.5	+/- 1/4 inch

Where the thickness of the lift of mixture is less than that shown on the plans beyond the tolerances shown in Table 4.06-3, the Contractor, with the approval of the Engineer, shall take corrective action in accordance with this specification.

- b) Area- Where the width of the lift exceeds that shown on the plans by more than the specified thickness, the Engineer will calculate the area adjustment in accordance with Article 4.06.04.



- c) Delivered Weight of Mixture - When the delivery ticket shows that the vehicle exceeds the allowable gross weight for the vehicle type, the Engineer will calculate the weight adjustment in accordance with Article 4.06.04.

Transverse Joints: All transverse joints shall be formed by saw-cutting to expose the full thickness of the lift. Tack coat shall be applied to the sawn face immediately prior to additional mixture being placed.

Compaction: The Contractor shall compact the mixture to meet the density requirements as stated in Article 4.06.03 and eliminate all roller marks without displacement, shoving, cracking, or aggregate breakage.

When placing a lift with a specified thickness less than one and one-half (1 ½) inches, or a wedge course, the Contractor shall provide a minimum rolling pattern as determined by the development of a compaction curve. The procedure to be used shall be documented in the Contractor's QCP for placement and demonstrated on the first day of placement.

The use of the vibratory system on concrete structures is prohibited. When approved by the Engineer, the Contractor may operate a roller using an oscillatory system at the lowest frequency setting.

If the Engineer determines that the use of compaction equipment in the dynamic mode may damage highway components, utilities, or adjacent property, the Contractor shall provide alternate compaction equipment. The Engineer may allow the Contractor to operate rollers in the dynamic mode using the oscillatory system at the lowest frequency setting.

Rollers operating in the dynamic mode shall be shut off when changing directions.

These allowances will not relieve the Contractor from meeting pavement compaction requirements.

Surface Requirements:

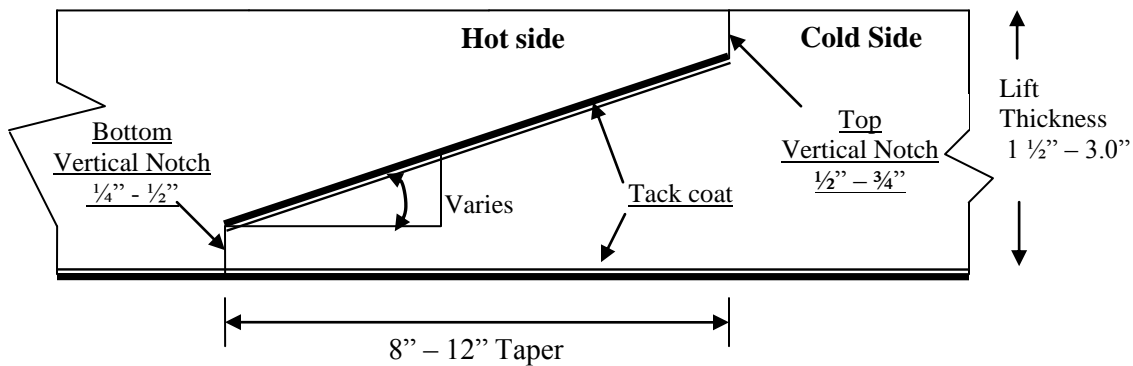
Each lift of the surface course shall not vary more than ¼ inch from a Contractor-supplied 10 foot straightedge. For all other lifts, the tolerance shall be ⅜ inch. Such tolerance will apply to all paved areas.

Any surface that exhibits these characteristics or exceeds these tolerances shall be corrected by the Contractor at its own expense.

**7. Longitudinal Joint Construction Methods:** The Contractor shall use Method I- Notched Wedge Joint (see Figure 4.06-1) when constructing longitudinal joints where lift thicknesses are between 1½ and 3 inches. S1.0 mixtures shall be excluded from using Method I. Method II Butt Joint (see Figure 4.06-2) shall be used for lifts less than 1½ inches or greater than or equal to 3 inches. During placement of multiple lifts, the longitudinal joint shall be constructed in such a

manner that it is located at least 6 inches from the joint in the lift immediately below. The joint in the final lift shall be at the centerline or at lane lines. Each longitudinal joint shall maintain a consistent offset from the centerline of the roadway along its entire length. The difference in elevation between the two faces of any completed longitudinal joint shall not exceed 1/4 inch in any location.

**Method I - Notched Wedge Joint:**



**FIGURE 4.06-1: Notched Wedge Joint**

A notched wedge joint shall be constructed as shown in Figure 4.06-1 using a device that is attached to the paver screed and is capable of independently adjusting the top and bottom vertical notches. The device shall have an integrated vibratory system.

The taper portion of the wedge joint must be placed over the longitudinal joint in the lift immediately below. The top vertical notch must be located at the centerline or lane line in the final lift. The requirement for paving full width "curb to curb" as described in Method II may be waived if addressed in the QC plan and approved by the Engineer.

The taper portion of the wedge joint shall be evenly compacted using equipment other than the paver or notch wedge joint device.

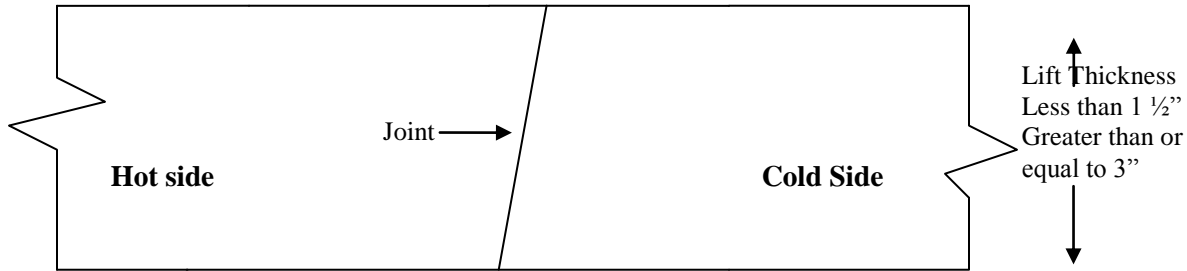
The taper portion of the wedge joint shall not be exposed to traffic for more than 5 calendar days.

Any exposed wedge joint must be located to allow for the free draining of water from the road surface.

The Engineer reserves the right to define the paving limits when using a wedge joint that will be exposed to traffic.

If Method I, Notched Wedge Joint cannot be used on lifts between 1.5 and 3 inches, Method III Butt Joint may be substituted according to the requirements below for “Method III – Butt Joint with Hot Pour Rubberized Asphalt Treatment.”

**Method II - Butt Joint:**

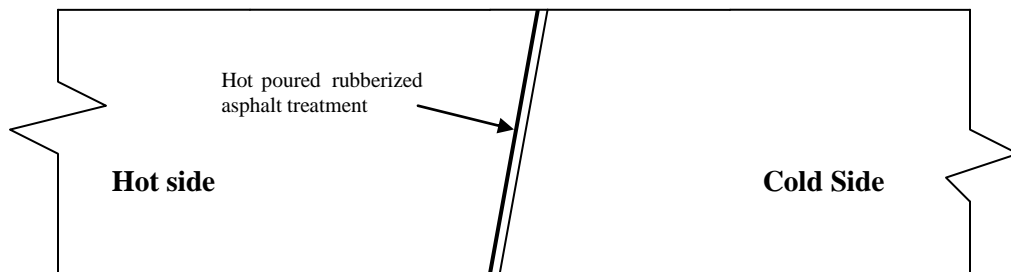


**FIGURE 4.06-2: Butt Joint**

When adjoining passes are placed, the Contractor shall utilize equipment that creates a near vertical edge (refer to Figure 4.06-2). The completing pass (hot side) shall have sufficient mixture so that the compacted thickness is not less than the previous pass (cold side). The end gate on the paver should be set so there is an overlap onto the cold side of the joint.

The Contractor shall not allow any butt joint to be incomplete at the end of a work shift unless otherwise allowed by the Engineer. When using this method, the Contractor is not allowed to leave a vertical edge exposed at the end of a work shift and must complete paving of the roadway full width “curb to curb.”

**Method III- Butt Joint with Hot Poured Rubberized Asphalt Treatment:** If Method I Wedge Joint cannot be used due to physical constraints in certain limited locations; the contractor may submit a request in writing for approval by the Engineer, to utilize Method III Butt Joint as a substitution in those locations. There shall be no additional measurement or payment made when the Method III Butt Joint is substituted for the Method I Notched Wedge Joint. When required by the contract or approved by the Engineer, Method III (see Figure 4.06-3) shall be used.



**FIGURE 4.06-3: Butt Joint with Hot Poured Rubberized Asphalt Treatment**

All of the requirements of Method II must be met with Method III. In addition, the longitudinal vertical edge must be treated with a rubberized joint seal material meeting the requirements of ASTM D 6690, Type 2. The joint sealant shall be placed on the face of the “cold side” of the butt joint as shown above prior to placing the “hot side” of the butt joint. The joint seal material shall be applied in accordance with the manufacturer’s recommendation so as to provide a uniform coverage and avoid excess bleeding onto the newly placed pavement.

**8. Contractor Quality Control (QC) Requirements:** The Contractor shall be responsible for maintaining adequate quality control procedures throughout the production and placement operations. Therefore, the Contractor must ensure that the materials, mixture and work provided by Subcontractors, Suppliers and Producers also meet contract specification requirements.

This effort must be documented in Quality Control Plans and address the actions, inspection, or sampling and testing necessary to keep the production and placement operations in control, to determine when an operation has gone out of control and to respond to correct the situation in a timely fashion.

The Standard QCP for production shall consist of the quality control program specific to the production facility.

There are three components to the QCP for placement: a Standard QCP, a Project Summary Sheet that details project specific information, and if applicable a separate Extended Season Paving Plan as required in Section 9 “Temperature and Seasonal Requirements”.

The Standard QCP for both production and placement shall be submitted to the Department for approval each calendar year and at a minimum of 30 days prior to production or placement.

Production or placement shall not occur until all QCP components have been approved by the Engineer.

Each QCP shall include the name and qualifications of a Quality Control Manager (QCM). The QCM shall be responsible for the administration of the QCP, and any modifications that may become necessary. The QCM shall have the ability to direct all Contractor personnel on the project during paving operations. All Contractor sampling, inspection and test reports shall be reviewed and signed by the QCM prior to submittal to the Engineer. The QCPs shall also include the name and qualifications of any outside testing laboratory performing any QC functions on behalf of the Contractor.

Approval of the QCP does not relieve the Contractor of its responsibility to comply with the project specifications. The Contractor may modify the QCPs as work progresses and must document the changes in writing prior to resuming operations. These changes include but are not limited to changes in quality control procedures or personnel. The Department reserves the right to deny significant changes to the QCPs.

QCP for Production: Refer to Section M.04.03-1.

QCP for Placement: The Standard QCP, Project Summary Sheet, and Extended Season Paving Plan shall conform to the format provided by the Engineer. The format is available at [http://www.ct.gov/dot/lib/dot/documents/dconstruction/pat/qcp\\_outline\\_hma\\_placement.pdf](http://www.ct.gov/dot/lib/dot/documents/dconstruction/pat/qcp_outline_hma_placement.pdf).

The Contractor shall perform all quality control sampling and testing, provide inspection, and exercise management control to ensure that placement conforms to the requirements as outlined in its QCP during all phases of the work. The Contractor shall document these activities for each day of placement.

The Contractor shall submit complete field density testing and inspection records to the Engineer within 48 hours in a manner acceptable to the Engineer.

The Contractor may obtain one (1) mat core and one (1) joint core per day for process control, provided this process is detailed in the QCP. The results of these process control cores shall not be used to dispute the Department determinations from the acceptance cores. The Contractor shall submit the location of each process control core to the Engineer for approval prior to taking the core. The core holes shall be filled to the same requirements described in sub-article 4.06.03-10.

**9. Temperature and Seasonal Requirements:** Paving, including placement of temporary pavements, shall be divided into two seasons, “In-Season” and “Extended-Season”. In-Season paving occurs from May 1 – October 14, and Extended Season paving occurs from October 15- April 30. The following requirements shall apply unless otherwise authorized or directed by the Engineer:

- Mixtures shall not be placed when the air or sub base temperature is less than 40°F regardless of the season.
- Should paving operations be scheduled during the Extended Season, the Contractor must submit an Extended Season Paving Plan for the project that addresses minimum delivered mix temperature considering WMA, PMA or other additives, maximum paver speed, enhanced rolling patterns and the method to balance mixture delivery and placement operations. Paving during Extended Season shall not commence until the Engineer has approved the plan.

**10. Obtaining Bituminous Concrete Cores:** This Section describes the methodology and sampling frequency the Contractor shall use to obtain pavement cores.

Coring shall be performed on each lift specified to a thickness of one and one-half (1 ½) inches or more within 5 days of placement. The Contractor shall extract cores (4 or 6 inch diameter for S0.25, S0.375 and S0.5 mixtures 6 inch diameter for S1.0 mixtures) from locations determined

by the Engineer. The Engineer must witness the extraction, labeling of cores and filling of the core holes.

A density lot will be complete when the full designed paving width and length of the lot has been placed and shall include all longitudinal joints between the curb lines. HMA S1 mixes are excluded from the longitudinal joint density requirements.

A standard density lot is the quantity of material placed within the defined area exclusive of any structures. A combo density lot is the quantity of material placed within the defined area inclusive of structures less than or equal to 500 feet long. A bridge density lot is the quantity of material placed on a structure larger than 500 feet in length.

Prior to paving, the type and number of lot (s) shall be determined by the Engineer. The number of cores per lot shall be determined in accordance to Tables 4.06-4, 4.06-5A and 4.06-5B. Noncontiguous areas such as highway ramps may be combined to create one lot. Combined areas should be set up to target a 2000 ton lot size. The longitudinal locations of mat cores within a lot containing multiple paving passes will be determined using the total distance covered by the paver. The locations of the joint cores will be determined using the total length of longitudinal joints within the lot.

Sampling is in accordance with the following tables:

**TABLE 4.06-4: Bridge Density Lot(s)**

Length of Each Structure (Feet)	No. of Mat Cores	No. of Joint Cores
≤ 500'	See Table 4.06-5(A or B)	See Table 4.06-5(A or B)
501' – 1500'	3	3
1501' – 2500'	4	4
2501' and greater	5	5

All material placed on structures less than or equal to 500 feet in length shall be included as part of a standard lot as follows:

**TABLE 4.06-5A: Standard and Combo Density Lot(s) ≥ 500 Tons**

Lot Type	No. of Mat Cores		No. of Joint Cores		Target Lot Size (Tons)
Standard Lot / Without Bridge (s)	4		4		2000
Combo Lot / Lot With Bridge(s) <sup>(1)</sup>	4 plus	1 per structure (≤ 300')	4 plus	1 per structure (≤ 300')	2000
		2 per structure (301' – 500')		2 per structure (301' – 500')	

**TABLE 4.06-5B: Standard and Combo Density Lot < 500 Tons**

Lot Type	No. of Mat Cores		No. of Joint Cores	
Standard Lot / Without Bridge (s)	3		3	
Combo Lot / Lot With Bridge(s) <sup>(1)</sup>	2 plus	1 per structure	2 plus	1 per structure

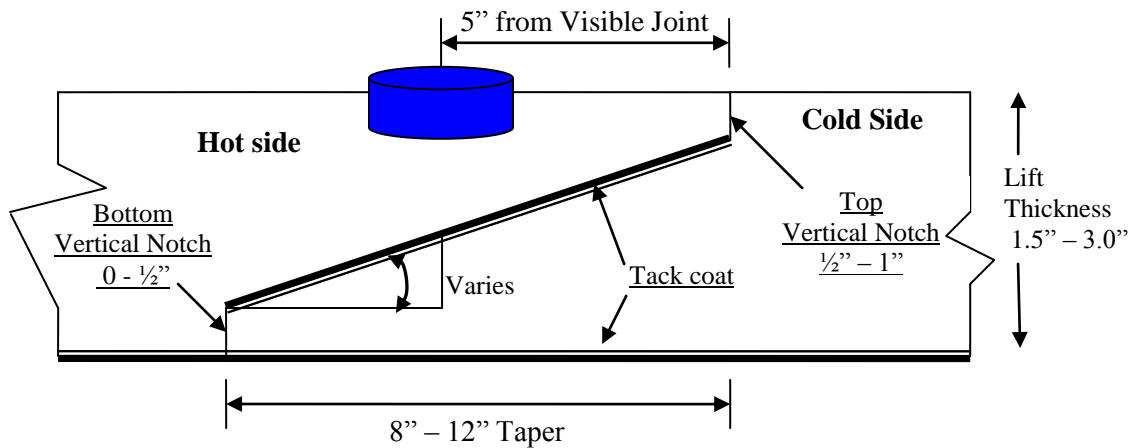
Note:

<sup>(1)</sup> If a combo lot mat or joint core location randomly falls on a structure, the core is to be obtained on the structure in addition to the core(s) required on the structure.

After the lift has been compacted and cooled, the Contractor shall cut cores to a depth equal to or greater than the lift thickness and remove them without damaging the lift(s) to be tested. Any core that is damaged or obviously defective while being obtained will be replaced with a new core from a location within 2 feet measured in a longitudinal direction.

A mat core shall not be located any closer than one foot from the edge of a paver pass. If a random number locates a core less than one foot from any edge, the location will be adjusted by the Engineer so that the outer edge of the core is one foot from the edge of the paver pass.

Method I, Notched Wedge Joint cores shall be taken so that the center of the core is 5 inches from the visible joint on the hot mat side (Figure 4.06-5).

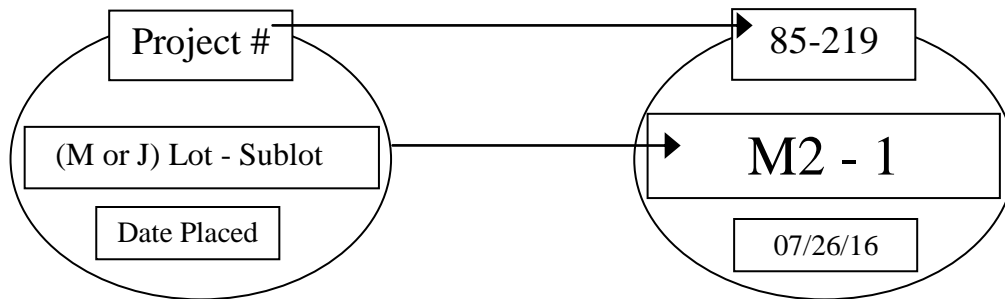


**FIGURE 4.06-5: Notched Wedge Joint Cores**

When Method II or Method III Butt Joint is utilized, cores shall be taken from the hot side so the edge of the core is within 1 inch of the longitudinal joint.

The cores shall be labeled by the Contractor with the project number, date placed, lot number and sub-lot number. The core's label shall, include "M" for a mat core and "J" for a joint core. A mat core from the second lot and first sub-lot shall be labeled "M2 - 1" (Figure 4.06-4). The Engineer shall fill out a MAT-109 to accompany the cores. The Contractor shall deliver the

cores and MAT-109 to the Department's Central Lab. The Contractor shall use a container approved by the Engineer. The container shall have a lid capable of being locked shut and tamper proof. The Contractor shall use foam, bubble wrap, or another suitable material to prevent the cores from being damaged during handling and transportation. Once the cores and MAT-109 are in the container the Engineer will secure the lid using a security seal. The security seal's identification number must be documented on the MAT-109. Central Lab personnel will break the security seal and take possession of the cores.



**FIGURE 4.06-4: Labeling of Cores**

Each core hole shall be filled within four hours upon core extraction. Prior to being filled, the hole shall be prepared by removing any free water and applying tack coat using a brush or other means to uniformly cover the cut surface. The core hole shall be filled using a bituminous concrete mixture at a minimum temperature of 240°F containing the same or smaller nominal maximum aggregate size and compacted with a hand compactor or other mechanical means to the maximum compaction possible. The bituminous concrete shall be compacted to 1/8 inch above the finished pavement.

**11. Acceptance Sampling and Testing:** Sampling and testing shall be performed at a frequency not less than the minimum frequency specified in Section M.04 and sub-article 4.06.03-10.

Sampling shall be performed in accordance with ASTM D 3665, or a statistically based procedure of stratified random sampling approved by the Engineer.

Plant Material Acceptance: The Contractor shall provide the required sampling and testing during all phases of the work in accordance with Section M.04. The Department will verify the Contractor's acceptance test results. Should any test results exceed the specified tolerances in the Department's current QA Program for Materials, the Contractor test results for a subject lot or sub lot may be replaced with the Department's results for the purpose of calculating adjustments. The verification procedure is included in the Department's current QA Program for Materials.

Density Acceptance: The Engineer will perform all acceptance testing in accordance with AASHTO T 331. The density of each core will be determined using the daily production's



average maximum theoretical specific gravity (Gmm) established during the testing of the parent material at the Plant. When there was no testing of the parent material or any Gmm exceeds the specified tolerances in the Department's current QA Program for Materials, the Engineer will determine the maximum theoretical density value to be used for density calculations.

**12. Density Dispute Resolution Process:** The Contractor and Engineer will work in partnership to avoid potential conflicts and to resolve any differences that may arise during quality control or acceptance testing for density. Both parties will review their sampling and testing procedures and results and share their findings. If the Contractor disputes the Engineer's test results, the Contractor must submit in writing a request to initiate the Dispute Resolution Process within 7 calendar days of the notification of the test results. No request for dispute resolution will be allowed unless the Contractor provides quality control results within the timeframe described in sub-article 4.06.03-9 supporting its position. No request for Dispute Resolution will be allowed for a Density Lot in which any core was not taken within the required 5 calendar days of placement. Should the dispute not be resolved through evaluation of existing testing data or procedures, the Engineer may authorize the Contractor to obtain a new set of core samples per disputed lot. The core samples must be extracted no later than 14 calendar days from the date of Engineer's authorization.

The number and location (mat, joint, or structure) of the cores taken for dispute resolution must reflect the number and location of the original cores. The location of each core shall be randomly located within the respective original sub lot. All such cores shall be extracted and the core hole filled using the procedure outlined in Article 4.06.03. The dispute resolution results shall be added to the original results and averaged for determining the final in-place density value.

**13. Corrective Work Procedure:**

If pavement placed by the Contractor does not meet the specifications, and the Engineer requires its replacement or correction, the Contractor shall:

- a) Propose a corrective procedure to the Engineer for review and approval prior to any corrective work commencing. The proposal shall include:
  - Limits of pavement to be replaced or corrected, indicating stationing or other landmarks that are readily distinguishable.
  - Proposed work schedule.
  - Construction method and sequence of operations.
  - Methods of maintenance and protection of traffic.
  - Material sources.
  - Names and telephone numbers of supervising personnel.
  
- b) Any corrective courses placed as the final wearing surface shall match the specified lift thickness after compaction.

**14. Protection of the Work:** The Contractor shall protect all sections of the newly finished pavement from damage that may occur as a result of the Contractor's operations for the duration of the Project.

**15. Cut Bituminous Concrete Pavement:** Work under this item shall consist of making a straight-line cut in the pavement to the lines delineated on the plans or as directed by the Engineer. The cut shall provide a straight, clean, vertical face with no cracking, tearing or breakage along the cut edge.

#### 4.06.04—Method of Measurement:

**1. HMA S\* or PMA S\*:** The quantity of bituminous concrete measured for payment will be determined by the documented net weight in tons accepted by the Engineer in accordance with this specification and Section M.04.

**2. Adjustments:** Adjustments may be applied to bituminous concrete quantities and will be measured for payment using the following formulas:

**Yield Factor** for Adjustment Calculation = 0.0575 Tons/SY/inch

**Actual Area** = [(Measured Length (ft)) x (Avg. of width measurements (ft))]

**Actual Thickness (t)** = Total tons delivered / [Actual Area (SY) x 0.0575 Tons/SY/inch]

- a) Area: If the average width exceeds the allowable tolerance, an adjustment will be made using the following formula. The tolerance for width is equal to the specified thickness (in.) of the lift being placed.

**Tons Adjusted for Area (T<sub>A</sub>)** = [(L x W<sub>adj</sub>)/9] x (t) x 0.0575 Tons/SY/inch = (-) Tons

Where: L = Length (ft)

(t) = Actual thickness (inches)

W<sub>adj</sub> = (Designed width (ft) + tolerance /12) - Measured Width)

- b) Thickness: If the actual average thickness is less than the allowable tolerance, the Contractor shall submit a repair procedure to the Engineer for approval. If the actual thickness exceeds the allowable tolerance, an adjustment will be made using the following formula:

**Tons Adjusted for Thickness (T<sub>T</sub>)** = A x t<sub>adj</sub> x 0.0575 = (-) Tons

Where: A = Area = {[L x (Designed width + tolerance (lift thickness)/12)] / 9}

t<sub>adj</sub> = Adjusted thickness = [(Dt + tolerance) - Actual thickness]

Dt = Designed thickness (inches)

- c) Weight: If the quantity of bituminous concrete representing the mixture delivered to the project is in excess of the allowable gross vehicle weight (GVW) for each vehicle, an adjustment will be made using the following formula:

$$\text{Tons Adjusted for Weight (T}_w) = \text{GVW} - \text{DGW} = (-) \text{ Tons}$$

Where: DGW = Delivered gross weight as shown on the delivery ticket or measured on a certified scale.

- d) Mixture Adjustment: The quantity of bituminous concrete representing the production lot at the Plant will be adjusted as follow:

- i. Non-PWL Production Lot (less than 3500 tons):

The adjustment values in Table 4.06-6 and 4.06-7 shall be calculated for each sub lot based on the Air Void (AV) and Asphalt Binder Content (PB) test results for that sub lot. The total adjustment for each day's production (lot) will be computed using tables and the following formulas:

$$\text{Tons Adjusted for Superpave Design (T}_{SD}) = [(\text{AdjAV}_t + \text{AdjPB}_t) / 100] \times \text{Tons}$$

$$\text{Percent Adjustment for Air Voids} = \text{AdjAV}_t = [\text{AdjAV}_1 + \text{AdjAV}_2 + \text{AdjAV}_i + \dots + \text{AdjAV}_n] / n$$

Where: AdjAV<sub>t</sub> = Total percent air void adjustment value for the lot

AdjAV<sub>i</sub> = Adjustment value from Table 4.06-7 resulting from each sub lot or the average of the adjustment values resulting from multiple tests within a sub lot, as approved by the Engineer.

n = number of sub lots based on Table M.04.03-2

**TABLE 4.06-6: Adjustment Values for Air Voids**

Adjustment Value (AdjAV <sub>i</sub> ) (%)	S0.25, S0.375, S0.5, S1 Air Voids (AV)
+2.5	3.8 - 4.2
+3.125*(AV-3)	3.0 - 3.7
-3.125*(AV-5)	4.3 - 5.0
20*(AV-3)	2.3 - 2.9
-20*(AV-5)	5.1 - 5.7
-20.0	≤ 2.2 or ≥ 5.8

$$\text{Percent Adjustment for Asphalt Binder} = \text{AdjPB}_t = [(\text{AdjPB}_1 + \text{AdjPB}_2 + \text{AdjPB}_i + \dots + \text{AdjPB}_n) / n]$$

Where: AdjPB<sub>t</sub> = Total percent asphalt binder adjustment value for the lot

AdjPB<sub>i</sub> = Adjustment value from Table 4.06-7 resulting from each sub lot

n = number of binder tests in a production lot

**TABLE 4.06-7: Adjustment Values for Binder Content**

<b>Adjustment Value (AdjAV<sub>i</sub>) (%)</b>	<b><u>S0.25, S0.375, S0.5, S1</u> Pb</b>
0.0	JMF Pb ± 0.3
- 10.0	≤ JMF Pb - 0.4 or ≥ JMF Pb + 0.4

ii. PWL Production Lot (3500 tons or more):

For each lot, the adjustment values shall be calculated based on PWL for AV, VMA and PB test results. The lot will be considered as being normally distributed and all applicable equations in AASHTO R9 and AASHTO R42 Appendix X4 will apply.

Only one test result will be considered for each sub lot. The specification limits are listed in Section M.04.

For AV, PB and voids in mineral aggregate (VMA), the individual material quality characteristic adjustment (Adj) will be calculated as follow:

For PWL between 50 and 90%:  $Adj(AV_t \text{ or } PB_t \text{ or } VMA_t) = (55 + 0.5 \text{ PWL}) - 100$

For PWL at and above 90%:  $Adj(AV_t \text{ or } PB_t \text{ or } VMA_t) = (77.5 + 0.25 \text{ PWL}) - 100$

Where:

AdjAV<sub>t</sub> = Total percent AV adjustment value for the lot

AdjPB<sub>t</sub> = Total percent PB adjustment value for the lot

AdjVMA<sub>t</sub> = Total percent VMA adjustment value for the lot

Lots with PWL less than 50% in any of the three individual material quality characteristics will be evaluated under 1.06.04.

The total adjustment for each production lot will be computed using the following formula:

$$\text{Tons Adjusted for Superpave Design (T}_{SD}) = [(0.5AdjAV_t + 0.25AdjPB_t + 0.25AdjVMA_t) / 100] \times \text{Tons}$$

iii. Partial Lots:

Lots with less than 4 sublots will be combined with the prior lot. If there is no prior lot with equivalent material or if the last test result of the prior lot is over 30 calendar days old, the adjustment will be calculated as indicated in 4.06.04-2.d.i.

Lots with 4 or more sublots will be calculated as indicated in 4.06.04-2.d.ii.

- e) **Density Adjustment:** The quantity of bituminous concrete measured for payment in a lift of pavement specified to be 1½ inches or greater may be adjusted for density. Separate density adjustments will be made for each lot and will not be combined to establish one density adjustment. The final lot quantity shall be the difference between the total payable tons for the project and the sum of the previous lots. If either the Mat or Joint adjustment value is “remove and replace”, the density lot shall be removed and replaced (curb to curb).

No positive adjustment will be applied to a Density Lot in which any core was not taken within the required 5 calendar days of placement.

**Tons Adjusted for Density ( $T_D$ )** =  $[(P_{AM} \times .50) + (P_{AJ} \times .50)] / 100$  X Density Lot Tons

Where:  $T_D$  = Total tons adjusted for density for each lot

$P_{AM}$  = Mat density percent adjustment from Table 4.06-9

$P_{AJ}$  = Joint density percent adjustment from Table 4.06-10

**TABLE 4.06-9: Adjustment Values for Pavement Mat density**

Average Core Result Percent Mat Density	Percent Adjustment (Bridge and Non-Bridge) <sup>(1)(2)</sup>
97.1 - 100	-1.667*(ACRPD-98.5)
94.5 – 97.0	+2.5
93.5 – 94.4	+2.5*(ACRPD-93.5)
92.0 – 93.4	0
90.0 – 91.9	-5*(92-ACRPD)
88.0 – 89.9	-10*(91-ACRPD)
87.0 – 87.9	-30
86.9 or less	Remove and Replace (curb to curb)

**TABLE 4.06-10: Adjustment Values for Pavement Joint Density**

<b>Average Core Result Percent Joint Density</b>	<b>Percent Adjustment (Bridge and Non-Bridge) <sup>(1)(2)</sup></b>
97.1 – 100	-1.667*(ACRPD-98.5)
93.5 – 97.0	+2.5
92.0 – 93.4	+1.667*(ACRPD-92)
91.0 – 91.9	0
89.0 – 90.9	-7.5*(91-ACRPD)
88.0 – 88.9	-15*(90-ACRPD)
87.0 – 87.9	-30
86.9 or less	Remove and Replace (curb to curb)

<sup>(1)</sup> ACRPD = Average Core Result Percent Density

<sup>(2)</sup> All Percent Adjustments to be rounded to the second decimal place. For example, 1.667 is to be rounded to 1.67.

**3. Transitions for Roadway Surface:** The installation of permanent transitions shall be measured under the appropriate item used in the formation of the transition.

The quantity of material used for the installation of temporary transitions shall be measured for payment under the appropriate item used in the formation of the transition. The installation and removal of a bond breaker, and the removal and disposal of any temporary transition formed by milling or with bituminous concrete pavement is not measured for payment.

**4. Cut Bituminous Concrete Pavement:** The quantity of bituminous concrete pavement cut will be measured in accordance with Article 2.02.04.

**5. Material for Tack Coat:** The quantity of tack coat will be measured for payment by the number of gallons furnished and applied on the Project and approved by the Engineer. No tack coat material shall be included that is placed in excess of the tolerance described in Article 4.06.03.

- a. Container Method- Material furnished in a container will be measured to the nearest ½ gallon. The volume will be determined by either measuring the volume in the original container by a method approved by the Engineer or using a separate graduated container capable of measuring the volume to the nearest ½ gallon. The container in which the material is furnished must include the description of material, including lot number or batch number and manufacturer or product source.

b. Vehicle Method-

i. Measured by Weight: The number of gallons furnished will be determined by weighing the material on calibrated scales furnished by the Contractor. To convert weight to gallons, one of the following formulas will be used:

$$\text{Tack Coat (gallons at } 60^{\circ}\text{F)} = \frac{\text{Measured Weight (pounds)}}{\text{Weight per gallon at } 60^{\circ}\text{F}}$$

$$\text{Tack Coat (gallons at } 60^{\circ}\text{F)} = \frac{0.996 \times \text{Measured Weight (pounds)}}{\text{Weight per gallon at } 77^{\circ}\text{F}}$$

ii. Measured by automated metering system on the delivery vehicle:

Tack Coat (gallons at 60°F) = Factor (from Table 4.06-11) multiplied by the measured gallons.

**TABLE 4.06-11: Factor to Convert Volume of Tack Coat to 60°F**

<b>Tack Coat Application Temperature (°F)</b>	<b>Factor</b>	<b>Tack Coat Application Temperature (°F)</b>	<b>Factor</b>
75	0.996	120	0.985
80	0.995	125	0.984
85	0.994	130	0.983
90	0.993	135	0.982
95	0.991	140	0.980
100	0.990	145	0.979
105	0.989	150	0.978
110	0.988	155	0.977
115	0.986	160	0.976

**6. Material Transfer Vehicle (MTV):** The furnishing and use of a MTV will be measured separately for payment based on the actual number of surface course tons delivered to a paver using the MTV.

**4.06.05—Basis of Payment:**

**1. HMA S\* or PMA S\*:** The furnishing and placing of bituminous concrete will be paid for at the Contract unit price per ton for “HMA S\*” or “PMA S\*”.

- All costs associated with providing illumination of the work area are included in the general cost of the work.
- All costs associated with cleaning the surface to be paved, including mechanical sweeping, are included in the general cost of the work. All costs associated with constructing longitudinal joints are included in the general cost of the work.

- All costs associated with obtaining cores for acceptance testing and dispute resolution are included in the general cost of the work.

**2. Bituminous Concrete Adjustment Costs:** The adjustment will be calculated using the formulas shown below if all of the measured adjustments in Article 4.06.04 are not equal to zero. A positive or negative adjustment will be applied to monies due the Contractor.

**Production Lot:**  $[T_T + T_A + T_W + T_{SD}] \times \text{Unit Price} = \text{Est. (P)}$

**Density Lot:**  $T_D \times \text{Unit Price} = \text{Est. (D)}$

Where: Unit Price = Contract unit price per ton per type of mixture

$T_*$  = Total tons of each adjustment calculated in Article 4.06.04

Est. ( ) = Pay Unit represented in dollars representing incentive or disincentive.

The Bituminous Concrete Adjustment Cost item if included in the bid proposal or estimate is not to be altered by the Contractor.

**3. Transitions for Roadway Surface:** The installation of permanent transitions shall be paid under the appropriate item used in the formation of the transition. The quantity of material used for the installation of temporary transitions shall be paid under the appropriate pay item used in the formation of the transition. The installation and removal of a bond breaker, and the removal and disposal of any temporary transition formed by milling or with bituminous concrete pavement is included in the general cost of the work.

**4.** The cutting of bituminous concrete pavement will be paid in accordance with Article 2.02.05.

**5.** Material for tack coat will be paid for at the Contract unit price per gallon at 60°F for "Material for Tack Coat".

**6.** The Material Transfer Vehicle (MTV) will be paid at the Contract unit price per ton for a "Material Transfer Vehicle".

<u>Pay Item*</u>	<u>Pay Unit*</u>
HMA S*	ton
PMA S*	ton
Bituminous Concrete Adjustment Cost	est.
Material for Tack Coat	gal.
Material Transfer Vehicle	ton

\*For contracts administered by the State of Connecticut, Department of Administrative Services, the pay items and pay units are as shown in contract award price schedule.



## **SECTION 5.86 – CATCH BASINS, MANHOLES AND DROP INLETS**

### **5.86.01—Description**

### **5.86.02—Materials**

### **5.86.03—Construction Methods**

### **5.86.04—Method of Measurement**

### **5.86.05—Basis of Payment**

**5.86.01—Description:** The work under this Section shall consist of furnishing, preparing, and installing catch basins, manholes and drop inlets (and also the removal, abandonment, alteration, reconstruction, or conversion of such existing structures) in conformity with the lines, grades, dimensions and details shown on the plans.

This Section shall also include resetting or replacing catch basin tops as well as manhole frames and covers.

**5.86.02—Materials:** The materials for this work shall meet the following requirements:

Drainage structures shall meet the requirements of M.08.02 and shall utilize concrete with a 28-day minimum compressive strength of 4000 psi.

Galvanizing shall meet the requirements of M.06.03.

Mortar shall meet the requirements of M.11.04.

Butyl rubber joint seal shall meet the requirements of ASTM C990.

Granular fill, if necessary, shall meet the requirements of M.02.01.

Protective compound material shall be a type appearing on the Department's Qualified Products List and be acceptable to the Engineer, as specified in M.03.09.

**5.86.03—Construction Methods:** Drainage trench excavation, including rock in drainage trench excavation and backfilling, shall be performed in accordance with 2.86.03 and the requirements of the plans.

Where a drainage structure is to be installed below the surface, a drainage trench shall be excavated to the required depth, the bottom of which shall be graded to the elevation of the bottom of the proposed drainage structure or to ensure a uniform foundation for the structure.

Where a firm foundation is not encountered at the grades established due to unsuitable material, such as soft, spongy, or unstable soil, the unsuitable material shall be removed and replaced with approved granular fill, thoroughly compacted in lifts not to exceed 6 inches. The Engineer shall be notified prior to removal of the unsuitable material in order to determine the depth of removal necessary.

When rock, as defined in 2.86.01-2, is encountered, work shall be performed in accordance with 2.86.03 and the requirements of the plans.

When a drainage structure outside of proposed drainage trench limits is to be removed, it shall be completely removed and all pipes shall be removed or plugged with cement masonry.

When a drainage structure is to be abandoned, the structure shall be removed to a depth 2 feet below the subgrade or as directed by the Engineer. The floor of the structure shall be broken and all pipes shall be plugged with cement masonry.

GENERAL

Drainage structures shall be constructed in accordance with the plans and the requirements contained herein for the character of the work involved. The provisions of 6.02.03 pertaining to bar reinforcement shall apply except that shop drawings need not be submitted for approval unless called for in the plans, Contract or directed by the Engineer. Welding shall be performed in accordance with the applicable sections of the AWS Structural Welding Code, D1.1.

When it becomes necessary to increase the horizontal dimensions of manholes, catch basins and drop inlets to sizes greater than those shown on the plans in order to provide for multiple pipe installations, large pipes or for other reasons, the Contractor shall construct such manholes, catch basins and drop inlets to modified dimensions as directed by the Engineer.

The surfaces of the tops of all catch basins, and drop inlets shall be given a coat of protective compound material, at the manufacturer's recommended application rate, immediately upon completion of the concrete curing period.

All masonry units shall be laid in full mortar beds.

Metal fittings for catch basins, manholes or drop inlets shall be set in full mortar beds or otherwise secured as shown on the plans.

All inlet and outlet pipes shall be set flush with the inside face of the wall of the drainage structure as shown on the plans. The pipes shall extend through the walls for a sufficient distance beyond the outside surface to allow for satisfactory connections, and the concrete or masonry shall be constructed around them neatly to prevent leakage along their outer surfaces.

When constructing a new drainage structure within a run of existing pipe, the section of existing pipe disturbed by the construction shall be replaced with new pipe of identical type and size extending from the drainage structure to the nearest joint of the existing pipe in accordance with 6.86.03 or as directed by the Engineer.

Backfilling shall be performed in accordance with 2.86.03.

Frames, covers and tops which are to be reset shall be removed from their present beds, the walls or sides shall be rebuilt to conform to the requirements of the new construction and the frames, covers and tops shall be reset as shown on the plans or as directed by the Engineer.

#### **5.86.04—Method of Measurement:**

**Drainage Trench Excavation:** In accordance with 2.86.04, excavation for drainage trench will not be measured for payment but shall be included in the Contract unit price for the type of structure being installed.

**Rock in Drainage Trench Excavation:** Rock in Drainage Trench Excavation will be measured in accordance with the drainage trench excavation limits described in 2.86.03.

**Manholes, Catch Basins and Drop Inlets** will be measured as separate units.

**Resetting of Manholes, Catch Basins and Drop Inlets** will be measured as separate units.

**Replacement of frames, covers, and tops** will be measured as a unit for catch basin top or manhole frame and cover.

**Conversion of drainage structures** as specified on the plans, or as directed by the Engineer, including structure reconstruction will be measured for payment as a unit.

**Removal or abandonment of drainage structures** outside of drainage trench excavation limits, as defined in 2.86.03, will be measured as separate units.

There will be no measurement or direct payment for the application of the protective compound material, the cost of this work shall be considered as included in the general cost of the work.

Measurement for payment for work and materials involved with installing pipes to connect new drainage structures into a run of existing pipe will be as provided for under the applicable Contract items in accordance with 6.86.04.

There will be no measurement or direct payment for plugging existing pipes with cement masonry, the cost of this work will be considered as included in the general cost of the work.

**5.86.05—Basis of Payment:**

**Drainage Trench Excavation** for the installation of proposed structures described herein will be paid for under the respective drainage Contract item(s) for which the excavation is being performed, in accordance with the provisions of 2.86.05.

**Rock in Drainage Trench Excavation** will be paid for in accordance with the provisions of 2.86.05.

**Manholes and Catch Basins** will be paid for at the Contract unit price for each "Manhole," or "Catch Basin," of the type specified, at "0' to 10' Deep" or "0' to 20' Deep," complete in place, which price shall include all excavation, backfill, materials, equipment, tools and labor incidental thereto.

**Drop Inlets** will be paid for at the Contract unit price for each "Drop Inlet," of the type specified, complete in place, which price shall include all excavation, backfill, materials, equipment, tools and labor incidental thereto.

**Manholes, Catch Basins and Drop Inlets** constructed to modified dimensions as directed by the Engineer, will be paid for as follows:

Where the interior floor area has to be increased to accommodate existing field conditions, as measured horizontally at the top of the base of the completed structure, and does not exceed 125% of the interior floor area as shown on the plans for that structure, then the structure shall be paid for at the Contract unit price for each "Manhole," "Catch Basin," or "Drop Inlet" of the type specified. Where the floor area is greater than 125%, the increase in the unit price for the individual structure shall be in direct proportion to the increase of the completed structure interior floor area as compared to the interior floor area as shown on the plans for that structure. Such increased unit price shall include all excavation, materials, equipment, tools, and labor incidental to the completion of the structure.

**Reset Units** will be paid for at the Contract unit price each for "Reset Manhole," "Reset Catch Basin," or "Reset Drop Inlet," of the type specified, respectively, complete in place, which price shall include excavation, cutting of pavement, removal and replacement of pavement structure, and all materials, equipment, tools and labor incidental thereto, except when the work requires reconstruction greater than 3 feet, measured vertically, then the entire cost of resetting the unit will be paid for as Extra Work in accordance with the provisions of 1.04.05.

**Frames, Covers, and Tops** when required in connection with reset units, will be paid for at the Contract unit price each for such "Manhole Frame and Cover" or "(Type) Catch Basin Top," complete in place, including all incidental expense; or when no price exists, the furnishing and placing of such material will be paid for as Extra Work in accordance with the provisions of 1.04.05.

When the catch basin top has a stone or granite curb in its design, the curb or inlet shall be included in the cost of the "(Type) Catch Basin Top."

**Conversion of drainage structures** will be paid for at the Contract unit price each for "Convert Catch Basin to (Type) Catch Basin," "Convert Catch Basin to (Type) Manhole," or

"Convert Manhole to (Type) Catch Basin," complete in place, which price shall include excavation, cutting of pavement, removal and replacement of pavement, backfill, all alterations to existing structure, all materials including catch basin frame and grate of the type specified, or manhole frame and cover, all equipment, tools and labor incidental thereto.

The maximum change in elevation of frame under these items shall not exceed 3 feet. Greater depth changes, if required, shall be paid for as Extra Work, in accordance with 1.04.05.

**Removal or abandonment of drainage structures** outside of drainage trench excavation limits as defined in 2.86.03 will be paid for at the Contract unit price each for "Remove Drainage Structure – 0' to 10' Deep," "Remove Drainage Structure – 0' to 20' Deep," or "Abandon Drainage Structure," which price shall include excavation, cutting of pavement, removal and replacement of pavement, backfill, and all equipment, tools and labor incidental thereto.

Pay Item	Pay Unit
(Type) Catch Basin – 0' to 10' Deep	ea.
(Type) Catch Basin – 0' to 20' Deep	ea.
Manhole (Size) – 0' to 10' Deep	ea.
Manhole (Size) – 0' to 20' Deep	ea.
(Type) Drop Inlet	ea.
Reset Catch Basin	ea.
Reset Manhole	ea.
Reset Drop Inlet	ea.
Convert Catch Basin to (Type) Catch Basin	ea.
Convert Catch Basin to (Type) Manhole	ea.
Convert Manhole to (Type) Catch Basin	ea.
Manhole Frame and Cover	ea.
(Type) Catch Basin Top	ea.
Remove Drainage Structure – 0' to 10' Deep	ea.
Remove Drainage Structure – 0' to 20' Deep	ea.
Abandon Drainage Structure	ea.

## **SECTION 6.86 – DRAINAGE PIPES, DRAINAGE PIPE ENDS**

### **6.86.01—Description**

### **6.86.02—Materials**

### **6.86.03—Construction Methods**

### **6.86.04—Method of Measurement**

### **6.86.05—Basis of Payment**

**6.86.01—Description:** This work shall consist of furnishing, preparing and installing drainage pipes of the size and type specified, bedding material, joint sealant, rubber gaskets, clamps, collars, grout, grout collars, drainage trench excavation, backfilling or satisfactory disposal of all materials, the removal of which is necessary for the proper completion of the work, connecting proposed drainage systems to existing systems, plugging or abandoning existing pipes and removal of existing pipe within trench limits, as shown on the plans or as directed by the Engineer.

This Section shall also include removal of drainage pipes outside of drainage trench excavation limits, as defined in 2.86.03-1.

**6.86.02—Materials:** The materials for this work shall meet the following requirements: Drainage Pipe, Drainage Pipe Ends, Sealers, Gaskets and connection hardware shall meet the requirements of M.08.01.

Bedding Material shall meet the requirements of M.08.03-1.

Granular Fill, if necessary, shall meet the requirements of M.02.01.

Brick Masonry shall meet the requirements of M.11.03 and Mortar shall meet the requirements of M.11.04.

Concrete used for Concrete Pipe Connections shall be Class “F” Concrete meeting the requirements of M.03.

### **6.86.03—Construction Methods:**

- (1) **Drainage Trench Excavation:** Drainage trench excavation and backfilling shall be performed in accordance with 2.86.03 and the requirements of the plans.

Where drainage pipe is to be laid below the surface, a drainage trench shall be excavated to the required depth, the bottom of which shall be graded to the elevation of the bottom of the bedding material.

Where drainage pipe is to be laid in a fill area, the embankment shall be placed and compacted to a minimum elevation 12 inches above the top of the proposed pipe, whereupon the drainage trench excavation shall be performed and the pipe installed.

- (2) **Rock in Drainage Trench Excavation:** When rock, as defined in 2.86.01-2, is encountered, work shall be performed in accordance with 2.86.03 and the requirements of the plans.
- (3) **Drainage Pipe Installation:** New or re-laid drainage pipes shall be installed on 4 inches of bedding material (12 inches if over rock in ledge formation), the details as shown on the plans, or as directed by the Engineer. Prior to placement of the drainage pipe, in accordance with the plans, bedding material shall be pre-shaped to 10% of the total height

of the pipe in order to keep the pipe in the center of the trench. Following placement of the drainage pipe, bedding material backfill shall be placed in accordance with the following table:

<b>Internal Pipe Diameter</b>	<b>Required Bedding Material Backfill</b>
< 48 inches *	25% of total height of the pipe
≥ 48 inches *	12 inches above the top of the pipe
*Includes pipe arch of equivalent internal horizontal span See Standard Drawing	

The placement of the drainage pipe shall start at the downstream end and progress upstream or as shown on the plans, or as directed by the Engineer. All drainage pipes shall be carefully laid in the center of the drainage trench, true to the lines and grades given. Bell ends shall face upgrade and all joints shall be tight.

Joints in concrete pipe shall be sealed with cold-applied bituminous sealer, preformed plastic gaskets or flexible, watertight, rubber-type gaskets. Portland cement mortar shall not be used for sealing pipe joints except with permission of the Engineer.

When cold-applied bituminous sealer is used, the bell and spigot ends shall be wiped clean and dry before applying the bituminous sealer to the pipe ends. Before the drainage pipes are placed in contact with each other, the spigot or tongue end shall be completely covered with bituminous sealer; then the pipe shall be laid to line and grade so the inside surface of all abutting pipes are flush. Additional bituminous sealer shall be applied to the joint after the connection has been made to ensure a water tight connection.

Where the end of an existing drainage pipe is not compatible with the end of a proposed concrete pipe, the Contractor shall align the inner diameters of the pipes being connected, butt the pipe ends together, and construct a cast-in-place concrete pipe connection, as shown in the plans. Incompatible bell/spigot or tongue/groove ends shall be cut off as required to ensure the interior drainage pipe walls are aligned to provide a smooth transition between the pipes.

Metal pipe and pipe arches shall be carefully joined and firmly clamped together by approved connecting bands, which shall be properly bolted in place before any backfill is placed.

Newly installed drainage pipe which is not in true alignment, or which shows any settlement or distortion, shall be reinstalled in accordance with 1.05.03.

When drainage pipe outside of proposed drainage trench limits is to be removed, it shall be removed to the limits shown on the plans and all remaining pipes shall be plugged with cement masonry.

Where shown on the plans or directed by the Engineer, the Contractor shall plug abandoned existing pipes with cement masonry.

- (4) **Drainage Pipe End Installation:** Reinforced concrete drainage pipe ends shall be placed on a prepared bed of the existing ground and accurately aligned as shown on the plans. The joints shall be sealed as specified in 6.86.03-3 and backfill shall be placed around both sides of the unit simultaneously to the elevation shown on the plans.

Metal drainage pipe ends shall be placed on a prepared bed of the existing ground and accurately aligned as shown on the plans. After the attachment of the drainage pipe end, backfill shall be placed around both sides of the unit up to the elevation shown on the plans, exercising caution to avoid displacement or deformation of the unit.

**6.86.04—Method of Measurement:** This work will be measured as follows:

**Drainage Trench Excavation**, in accordance with 2.86.04, will not be measured for payment.

**Rock in Drainage Trench Excavation** will be measured in accordance with 2.86.04.

**Bedding Material** will not be measured for payment.

**New and Re-laid Pipes and Pipe Arches** will be measured for payment by the actual number of linear feet of pipe or pipe arch of the various sizes and types, completed and accepted and measured in place along the invert. Coupling bands and fittings for pipes and pipe arches will not be measured for payment.

**Reinforced Concrete Drainage Pipe Ends and Metal Drainage Pipe Ends** will be measured for payment as separate units.

**Corrugated Metal Pipe Elbows** (of the Size and Type specified) will be measured for payment by the actual number of linear feet of pipe elbows completed and accepted, based on 6 linear feet per elbow, as shown on the plans. Coupling bands for elbows will not be measured for payment.

**Concrete Pipe Connection** will be measured for payment by the number of each concrete pipe connection constructed at locations where proposed concrete pipes tie into an existing pipe with an incompatible end, completed and accepted by the Engineer.

**Removal of drainage pipe** outside of drainage trench excavation limits, as defined in 2.86.03, will be measured for payment by the actual number of linear feet of drainage pipe removed.

There will be no measurement for plugging existing pipes with cement masonry.

**6.86.05—Basis of Payment:**

**Drainage Trench Excavation** for the installation of drainage pipes will not be paid separately but shall be included in the Contract unit price for the respective drainage pipe or pipe end item(s), in accordance with the provisions of 2.86.05.

**Rock in Drainage Trench Excavation** will be paid for in accordance with the provisions of 2.86.05.

**Bedding Material** necessary for the installation of drainage items described herein will be included in the Contract unit price for the respective drainage pipe or pipe end item(s). Bedding material required to fill voids when rock in drainage trench is encountered will not be measured for payment but shall be included in the Contract unit price for "Rock in Drainage Trench Excavation," in accordance with 2.86.05.

**New Pipes and Pipe Arches** will be paid for at the Contract unit price per linear foot for "(Size and Type) Pipe (Thickness) – 0' to 10' Deep," "(Size and Type) Pipe (Thickness) – 0' to 20' Deep," "(Size) Pipe Arch (Thickness) – 0' to 10' Deep" or "(Size) Pipe Arch (Thickness) – 0' to 20' Deep" complete in place, including materials, drainage trench excavation, bedding material, equipment, tools, and labor incidental thereto.

**Relaid Pipes and Pipe Arches** will be paid for at the Contract unit price per linear foot for "Relaid Pipe (Size and Type) – 0' to 10' Deep," "Re-laid Pipe (Size and Type) – 0' to 20' Deep," "Relaid Pipe Arch (Size and Type) – 0' to 10' Deep," or "Relaid Pipe Arch (Size and Type) – 0' to 20' Deep," complete in place, including all materials, drainage trench excavation, bedding material, equipment, tools, and labor incidental thereto.

**Reinforced Concrete Drainage Pipe Ends and Metal Drainage Pipe Ends** will be paid for at the Contract unit price for each drainage pipe end of the Size and Type specified, complete in place, including all excavation, materials, attachment systems, equipment, tools and labor incidental thereto.

**Corrugated Metal Pipe Elbows** will be paid for at the Contract unit price per linear foot for "(Size and Type) Corrugated Metal Pipe Elbow" including all materials, drainage trench excavation, bedding material, equipment, tools, and labor incidental thereto.

**Concrete Pipe Connection** will be paid for at the Contract unit price each for "Concrete Pipe Connection" complete in place, including all materials, equipment, tools and labor incidental thereto.

**Removal of drainage pipes** of all types and sizes, outside of drainage trench excavation limits, as defined in 2.86.03-1, will be paid for at the Contract unit price per linear foot for "Remove Existing Pipe – 0' to 10' Deep," or "Remove Existing Pipe – 0' to 20' Deep," which price shall include excavation, temporary trench protection, backfill, and all equipment, tools and labor incidental thereto.

There will be no direct payment for the plugging of existing drainage pipes, but the cost thereof shall be included in the respective drainage Contract item(s).

Pay Item	Pay Unit
(Size and Type) Pipe (Thickness) – 0' to 10' Deep	l.f.
(Size and Type) Pipe (Thickness) – 0' to 20' Deep	l.f.
(Size and Type) Pipe Arch (Thickness) – 0' to 10' Deep	l.f.
(Size and Type) Pipe Arch (Thickness) – 0' to 20' Deep	l.f.
Relaid (Size and Type) Pipe– 0' to 10' Deep	l.f.
Relaid (Size and Type) Pipe– 0' to 20' Deep	l.f.
(Size and Type) Relaid Pipe Arch – 0' to 10' Deep	l.f.
(Size and Type) Relaid Pipe Arch – 0' to 20' Deep	l.f.
(Size) Reinforced Concrete Drainage Pipe End	ea.
(Size) Metal Drainage Pipe End	ea.
(Size and Type) Corrugated Metal Pipe Elbow	l.f.
Concrete Pipe Connection	ea.
Remove Existing Pipe – 0' to 10' Deep	l.f.
Remove Existing Pipe – 0' to 20' Deep	l.f.



## **SECTION 10.00 – GENERAL CLAUSES FOR HIGHWAY ILLUMINATION AND TRAFFIC SIGNAL PROJECTS**

### **Article 10.00.03 – Plans:**

In the first paragraph, replace the 2<sup>nd</sup>, 3<sup>rd</sup>, and 4<sup>th</sup> sentences with the following:

The Contractor shall digitally mark, in red, any changes on the plan(s) using a pdf program.

The Contractor shall submit the digital pdf file(s) to the Engineer and to [DOT.TrafficElectrical@ct.gov](mailto:DOT.TrafficElectrical@ct.gov), for Traffic Signals, prior to requesting the Functional Inspection.

Also prior to requesting the Functional Inspection, the Contractor shall deliver to the Engineer the following:

In the first paragraph, last sentence, in item no. 1, replace “Four (4)” with “Digital PDF Files and Five (5)” [paper prints of schematics and wiring diagrams...].

**Article 10.00.10 Section 3.** Functional Inspection, first paragraph after the 2<sup>nd</sup> sentence: Add the following:

The Contractor shall have a bucket truck with crew on site during the Functional Inspection to make any necessary aerial signal adjustments as directed by the Engineer.

**Article 10.00.12** - Negotiations with utility company: Add the following:

The Contractor shall give notice to utility companies a minimum of 30 days prior to required work or services to the utility company. Refer to Section 1.07 – Legal Relations and Responsibilities for the list of utility companies and representatives the contractor shall use.

The Contractor shall perform all work in conformance with Rules and Regulations of Public Utility Regulatory Authority (PURA) concerning Traffic Signals attached to Public Service Company Poles. The Contractor is cautioned that there may be energized wires in the vicinity of the specified installations. In addition to ensuring compliance with NESC and OSHA regulations, the Contractor and/or its Sub-Contractors shall coordinate with the appropriate utility company for securing/protecting the site during the installation of traffic signal mast arms, span poles or illumination poles.

When a span is attached to a utility pole, the Contractor shall ensure the anchor is in line with the proposed traffic signal span wire. More than 5 degree deviation will lower the holding strength and is not allowed. The Contractor shall provide any necessary assistance required by the utility company, and ensure the anchor and guy have been installed and properly tensioned prior to attaching the span wire to the utility pole.

## **SECTION 12.00 – GENERAL CLAUSES FOR HIGHWAY SIGNING**

### **Description:**

Work under this item shall conform to the requirements of Section 12.00 supplemented as follows:

### **12.00.07 – Global Positioning System (GPS) coordinates for signs:**

The Contractor shall obtain and provide to the Engineer sign installation data, including Global Positioning System (GPS) latitude and longitude coordinates, for all new permanent State owned and maintained signs (temporary and construction signs are not to be included) installed in the project. The Engineer shall forward the sign data to the Division of Traffic Engineering for upload into the Highway Sign Inventory and Maintenance Management Program (SIMS). Sign data submissions or questions relating to SIMS or GPS shall be sent to [DOT-SignInventory@ct.gov](mailto:DOT-SignInventory@ct.gov).

The horizontal datum is to be set to the State Plane Coordinate System, North American Datum of 1983 (NAD83) in feet. The minimum tolerance must be within 10 feet. The format of the GPS information shall be provided in a Microsoft Office compatible spreadsheet (Excel) file with data for each sign. The record for each sign installed is to be compatible with the anticipated CTDOT Sign Inventory and Management System (CTSIMS). The following format shall be used. However, the data fields noted by “#” are not required for the project submission. These entries will be completed as part of the Traffic Engineering CTSIMS data upload.

The cost of this work shall be included in the cost of the respective sign face – sheet aluminum and sign face – extruded aluminum items. The receipt of this electronic database must be received and accepted by the Engineer prior to final payment for items involving permanent highway signing. The electronic database information shall detail information regarding the sign actually installed by the project.

Field Number	Type	size	Description
1	text	20	Record Number (starting at 1...)
2	text	20	Sign Catalog Number
# 3	text	10	Size Height
# 4	text	10	Size Width
5	text	25	Legend
# 6	text	10	Background Color
# 7	text	10	Copy Color
8	Link	25	Material (see acceptable categories)
9	text	30	Comments if any
# 10	text	20	MUTCD Type
11	text	15	Town

GENERAL

	12	text	5	Route
	13	text	5	Route direction
#	14	text	10	Highway Log Mileage
	15	text	15	Latitude
	16	text	15	Longitude
	17	text	25	Mounting Type
	18	text	25	Reflective Sheeting Type
	19	date	25	Date Installed
	20	text	10	Number of Posts
	21	text	255	Sheeting Manufacturer name and address
	22	text	15	State Project Number (or)
	23	text	15	Encroachment Permit number.
	24	Graphic	*	Sign Picture Graphic.

\* Graphics provided shall be representative of the sign supplied and be in color. Graphic formats shall be either JPG or TIFF and provided with a recommended pixel density of 800 x 600. The graphic shall be inserted in the supplied media in field 24 for each sign.

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SECTION 18.03 – IMPACT ATTENUATION SYSTEM,.....2  
TEMPORARY IMPACT ATTENUATION SYSTEM.....2

**SECTION 18.03 – IMPACT ATTENUATION SYSTEM,**  
**TEMPORARY IMPACT ATTENUATION SYSTEM**

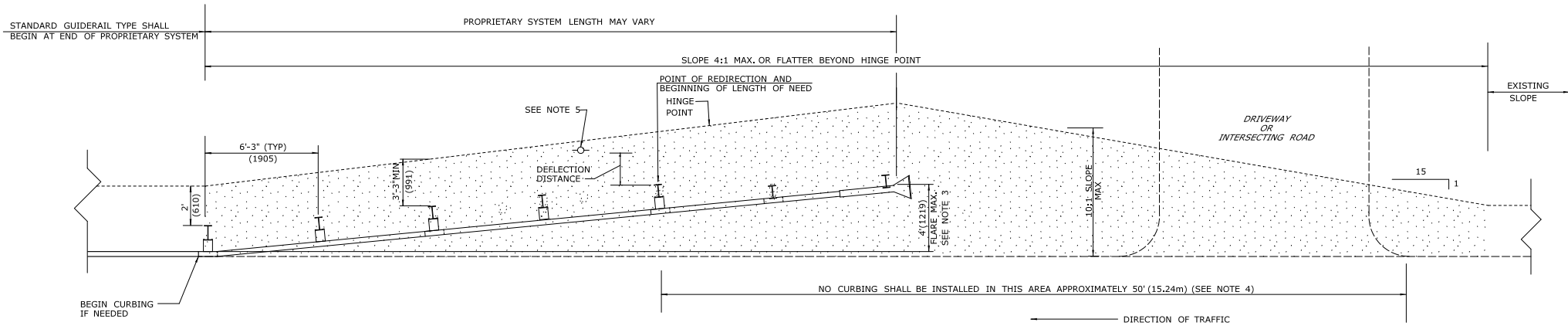
**Article 18.03.03 – Construction Methods:**

*Add the following:*

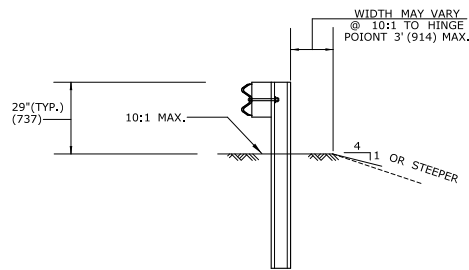
“The impact attenuation system shall be constructed in accordance with the attached drawings and based on the system type being installed.”

**GENERAL NOTES:**

1. THIS GRADING PLAN APPLIES TO THE LATEST VERSION OF DEPARTMENT APPROVED PROPRIETARY IMPACT ATTENUATION SYSTEM FLARED TYPES CHOSEN FROM THE DEPARTMENT'S QUALIFIED PRODUCTS LIST.
2. A MINIMUM AREA OF 75' (22.9m) LONG BY THE DESIGNATED CLEAR ZONE WIDTH IMMEDIATELY BEHIND AND BEYOND THE TERMINAL SHOULD BE FREE OF FIXED OBJECTS.
3. SEE CONSTRUCTION PLANS FOR APPROPRIATE OFFSET FOR NOSE OF SYSTEM. THE FLARE IS BASED ON THE OFFSET DESIGNATED ON THE PLANS.
4. WHEN A DRIVEWAY OR INTERSECTING ROAD IS WITHIN 5' OF THE SYSTEM, AND CURB EXISTS REMOVE CURBING UP TO POST 3. REDIRECTION BEGINS AT POST 3.
5. IF A UTILITY POLE OR FIXED OBJECT EXISTS NEAR END OF SYSTEM, THE SYSTEM SHALL BE INSTALLED SUCH THAT THE POINT OF REDIRECTION OCCURS PRIOR TO UTILITY POLE OR OBJECT. IN ADDITION, THE DEFLECTION DISTANCE NOTED IS 4'-3" FOR STANDARD W-BEAM STRONG POST GUIDERAIL INSTALLED @ A 6'-3" POST SPACING AND SHALL BE MAINTAINED. A CLEAR RUN-OUT LENGTH BEHIND THE SYSTEM FREE OF FIXED OBJECTS IS ESSENTIAL TO PROPER FUNCTIONING OF A PROPRIETARY GATING IMPACT ATTENUATION SYSTEM AND SHOULD BE STRIVED FOR.



**PLAN VIEW  
FLARE**

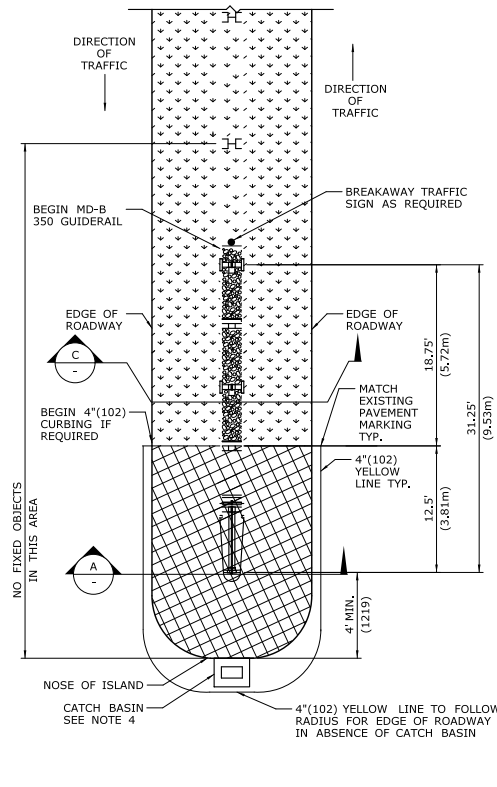
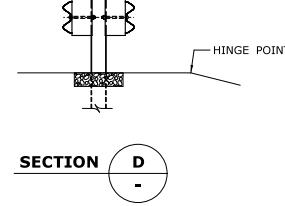
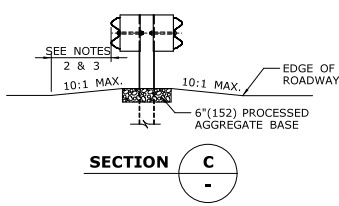
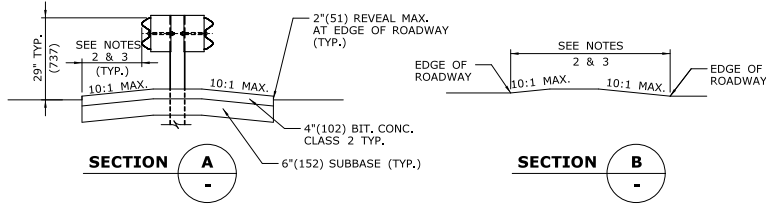


**TYPICAL SECTION**

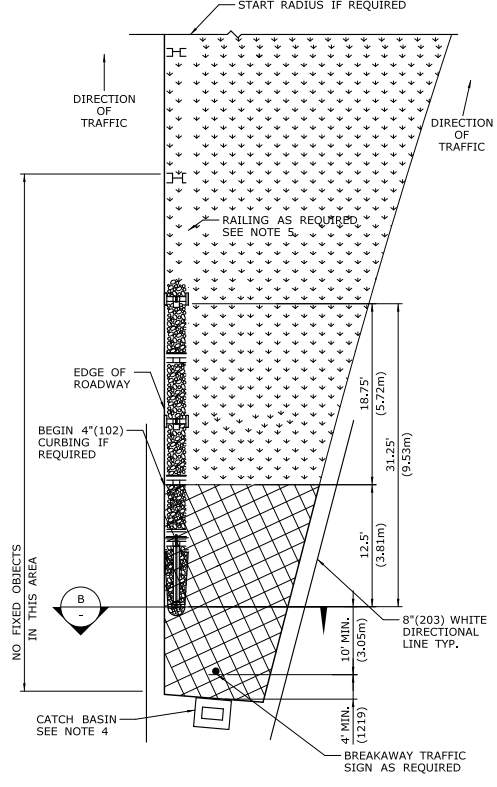
**GRADING PLAN FOR IMPACT ATTENUATION SYSTEM (FLARED)**

**GENERAL NOTES:**

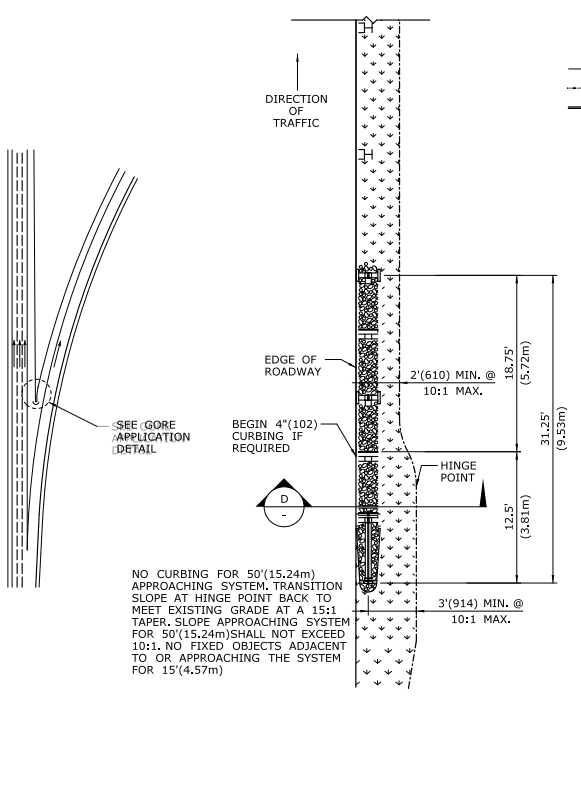
1. THIS GRADING PLAN APPLIES TO THE LATEST VERSION OF DEPARTMENT APPROVED PROPRIETARY IMPACT ATTENUATION SYSTEM MEDIAN/GORE TYPES CHOSEN FROM THE DEPARTMENT'S QUALIFIED PRODUCTS LIST.
2. WHEN THE DISTANCE FROM THE EDGE OF ROADWAY IS BETWEEN 0 AND 11.5'(3.51m) ON ONE OR BOTH SIDES OF THE SYSTEM, THE SLOPE SHALL NOT BE GREATER THAN 10:1 FOR THE ENTIRE LENGTH INCLUDING GORE OR NOSE OF ISLAND IN THE FRONT OF THE SYSTEM. IF THE SYSTEM IS A BRAKE MASTER, THE DISTANCE FROM THE EDGE OF TRAVEL WAY TO THE CENTER LINE OF THE SYSTEM ON BOTH SIDES MUST BE A MINIMUM OF 10'(3.05m).
3. WHEN THE DISTANCE FROM THE EDGE OF THE ROADWAY IS GREATER THAN 11.5'(3.51m) ON ONE OR BOTH SIDES OF THE SYSTEM, THE SLOPE SHALL NOT BE GREATER THAN 6:1 FOR THE ENTIRE LENGTH.
4. CATCH BASIN AT THIS LOCATION IF NEEDED, MUST HAVE A TYPE "C-L" TOP.
5. RAIL ON LEFT SIDE OF RAMP MAY NOT ALWAYS BE REQUIRED. IF NEEDED ON THE RAMP, IT SHOULD BE A 50'(15.24m) RADIUS OR GREATER.
6. WORK WILL BE MEASURED AND PAID FOR AT CONTRACT UNIT PRICES FOR THE VARIOUS ITEMS INVOLVED.
7. DELINEATE THE NOSE OF THE TERMINAL WITH A TYPE III RETROREFLECTIVE SHEETING IN CONFORMANCE WITH SECTION M18.09 OR AS PROVIDED BY THE MANUFACTURER.



**MEDIAN ISLAND APPLICATION**



**GORE APPLICATION**



**SHOULDER APPLICATION**

**LEGEND**

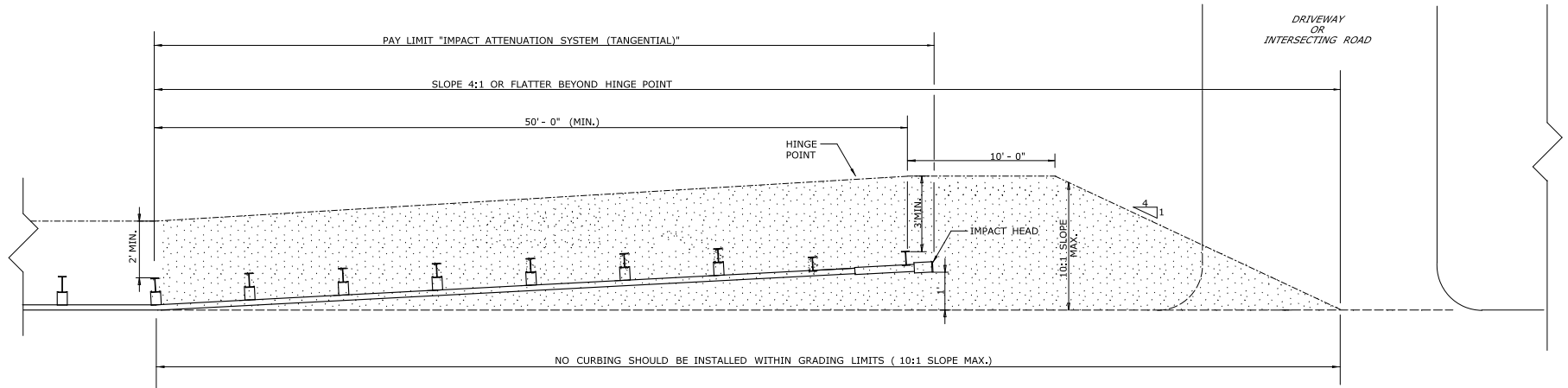
	NO CURBING
	2"(51) REVEAL MAX.
	4"(102) CURBING MAX.
	TURF ESTABLISHMENT
	PROCESSED AGGREGATE WELL COMPACTED
	PAVEMENT

**GRADING PLAN FOR IMPACT ATTENUATION SYSTEM (MEDIAN/GORE)**

ALL METRIC DIMENSIONS ARE IN MILLIMETERS (mm) UNLESS OTHERWISE NOTED.

**GENERAL NOTE:**

1. SEE TR-1205-01 FOR ATTENUATOR REFLECTOR SIGN #50-5032 TO BE INSTALLED ON THE NOSE OF THE IMPACT HEAD, THE HEIGHT AND WIDTH OF THE SHEET VARIES DEPENDING ON THE SIZE OF THE NOSE OF THE IMPACT HEAD. REFLECTOR SIGN SHALL COVER THE ENTIRE SURFACE AREA OF THE IMPACT HEAD.



**Plan**

**IMPACT ATTENUATION SYSTEM (TANGENTIAL)**



## **SECTION M.04 BITUMINOUS CONCRETE MATERIALS**

Section M.04 is being deleted in its entirety and replaced with the following:

### **M.04.01—Bituminous Concrete Materials and Facilities**

### **M.04.02—Mix Design and Job Mix Formula (JMF)**

### **M.04.03—Production Requirements**

**M.04.01—Bituminous Concrete Materials and Facilities:** Each source of component material, Plant and laboratory used to produce and test bituminous concrete must be qualified on an annual basis by the Engineer. AASHTO or ASTM Standards noted with an (M) have been modified and are detailed in Table M.04.03-6.

Aggregates from multiple sources of supply must not be blended or stored in the same stockpile.

#### **1. Coarse Aggregate:**

All coarse aggregate shall meet the requirements listed in Section M.01.

#### **2. Fine Aggregate:**

All fine aggregate shall meet the requirements listed in Section M.01

#### **3. Mineral Filler:**

Mineral filler shall conform to the requirements of AASHTO M 17.

#### **4. Performance Graded (PG) Asphalt Binder:**

##### **a. General:**

i. PG asphalt binder shall be uniformly mixed and blended and be free of contaminants such as fuel oils and other solvents. Binder shall be properly heated and stored to prevent damage or separation.

ii. The binder shall meet the requirements of AASHTO M 332 and shall be graded or verified in accordance with AASHTO R 29. The Contractor shall submit a Certified Test Report and bill of lading representing each delivery in accordance with AASHTO R 26(M). The Certified Test Report must also indicate the binder specific gravity at 77°F; rotational viscosity at 275°F and 329°F and the mixing and compaction viscosity-temperature chart for each shipment.

iii. The Contractor shall submit the name(s) of personnel responsible for receipt, inspection, and record keeping of PG binder. Contractor plant personnel shall document specific storage tank(s) where binder will be transferred and stored until used, and provide binder samples to the Engineer upon request. The person(s) shall assure that each shipment is accompanied by a statement certifying that the transport vehicle was inspected before loading and was found acceptable for the material

shipped, and, that the binder is free of contamination from any residual material, along with two (2) copies of the bill of lading.

iv. The blending or combining of PG binders in one storage tank at the Plant from different suppliers, grades, or additive percentages is prohibited.

b. Basis of Approval:

The request for approval of the source of supply shall list the location where the material will be manufactured, and the handling and storage methods, along with necessary certification in accordance with AASHTO R 26(M). Only suppliers/refineries that have an approved "Quality Control Plan for Performance Graded Binders" formatted in accordance with AASHTO R 26(M) may supply PG binders to Department projects.

c. Standard Performance Grade (PG) Binder:

i. Standard PG binder shall be defined as "Neat". Neat PG binders shall be free from modification with: fillers, extenders, reinforcing agents, adhesion promoters, thermoplastic polymers, acid modification and other additives such as re-refined motor oil, and shall indicate such information on each bill of lading and certified test report.

ii. The standard asphalt binder grade shall be PG 64S-22.

d. Modified Performance Grade (PG) Binder:

The modified asphalt binder shall be Performance Grade PG 64E-22 asphalt modified solely with a Styrene-Butadiene-Styrene (SBS) polymer. The polymer modifier shall be added at either the refinery or terminal and delivered to the bituminous concrete production facility as homogenous blend. The stability of the modified binder shall be verified in accordance with ASTM D7173 using the Dynamic Shear Rheometer (DSR). The DSR  $G^*/\sin(\delta)$  results from the top and bottom sections of the ASTM D7173 test shall not differ by more than 10%. The results of ASTM D7173 shall be included on the Certified Test Report. The binder shall meet the requirements of AASHTO M 332 (including Appendix X1) and AASHTO R 29.

e. Warm Mix Additive or Technology:

i. The warm mix additive or technology must be listed on the North East Asphalt User Producer Group (NEAUPG) Qualified Warm Mix Asphalt (WMA) Technologies List at the time of bid, which may be accessed online at <http://www.neaupg.uconn.edu>.

ii. The warm mix additive shall be blended with the asphalt binder in accordance with the manufacturer's recommendations.

iii. The blended binder shall meet the requirements of AASHTO M 332 and shall be graded or verified in accordance with AASHTO R 29 for the specified binder grade. The Contractor shall submit a Certified Test Report showing the results of the testing demonstrating the binder grade. In addition, it must include the grade of the virgin

binder, the brand name of the warm mix additive, the manufacturer's suggested rate for the WMA additive, the water injection rate (when applicable) and the WMA Technology manufacturer's recommended mixing and compaction temperature ranges.

## 5. Emulsified Asphalts:

### a. General:

- i. The emulsified asphalt shall meet the requirements of AASHTO M 140 or AASHTO M 208 as applicable.
- ii. The emulsified asphalts shall be free of contaminants such as fuel oils and other solvents.
- iii. The blending at mixing plants of emulsified asphalts from different suppliers is prohibited.

### b. Basis of Approval

- i. The request for approval of the source of supply shall list the location where the material is manufactured, the handling and storage methods, and certifications in accordance with AASHTO PP 71. Only suppliers that have an approved "Quality Control Plan for Emulsified Asphalt" formatted in accordance with AASHTO PP 71 and submit monthly split samples per grade to the Engineer may supply emulsified asphalt to Department projects.
- ii. Each shipment of emulsified asphalt delivered to the project site shall be accompanied with the corresponding Certified Test Report listing Saybolt viscosity, residue by evaporation, penetration of residue, and weight per gallon at 77°F and Material Certificate.
- iii. Anionic emulsified asphalts shall conform to the requirements of AASHTO M-140. Materials used for tack coat shall not be diluted and meet grade RS-1 or RS-1H. When ambient temperatures are 80°F and rising, grade SS-1 or SS-1H may be substituted if permitted by the Engineer.
- iv. Cationic emulsified asphalt shall conform to the requirements of AASHTO M-208. Materials used for tack coat shall not be diluted and meet grade CRS-1. The settlement and demulsibility test will not be performed unless deemed necessary by the Engineer. When ambient temperatures are 80°F and rising, grade CSS-1 or CSS-1H may be substituted if permitted by the Engineer.

**6. Reclaimed Asphalt Pavement (RAP):**

- a. General: RAP is a material obtained from the cold milling or removal and processing of bituminous concrete pavement. RAP material shall be crushed to 100% passing the ½ inch sieve and free from contaminants such as joint compound, wood, plastic, and metals.
- b. Basis of Approval: The RAP material will be accepted on the basis of one of the following criteria:
  - i. When the source of all RAP material is from pavements previously constructed on Department projects, the Contractor shall provide a Materials Certificate listing the detailed locations and lengths of those pavements and that the RAP is only from those locations listed.
  - ii. When the RAP material source or quality is not known, the Contractor shall request for approval to the Engineer at least 30 calendar days prior to the start of the paving operation. The request shall include a Material Certificate and applicable test results stating that the RAP consists of aggregates that meet the specification requirements of sub articles M.04.01-1 through 3, and, that the binder in the RAP is substantially free of solvents, tars and other contaminants. The Contractor is prohibited from using unapproved material on Department projects and shall take necessary action to prevent contamination of approved RAP stockpiles. Stockpiles of unapproved material shall remain separate from all other RAP materials at all times. The request for approval shall include the following:
    - 1. A 50-pound sample of the RAP to be incorporated into the recycled mixture.
    - 2. A 25-pound sample of the extracted aggregate from the RAP.

**7. Crushed Recycled Container Glass (CRCG):**

- a. Requirements: The Contractor may propose to use clean and environmentally-acceptable CRCG in an amount not greater than 5% by weight of total aggregate.
- b. Basis of Approval: The Contractor shall submit to the Engineer a request to use CRCG. The request shall state that the CRCG contains no more than 1% by weight of contaminants such as paper, plastic and metal and conform to the following gradation:

<b>CRCG Grading Requirements</b>	
<u>Sieve Size</u>	<u>Percent Passing</u>
3/8-inch	100
No. 4	35-100
No. 200	0.0-10.0

The Contractor shall submit a Materials Certificate to the Engineer stating that the CRCG complies with all the applicable requirements in this specification.

## 8. Joint Seal Material:

- a. Requirements: Joint seal material must meet the requirements of ASTM D 6690 – Type 2. The Contractor shall submit a Material Certificate in accordance with Article 1.06.07 certifying that the joint seal material meets the requirements of this specification.

## 9. Recycled Asphalt Shingles (RAS)

- a. Requirements: RAS shall consist of processed asphalt roofing shingles from post-consumer asphalt shingles or from manufactured shingle waste. The RAS material under consideration for use in bituminous concrete mixtures must be certified as being asbestos free and shall be entirely free of whole, intact nails. The RAS material shall meet the requirements of AASHTO MP 23.

The producer shall test the RAS material to determine the asphalt content and the gradation of the RAS material. The producer shall take necessary action to prevent contamination of RAS stockpiles.

The Contractor shall submit a Materials Certificate to the Engineer stating that the RAS complies with all the applicable requirements in this specification.

## 10. Plant Requirements:

- a. General: The Plant producing bituminous concrete shall comply with AASHTO M 156.
- b. Storage Silos: The Contractor may use silos for short-term storage with the approval of the Engineer. A silo must have heated cones and an unheated silo cylinder if it does not contain a separate internal heating system. When multiple silos are filled, the Contractor shall discharge one silo at a time. Simultaneous discharge of multiple silos for the same Project is not permitted.

<u>Type of silo cylinder</u>	<u>Maximum storage time for all classes (hr)</u>	
	HMA	WMA/PMA
Open Surge	4	Mfg Recommendations*
Unheated – Non-insulated	8	Mfg Recommendations*
Unheated – Insulated	18	Mfg Recommendations*
Heated – No inert gas	TBD by the Engineer	

\*Not to exceed HMA limits

- c. Documentation System: The mixing plant documentation system shall include equipment for accurately proportioning the components of the mixture by weight and in the proper order, controlling the cycle sequence and timing the mixing operations. Recording equipment shall monitor the batching sequence of each component of the

mixture and produce a printed record of these operations on each Plant ticket, as specified herein.

If recycled materials are used, the Plant tickets shall include their dry weight, percentage and daily moisture content.

If a WMA Technology is added at the Plant, the Plant tickets shall include the actual dosage rate.

For drum Plants, the Plant ticket shall be produced at 5 minute intervals and maintained by the vendor for a period of three years after the completion of the project.

For batch Plants, the Plant ticket shall be produced for each batch and maintained by the vendor for a period of three years after the completion of the project. In addition, an asterisk (\*) shall be automatically printed next to any individual batch weight(s) exceeding the following tolerances:

Each Aggregate Component	±1.5% of individual or cumulative target weight for each bin
Mineral Filler	±0.5% of the total batch
Bituminous Material	±0.1% of the total batch
Zero Return (Aggregate)	±0.5% of the total batch
Zero Return (Bituminous Material)	±0.1% of the total batch

The entire batching and mixing interlock cut-off circuits shall interrupt and stop the automatic batching operations when an error exceeding the acceptable tolerance occurs in proportioning.

The scales shall not be manually adjusted during the printing process. In addition, the system shall be interlocked to allow printing only when the scale has come to a complete rest. A unique printed character (m) shall automatically be printed on the ticket when the automatic batching sequence is interrupted or switched to auto-manual or full manual during proportioning.

- d. Aggregates: Aggregate stockpiles shall be managed to prevent segregation and cross contamination. For drum plants only, the percent moisture content at a minimum prior to production and half way through production shall be determined.
- e. Mixture: The dry and wet mix times shall be sufficient to provide a uniform mixture and a minimum particle coating of 95% as determined by AASHTO T 195(M) .

Bituminous concrete mixtures shall contain no more than 0.5% moisture when tested in accordance with AASHTO T 329.

- f. RAP: RAP moisture content shall be determined a minimum of twice daily (prior to production and halfway through production).
- g. Asphalt Binder: A binder log shall be submitted to the Department's Central Lab on a monthly basis.
- h. Warm mix additive: For mechanically foamed WMA, the water injection rate shall be monitored during production and not exceed 2.0% by total weight of binder. For additive added at the Plant, the dosage rate shall be monitored during production.
- i. Plant Laboratory: The Contractor shall maintain a laboratory at the production facility to test bituminous concrete mixtures during production. The laboratory shall have a minimum of 300 square feet, have a potable water source and drainage in accordance with the CT Department of Public Health Drinking Water Division, and be equipped with all necessary testing equipment as well as with a PC, printer, and telephone with a dedicated hard-wired phone line. In addition, the PC shall have internet connection and a functioning web browser with unrestricted access to <https://ctmail.ct.gov>. This equipment shall be maintained in working order at all times and be made available for use by the Engineer.

The laboratory shall be equipped with a heating system capable of maintaining a minimum temperature of 65°F. It shall be clean and free of all materials and equipment not associated with the laboratory. Sufficient light and ventilation must be provided. During summer months, adequate cooling or ventilation must be provided so the indoor air temperature shall not exceed the ambient outdoor temperature.

The laboratory testing apparatus, supplies, and safety equipment shall be capable of performing all tests in their entirety that are referenced in AASHTO R 35 and AASHTO M 323. The Contractor shall ensure that the Laboratory is adequately supplied at all times during the course of the project with all necessary testing supplies and equipment.

The Contractor shall maintain a list of laboratory equipment used in the acceptance testing processes including but not limited to, balances, scales, manometer/vacuum gauge, thermometers, gyratory compactor, clearly showing calibration and/or inspection dates, in accordance with AASHTO R 18. The Contractor shall notify the Engineer if any modifications are made to the equipment within the laboratory. The Contractor shall take immediate action to replace, repair, and/or recalibrate any piece of equipment that is out of calibration, malfunctioning, or not in operation.

#### **M.04.02—Mix Design and Job Mix Formula (JMF)**

##### **1. Curb Mix:**

- a. Requirements: The Contractor shall use bituminous concrete that meets the requirements of Table M.04.02-1. RAP may be used in 5% increments by weight up to 30%.

- b. Basis of Approval: Annually, an approved JMF based on a mix design for curb mix must be on file with the Engineer prior to use. .  
Any change in component source of supply or consensus properties must be approved by the Engineer. A revised JMF shall be submitted prior to use.

**TABLE M.04.02 – 1:  
Control Points for Curb Mix Mixtures**

<b>Notes:</b> (a) Compaction Parameter 50gyration $N_{des}$ . (b) The percent passing the #200 sieve shall not exceed the percentage of bituminous asphalt binder.		
<b>Mix</b>	<b>Curb Mix</b>	<b>Production Tolerances from JMF target</b>
<b>Grade of PG Binder content %</b>	<b>PG 64S-22 6.5 - 9.0</b>	<b>0.4</b>
<b>Sieve Size</b>		
# 200	3.0 – 8.0 (b)	2.0
# 50	10 - 30	4
# 30	20 - 40	5
# 8	40 - 70	6
# 4	65 - 87	7
1/4"		
3/8 "	95 - 100	8
1/2 "	100	8
3/4"		8
1"		
2"		
<b>Additionally, the fraction of material retained between any two consecutive sieves shall not be less than 4%</b>		
<b>Mixture Temperature</b>		
<b>Binder</b>	325°F maximum	
<b>Aggregate</b>	280-350° F	
<b>Mixtures</b>	265-325° F	
<b>Mixture Properties</b>		
<b>Air Voids (VA) %</b>	0 – 4.0 (a)	

## 2. Superpave Design Method – S0.25, S0.375, S0.5, and S1

- a. Requirements: All designated mixes shall be designed using the Superpave mix design method in accordance with AASHTO R 35. A JMF based on the mix design shall meet the requirements of Tables M.04.02-2 through Table M.04.02-5. Each JMF must be submitted no less than seven (7) days prior to production and must be approved by the Engineer prior to use. All approved JMFs expire at the end of the calendar year.



All aggregate component consensus properties and tensile strength ratio (TSR) specimens shall be tested at an AASHTO Materials Reference Laboratory (AMRL) by NETTCP certified technicians.

All bituminous concrete mixes shall be tested for stripping susceptibility by performing the tensile strength ratio (TSR) test procedure in accordance with AASHTO T 283(M) at a minimum every 36 months. The compacted specimens may be fabricated at the Plant and then tested at an AMRL accredited facility. TSR specimens, and corresponding JMF shall be submitted with each test report.

i. Superpave Mixtures with RAP: RAP may be used with the following conditions:

- RAP amounts up to 15% may be used with no binder grade modification.
- RAP amounts up to 20% may be used provided a new JMF is approved by the Engineer. The JMF submittal shall include the grade of virgin binder added. The JMF shall be accompanied by a blending chart and supporting test results in accordance with AASHTO M 323 Appendix X1, or by testing that shows the combined binder (recovered binder from the RAP, virgin binder at the mix design proportions, warm mix asphalt additive and any other modifier if used) meets the requirements of the specified binder grade.
- Two representative samples of RAP shall be obtained. Each sample shall be split and one split sample shall be tested for binder content in accordance with AASHTO T 164 and the other in accordance AASHTO T 308.
- RAP material shall not be used with any other recycling option.

ii. Superpave Mixtures with RAS: RAS may be used solely in HMA S1 mixtures with the following conditions:

- RAS amounts up to 3% may be used.
- RAS total binder replacement up to 15% may be used with no binder grade modification.
- RAS total binder replacement up to 20% may be used provided a new JMF is approved by the Engineer. The JMF submittal shall include the grade of virgin binder added. The JMF shall be accompanied by a blending chart and supporting test results in accordance to AASHTO M 323 appendix X1 or by testing that shows the combined binder (recovered binder from the RAP, virgin binder at the mix design proportions, warm mix asphalt additive and any other modifier if used) meets the requirements of the specified binder grade.
- Superpave Mixtures with RAS shall meet AASHTO PP 78 design considerations. The RAS asphalt binder availability factor (F) used in AASHTO PP 78 shall be 0.85.

iii. Superpave Mixtures with CRCG: CRCG may be used solely in HMA S1 mixtures. One percent of hydrated lime, or other accepted non-stripping agent, shall be added to all mixtures containing CRCG. CRCG material shall not be used with any other recycling option.

- b. Basis of Approval: The following information must be included with the JMF submittal:
- Gradation, consensus properties and specific gravities of the aggregate, RAP or RAS.
  - Average asphalt content of the RAP or RAS by AASHTO T 164.
  - Source of RAP or RAS, and percentage to be used.
  - Warm mix Technology, manufacturer's recommended additive rate and tolerances and manufacturer recommended mixing and compaction temperatures.
  - TSR test report and anti-strip manufacturer and recommended dosage rate if applicable.
  - Mixing and compaction temperature ranges for the mix with and without the warm-mix technology incorporated.
  - JMF ignition oven correction factor by AASHTO T 308.

With each JMF submittal, the following samples shall be submitted to the Division of Materials Testing:

- 4 - one quart cans of PG binder, with corresponding Safety Data Sheet (SDS)
- 1 - 50 lbs bag of RAP
- 2 - 50 lbs bag of plant blended virgin aggregate

A JMF may not be approved if any of the properties of the aggregate components or mix do not meet the verification tolerances as described in the Department's current QA Program for Materials, Acceptance and Assurance Testing Policies and Procedures.

Any material based on a JMF, once approved, shall only be acceptable for use when it is produced by the designated plant, it utilizes the same components, and the production of material continues to meet all criteria as specified herein, and component aggregates are maintained within the tolerances shown in Table M.04.02-2. A new JMF must be submitted to the Engineer for approval whenever a new component source is proposed.

Only one mix with one JMF will be approved for production at any one time. Switching between approved JMF mixes with different component percentages or sources of supply is prohibited.

- c. Mix Status: Each facility will have each type of mixture rated based on the results of the previous year's production. Mix Status will be provided to each bituminous concrete producer annually prior to the beginning of the paving season.

The rating criteria are based on compliance with Air Voids and Voids in Mineral Aggregate (VMA) as indicated in Table M.04.03-4 and are calculated as follows:

Criteria A: Percentage of acceptance test results with compliant air voids.

Criteria B: The average of the percentage of acceptance test results with compliant VMA, and percentage of acceptance test results with compliant air voids.

The final rating assigned will be the lower of the rating obtained with Criteria A or B.

Mix status is defined as:

“A” – Approved:

Assigned to each mixture type from a production facility with a current rating of 70% or greater, or to each mixture type completing a successful PPT.

“PPT” – Pre-Production Trial:

Temporarily assigned to each mixture type from a production facility when:

1. there are no compliant acceptance production test results submitted to the Department from the previous year;
2. there is a source change in one or more aggregate components
3. there is a component percentage change of more than 5% by weight;
4. there is a change in RAP percentage;
5. the mixture has a rating of less than 70% from the previous season;
6. a new JMF not previously submitted.

Bituminous concrete mixtures with a “PPT” status cannot be used on Department projects. Testing shall be performed by the Producer with NETTCP certified personnel on material under this status. Test results must confirm that specifications requirements in Table M.04.02-2 and Table M.04.02-5 are met before material can be used. One of the following methods must be used to verify the test results:

Option A: Schedule a day when a Department Inspector can be at the facility to witness testing or,

Option B: When the Contractor or their representative performs testing without being witnessed by an Inspector, the Contractor shall submit the test results and a split sample including 2 gyratory molds, 5,000 grams of boxed bituminous concrete, and 5,000 grams of cooled loose bituminous concrete for verification testing and approval.

Option C: When the Contractor or their representative performs testing without being witnessed by a Department Inspector, the Engineer may verify the mix in the Contractor’s laboratory.

Witnessing or verifying by the Department of compliant test results will change the mix’s status to an “A”.

The differences between the Department’s test results and the Contractor’s must be within the “C” tolerances included in the Department’s QA Program for Materials, Acceptance and Assurance Testing Policies and Procedures in order to be verified.

“U” – Not Approved:

Status assigned to a type of mixture that does not have an approved JMF. . Bituminous concrete mixtures with a “U” status cannot be used on Department projects.

**TABLE M.04.02– 2: Superpave Mixture Design Criteria**

Notes: <sup>(1)</sup> For all mixtures using a WMA technology, the mix temperature shall meet PG binder and WMA manufacturer's recommendations.								
Sieve	S0.25		S0.375		S0.5		S1	
	CONTROL POINTS		CONTROL POINTS		CONTROL POINTS		CONTROL POINTS	
inches	Min (%)	Max (%)	Min (%)	Max (%)	Min (%)	Max (%)	Min (%)	Max (%)
2.0	-	-	-	-	-	-	-	-
1.5	-	-	-	-	-	-	100	-
1.0	-	-	-	-	-	-	90	100
3/4	-	-	-	-	100	-	-	90
1/2	100	-	100	-	90	100	-	-
3/8	97	100	90	100	-	90	-	-
#4	75	90	-	75	-	-	-	-
#8	32	67	32	67	28	58	19	45
#16	-	-	-	-	-	-	-	-
#30	-	-	-	-	-	-	-	-
#50	-	-	-	-	-	-	-	-
#100	-	-	-	-	-	-	-	-
#200	2.0	10.0	2.0	10.0	2.0	10.0	1.0	7.0
VMA (%)	16.5 ± 1		16.0 ± 1		15.0 ± 1		13.0 ± 1	
VA (%)	4.0 ± 1		4.0 ± 1		4.0 ± 1		4.0 ± 1	
Gse	JMF value		JMF value		JMF value		JMF value	
Gmm	JMF ± 0.030		JMF ± 0.030		JMF ± 0.030		JMF ± 0.030	
Dust / binder	0.6 – 1.2		0.6 – 1.2		0.6 – 1.2		0.6 – 1.2	
Mix Temp <sup>(1)</sup>	265 – 325°F		265 – 325°F		265 – 325°F		265 – 325°F	
TSR	≥ 80%		≥ 80%		≥ 80%		≥ 80%	
T-283 Stripping	Minimal, as determined by the Engineer							

**TABLE M.04.02–3: Superpave Consensus Properties Requirements for Combined Aggregate**

Notes: (1) 95/90 denotes that a minimum of 95% of the coarse aggregate, by mass, shall have one fractured face and that a minimum of 90% shall have two fractured faces.. (2) Criteria presented as maximum Percent by mass of flat and elongated particles of materials retained on the #4 sieve, determined at 5:1 ratio.					
Traffic Level	Design ESALs (80 kN), Millions	Coarse Aggregate Angularity <sup>(1)</sup> ASTM D 5821, Minimum %	Fine Aggregate Angularity AASHTO T 304, Method A Minimum %	Flat and Elongated Particles <sup>(2)</sup> ASTM D 4791, Maximum %	Sand Equivalent AASHTO T 176, Minimum %
1	< 0.3	55/- -	40	10	40
2	0.3 to < 3.0	75/- -	40	10	40
3	≥ 3.0	95/90	45	10	45

**TABLE M.04.02– 4: Superpave Traffic Levels and Design Volumetric Properties**

Traffic Level	Design ESALs (million)	Number of Gyration by Superpave Gyrotory Compactor			Percent Density of Gmm from HMA/WMA specimen			Voids Filled with Asphalt (VFA) Based on Nominal mix size – inch			
		Nini	Ndes	Nmax	Nini	Ndes	Nmax	0.25	0.375	0.5	1
1	< 0.3	6	50	75	≤ 91.5	96.0	≤ 98.0	70 - 80	70 - 80	70 - 80	67 - 80
2	0.3 to < 3.0	7	75	115	≤ 90.5	96.0	≤ 98.0	65 - 78	65 - 78	65 - 78	65 - 78
3	≥ 3.0	8	100	160	≤ 90.0	96.0	≤ 98.0	65 - 77	73 - 76	65 - 75	65 - 75

**TABLE M.04.02– 5:  
Superpave Minimum Binder Content by Mix Type and Level**

<b>Mix Type</b>	<b>Level</b>	<b>Binder Content Minimum</b>
S0.25	1	5.70
S0.25	2	5.60
S0.25	3	5.50
S0.375	1	5.70
S0.375	2	5.60
S0.375	3	5.50
S0.5	1	5.10
S0.5	2	5.00
S0.5	3	4.90
S1	1	4.60
S1	2	4.50
S1	3	4.40

**M.04.03— Production Requirements:**

**1. Standard Quality Control Plan (QCP) for Production:**

The QCP for production shall describe the organization and procedures which the Contractor shall use to administer quality control. The QCP shall include the procedures used to control the production process, to determine when immediate changes to the processes are needed, and to implement the required changes. The QCP must detail the inspection, sampling and testing protocols to be used, and the frequency for each.

Control Chart(s) shall be developed and maintained for critical aspect(s) of the production process as determined by the Contractor. The control chart(s) shall identify the material property, applicable upper and lower control limits, and be updated with current test data. As a minimum, the following quality characteristics shall be included in the control charts: percent passing #4 sieve, percent passing #200 sieve, binder content, air voids, Gmm and VMA. The control chart(s) shall be used as part of the quality control system to document variability of the bituminous concrete production process. The control chart(s) shall be submitted to the Engineer the first day of each month.

The QCP shall also include the name and qualifications of a Quality Control Manager. The Quality Control Manager shall be responsible for the administration of the QCP, including compliance with the plan and any plan modifications.

The Contractor shall submit complete production testing records to the Engineer within 24 hours in a manner acceptable to the Engineer.

The QCP shall also include the name and qualifications of any outside testing laboratory performing any QC functions on behalf of the Contractor. The QCP must also include a list of sampling & testing methods and frequencies used during production, and the names of all Quality Control personnel and their duties.

Approval of the QCP does not imply any warranty by the Engineer that adherence to the plan will result in production of bituminous concrete that complies with these specifications. The Contractor shall submit any changes to the QCP as work progresses.

## **2. Acceptance Requirements:**

### **i. General:**

Acceptance samples shall be obtained from the hauling vehicles and tested by the Contractor at the Plant.

The Contractor shall submit all acceptance tests results to the Engineer within 24 hours or prior to the next day's production. All acceptance test specimens and supporting documentation must be retained by the Contractor and may be disposed of with the approval of the Engineer. All quality control specimens shall be clearly labeled and separated from the acceptance specimens.

Contractor personnel performing acceptance sampling and testing must be present at the facility prior to, during, and until completion of production, and be certified as a NETTCP HMA Plant Technician or Interim HMA Plant Technician and be in good standing. Production of material for use on State projects must be suspended by the Contractor if such personnel are not present. Technicians found by the Engineer to be non-compliant with NETTCP policies and procedures or Department policies may be removed by the Engineer from participating in the acceptance testing process for Department projects until their actions can be reviewed.

Anytime during production that testing equipment becomes defective or inoperable, production can continue for a maximum of 1 hour. The Contractor shall obtain box sample(s) in accordance with Table M.04.03-2 to satisfy the daily acceptance testing requirement for the quantity shipped to the project. The box sample(s) shall be tested once the equipment issue has been resolved to the satisfaction of the Engineer. Production beyond 1 hour may be considered by the Engineer. Production will not be permitted beyond that day until the subject equipment issue has been resolved.

Verification testing will be performed by the Engineer in accordance with the Department's QA Program for Materials.

Should the Department be unable to verify the Contractor's acceptance test result(s) due to a failure of the Contractor to retain acceptance test specimens or supporting documentation, the Contractor shall review its quality control plan, determine the cause of the nonconformance and

respond in writing within 24 hours to the Engineer describing the corrective action taken. In addition, the Contractor must provide supporting documentation or test results to validate the subject acceptance test result(s). The Engineer may invalidate any adjustments for material corresponding to the subject acceptance test(s). Failure of the Contractor to adequately address quality control issues at a facility may result in suspension of production for Department projects at that facility.

**ii. Curb Mix Acceptance Sampling and Testing Procedures:**

Curb Mix shall be tested in accordance to Table M.04.03-1 by the Contractor at a frequency of one test per every 250 tons of cumulative production, regardless of the day of production.

**TABLE M.04.03 – 1: Curb Mix Acceptance Test Procedures**

<b>Protocol</b>	<b>Reference</b>	<b>Description</b>
<b>1</b>	<b>AASHTO T 30(M)</b>	Mechanical Analysis of Extracted Aggregate
<b>2</b>	<b>AASHTO T 168</b>	Sampling of Bituminous Concrete
<b>3</b>	<b>AASHTO T 308</b>	Binder content by Ignition Oven method (adjusted for aggregate correction factor)
<b>4</b>	<b>AASHTO T 209(M)<sup>(2)</sup></b>	Theoretical Maximum Specific Gravity and Density of Bituminous Paving Mixtures
<b>5</b>	<b>AASHTO T 312<sup>(2)</sup></b>	<sup>(1)</sup> Superpave Gyration molds compacted to N <sub>des</sub>
<b>6</b>	<b>AASHTO T 329</b>	Moisture Content of Hot-Mix Asphalt (HMA) by Oven Method

**Notes:** <sup>(1)</sup> One set equals two six-inch molds. Molds to be compacted to 50 gyrations

<sup>(2)</sup> Once per year or when requested by the Engineer

a. Determination of Off-Test Status:

- i. Curb Mix is considered “off test” when the test results indicate that any single value for bitumen content or gradation are not within the tolerances shown in Table M.04.02-1. If the mix is “off test”, the Contractor must take immediate actions to correct the deficiency and a new acceptance sample shall be tested on the same day or the following day of production.
- ii. When multiple silos are located at one site, mixture supplied to one project is considered as coming from one source for the purpose of applying the “off test” status.
- iii. The Engineer may cease supply from the plant when test results from three consecutive samples are not within the JMF tolerances or the test results from two consecutive samples not within the control points indicated in Table M.04.02-1 regardless of production date.



b. JMF revisions

- i. If a test indicates that the bitumen content or gradation are outside the tolerances, the Contractor may make a single JMF revision as allowed by the Engineer prior to any additional testing. Consecutive test results outside the requirements of Table M.04.02-1 JMF tolerances may result in rejection of the mixture.
- ii. Any modification to the JMF shall not exceed 50% of the JMF tolerances indicated in Table M.04.02-1 for any given component of the mixture without approval of the Engineer. When such an adjustment is made to the bitumen, the corresponding production percentage of bitumen shall be revised accordingly.

**iii. Superpave Mix Acceptance:**

a. Sampling and Testing Procedures

Production Lot: The Lot will be defined as one of the following types:

- Non-PWL Production Lot for total estimated project quantities per mixture less than 3500 tons: All mixture placed during a single continuous paving operation.
- PWL Production Lot for total estimated project quantities per mixture of 3500 tons or more: Each 3500 tons of mixture produced within 30 calendar days.

Production Sub Lot:

- For Non-PWL: As defined in Table M.04.03 – 2
- For PWL: 500 tons (the last Sub Lot may be less than 500 tons)

Partial Production Lots (For PWL only): A Lot with less than 3500 tons due to:

- completion of the Course
- a Job Mix Formula revision due to changes in:
  - o cold feed percentages over 5%
  - o target combined gradation over 5%
  - o target binder over 0.15%
  - o any component specific gravity
- a Lot spanning 30 calendar days

The acceptance sample(s) location(s) shall be selected using stratified – random sampling in accordance with ASTM D 3665 based on:

- the total daily estimated tons of production for non-PWL lots, or
- the total lot size for PWL lots.

One acceptance sample shall be obtained and tested per Sub Lot. The Engineer may direct that additional acceptance samples be obtained. For non-PWL lots, one acceptance test shall always be performed in the last sub-lot based on actual tons of material produced.

For Non-PWL lots, quantities of the same mixture per plant may be combined daily for multiple State projects to determine the number of sub lots.

The payment adjustment will be calculated as described in 4.06.

**TABLE M.04.03 – 2:  
Superpave Acceptance Testing Frequency per Type/Level/Plant for Non-PWL lots**

Daily quantity produced in tons (lot)	Number of Sub Lots/Tests
0 to 150	0, Unless requested by the Engineer
151 to 500	1
501 to 1,000	2
1,001 to 2,000	3
2,001 or greater	1 per 500 tons or portions thereof

The following test procedures shall be used for acceptance:

**TABLE M.04.03– 3: Superpave Acceptance Testing Procedures**

Protocol	Procedure	Description
1	AASHTO T 168	Sampling of bituminous concrete
2	AASHTO R 47	Reducing samples to testing size
3	AASHTO T 308	Binder content by ignition oven method (adjusted for aggregate correction factor)
4	AASHTO T 30(M)	Gradation of extracted aggregate for bituminous concrete mixture
5	AASHTO T 312	<sup>(1)</sup> Superpave gyratory molds compacted to $N_{des}$
6	AASHTO T 166	<sup>(2)</sup> Bulk specific gravity of bituminous concrete
7	AASHTO R 35	<sup>(2)</sup> Air voids, VMA
8	AASHTO T 209(M)	Maximum specific gravity of bituminous concrete (average of two tests)
9	AASHTO T 329	Moisture content of bituminous concrete

**Notes:** <sup>(1)</sup> One set equals two six-inch molds. Molds to be compacted to  $N_{max}$  for PPTs and to  $N_{des}$  for production testing. The first subplot of the year will be compacted to  $N_{max}$

<sup>(2)</sup> Average value of one set of six-inch molds.

If the average ignition oven corrected binder content differs by 0.3% or more from the average of the Plant ticket binder content in five (5) consecutive tests regardless of the production date (moving average), the Contractor shall immediately investigate, determine an assignable cause and correct the issue. When two consecutive moving average differences are 0.3% or more and no assignable cause has been established, the Engineer may require a new ignition oven aggregate correction factor to be performed or to adjust the current factor by the average of the differences between the corrected binder content and production Plant ticket for the last five (5) acceptance results.

The test specimen must be placed in an ignition oven for testing in accordance with AASHTO T 308 within thirty minutes of being obtained from the hauling vehicle and the test shall start immediately after.

The Contractor shall perform TSR testing within 30 days after the start of production for all design levels of HMA- and PMA- S0.5 plant-produced mixtures, in accordance with AASHTO T 283(M). The TSR test shall be performed at an AMRL certified laboratory by NETTCP certified technicians. The compacted specimens may be fabricated at the Plant and then tested at an AMRL accredited facility. The test results and specimens shall be submitted to the Engineer for review. Superpave mixtures that require anti-strip additives (either liquid or mineral) shall continue to meet all requirements specified herein for binder and bituminous concrete. The Contractor shall submit the name, manufacturer, percent used, technical datasheet and SDS for the anti-strip additive (if applicable) to the Engineer.

b. Determination of Off-Test Status:

- i. Superpave mixes shall be considered “*off test*” when any Control Point Sieve, binder content, VA, VMA, or Gmm value is outside of the limits specified in Table M.04.03-4 or the target binder content at the Plant is below the minimum binder content stated in Table M.04.02-5. Note that further testing of samples or portions of samples not initially tested for this purpose cannot be used to change the status.
- ii. Any time the bituminous concrete mixture is considered Off-test:
  1. The Contractor shall notify the Engineer when the Plant is “*off test*” for any mix design that is delivered to the project in any production day. When multiple silos are located at one site, mixture supplied to one project is considered as coming from one source for the purpose of applying the “*off test*” determination.
  2. The Contractor must take immediate actions to correct the deficiency, minimize “*off test*” production to the project, and obtain an additional Process Control (PC) test after any corrective action to verify production is in conformance to the specifications. A PC test will not be used for acceptance and is solely for the use of the Contractor in its quality control process.

c. Cessation of Supply for Superpave Mixtures in non-PWL lots:

A mixture shall not be used on Department’s projects when it is “off test” for:

- i. four (4) consecutive tests in any combination of VA, VMA or Gmm, regardless of date of production, or,
- ii. two (2) consecutive tests in the Control Point sieves in one production shift.

As a result of cessation of supply, the mix status will be changed to PPT.

d. JMF revisions:

JMF revisions are only permitted prior to or after a production shift. A JMF revision is effective from the time it was submitted and is not retroactive to the previous test(s).

JMF revisions shall be justified by a documented trend of test results.

Revisions to aggregate and RAP specific gravities are only permitted when testing is performed at an AMRL certified laboratory by NETTCP certified technicians.

A JMF revision is required when the Plant target RAP and/or bin percentage deviates by more than 5% and/or the Plant target binder content deviates by more than 0.15% from the active JMF.

**TABLE M.04.03– 4: Superpave Mixture Production Requirements**

<b>Notes:</b> (1) 300°F minimum after October 15. (2) JMF tolerances shall be defined as the limits for production compliance. (3) For all mixtures with WMA technology, changes to the minimum aggregate temperature will require Engineer's approval. (4) For PMA and mixtures with WMA technology, the mix temperature shall meet manufacturer's recommendations. In addition, for all mixtures with WMA technology, the maximum mix temperature shall not exceed 325°F.(5) 0.4 for PWL lots (6) 1.3 for PWL lots (7) 1.2 for PWL lots									
	<b>S0.25</b>		<b>S0.375</b>		<b>S0.5</b>		<b>S1</b>		<b>Tolerances</b>
Sieve	CONTROL POINTS		CONTROL POINTS		CONTROL POINTS		CONTROL POINTS		<b>From JMF Targets (2)</b>
inches	Min(%)	Max(%)	Min(%)	Max(%)	Min(%)	Max(%)	Min(%)	Max(%)	±Tol
1.5	-	-	-	-	-	-	100	-	
1.0	-	-	-	-	-	-	90	100	
3/4	-	-	-	-	100	-	-	90	
1/2	100	-	100	-	90	100	-	-	
3/8	97	100	90	100	-	90	-	-	
#4	75	90	-	75	-	-	-	-	
#8	32	67	32	67	28	58	19	45	
#16	-	-	-	-	-	-	-	-	
#200	2.0	10.0	2.0	10.0	2.0	10.0	1.0	7.0	
Pb	JMF value		JMF value		JMF value		JMF value		0.3 <sup>(5)</sup>
VMA (%)	16.5		16.0		15.0		13.0		1.0 <sup>(6)</sup>
VA (%)	4.0		4.0		4.0		4.0		1.0 <sup>(7)</sup>
Gmm	JMF value		JMF value		JMF value		JMF value		0.030
Agg. Temp <sup>(3)</sup>	280 – 350F		280 – 350F		280 – 350F		280 – 350F		
Mix Temp <sup>(4)</sup>	265 – 325 F <sup>(1)</sup>		265 – 325 F <sup>(1)</sup>		265 – 325 F <sup>(1)</sup>		265 – 325 F <sup>(1)</sup>		
Prod. TSR	N/A		N/A		≥80%		N/A		
T-283 Stripping	N/A		N/A		Minimal as determined by the Engineer		N/A		

**TABLE M.04.03– 5:  
Superpave Traffic Levels and Design Volumetric Properties**

Traffic Level	Design ESALs	Number of Gyration by Superpave Gyratory Compactor	
	(million)	Nini	Ndes
1	< 0.3	6	50
2	0.3 to < 3.0	7	75
3	≥3.0	8	100

**TABLE M.04.03-6:  
Modifications to Standard AASHTO and ASTM Test Specifications and Procedures**

AASHTO Standard Method of Test	
Reference	Modification
<b>T 30</b>	Section 7.2 thru 7.4 Samples are not routinely washed for production testing
<b>T 168</b>	<p>Samples are taken at one point in the pile. Samples from a hauling vehicle are taken from only one point instead of three as specified.</p> <p>Selection of Samples: Sampling is equally important as the testing, and the sampler shall use every precaution to obtain samples that are truly representative of the bituminous mixture.</p> <p>Box Samples: In order to enhance the rate of processing samples taken in the field by construction or maintenance personnel the samples will be tested in the order received and data processed to be determine conformance to material specifications and to prioritize inspections by laboratory personnel.</p>
<b>T 195</b>	Section 4.3 only one truck load of mixture is sampled. Samples are taken from opposite sides of the load.
<b>T 209</b>	<p>Section 7.2 The average of two bowls is used proportionally in order to satisfy minimum mass requirements.</p> <p>8.3 Omit Pycnometer method.</p>
<b>T 283</b>	When foaming technology is used, the material used for the fabrication of the specimens shall be cooled to room temperature, and then reheated to the manufactures recommended compaction temperature prior to fabrication of the specimens.

<b>AASHTO Standard Recommended Practices</b>	
<b>Reference</b>	<b>Modification</b>
<b>R 26</b>	<p>All laboratory technician(s) responsible for testing PG-binders be certified or Interim Qualified by the New England Transportation Technician Certification Program (NETTCP) as a PG Asphalt Binder Lab Technician.</p> <p>All laboratories testing binders for the Department are required to be accredited by the AASHTO Materials Reference Laboratory (AMRL).</p> <p>Sources interested in being approved to supply PG-binders to the Department by use of an “in-line blending system,” must record properties of blended material, and additives used.</p> <p>Each source of supply of PG-binder must indicate that the binders contain no additives used to modify or enhance their performance properties. Binders that are manufactured using additives, modifiers, extenders etc., shall disclose the type of additive, percentage and any handling specifications/limitations required.</p> <p>All AASHTO M 320 references shall be replaced with AASHTO M 332.</p> <p>Once a month, one split sample and test results for each asphalt binder grade and each lot shall be submitted by the PG binder supplier to the Department’s Central Lab. Material remaining in a certified lot shall be re-certified no later than 30 days after initial certification. Each April and September, the PG binder supplier shall submit test results for two (2) BBR tests at two (2) different temperatures in accordance with AASHTO R 29.</p>

**SECTION M.10 – RAILING AND FENCE**

**M.10.02 – Metal Beam-Type Rail and Anchorages:**

**9. Plastic Blockouts:**

Replace *NCHRP Report 350* with *MASH*



## **ON-THE-JOB TRAINING (OJT) WORKFORCE DEVELOPMENT PILOT:**

### **Description**

To provide construction industry related job opportunities to minorities, women and economically disadvantaged individuals; and to increase the likelihood of a diverse and inclusive workforce on Connecticut Department of Transportation (ConnDOT) projects.

All contractors (existing and newcomers) will be automatically placed in the Workforce Development Pilot. Standard OJT requirements typically associated with individual projects will no longer be applied at the project level for new projects. Instead, these requirements will be applicable on an annual basis for each contractor performing work on ConnDOT projects.

The OJT Workforce Development Pilot will allow a contractor to train employees on Federal, State and privately funded projects located in Connecticut. However, contractors should give priority to training employees on ConnDOT Federal-Aid funded projects.

### **Funding**

The Department will establish an OJT fund annually from which contractors may bill the Department directly for eligible trainee hours. The funds for payment of trainee hours on federal-aid projects will be allocated from the ½ of 1% provided for OJT funding, and will be based on hours trained, not to exceed a maximum of \$25,000.00 per year; per contractor.

### **Minorities and Women**

Developing, training and upgrading of minorities, women and economically disadvantaged individuals toward journeyman level status is the primary objective of this special training provision. Accordingly, the Contractor shall make every effort to enroll minority, women and economically disadvantaged individuals as trainees to the extent that such persons are available within a reasonable area of recruitment. This training commitment is not intended, and shall not be used, to discriminate against any applicant for training whether a member of a minority group or not.

### **Assigning Training Goals**

The Department, through the OJT Program Coordinator, will assign training goals for a calendar year based on the contractor's past two year's activities and the contractor's anticipated upcoming year's activity with the Department. At the beginning of each year, all contractors eligible will be contacted by the Department to determine the number of trainees that will be assigned for the upcoming calendar year. At that time, the Contractor shall enter into an agreement with the Department to provide a self-imposed on-the-job training program for the calendar year. This agreement will include a specific number of annual training goals agreed to by both parties. The number of training assignments may range from one (1) to six (6) per

contractor per calendar year. Each January, a summary of the trainees required and the OJT Workforce Development Pilot package will be sent to participating contractors. The number of trainees assigned to each contractor in the summary will increase proportionately not to exceed 6, as shown in the following table. This package will also be provided to contractors as they become newly eligible for the OJT Workforce Development Pilot throughout the remainder of the year. Projects awarded after September 30 will be included in the following year's Program.

The dollar thresholds for training assignments are as follows:

\$4.5 – 8 million=	1 trainee
\$ 9 – 15 million=	2 trainees
\$16 – 23 million=	3 trainees
\$24 – 30 million=	4 trainees
\$31 – 40 million=	5 trainees
\$41 – and above=	6 trainees

### **Training Classifications**

Preference shall be given to providing training in the following skilled work classifications. However, the classifications established are not all-inclusive:

Equipment Operators	Electricians
Laborers	Painters
Carpenters	Iron / Reinforcing Steel Workers
Concrete Finishers	Mechanics
Pipe Layers	Welders

The Department has on file common training classifications and their respective training requirements; that may be used by the contractors. Contractors shall submit new classifications for specific job functions that their employees are performing. The Department will review and recommend for acceptance the new classifications proposed by contractors, if applicable. New classifications shall meet the following requirements:

Proposed training classifications are reasonable and realistic based on the job skill classification needs, and the number of training hours specified in the training classification is consistent with common practices and provides enough time for the trainee to obtain journeyman level status.

Where feasible, 25% percent of apprentices or trainees in each occupation shall be in their first year of apprenticeship or training. The number of trainees shall be distributed among the work classifications on the basis of the contractor's needs and the availability of journeymen in the various classifications within a reasonable area of recruitment.

No employee shall be employed as a trainee in any classification in which they have successfully completed a training course leading to journeyman level status or in which they have been employed as a journeyman.

## **Records and Reports**

The Contractor shall maintain enrollment in the program and submit all required reports documenting company compliance under these contract requirements. These documents and any other information shall be submitted to the OJT Program Coordinator as requested.

Upon the trainee's completion and graduation from the program, the Contractor shall provide each trainee with a certification Certificate showing the type and length of training satisfactorily completed.

## **Trainee Interviews**

In order to determine the continued effectiveness of the OJT Program in Connecticut, the department will periodically conduct personal interviews with current trainees and may survey recent graduates of the program. This enables the OJT Program Coordinator to modify and improve the program as necessary. Trainee interviews are generally conducted at the job site to ensure that the trainees' work and training is consistent with the approved training program.

## **Trainee Wages**

Contractors shall compensate trainees on a graduating pay scale based upon a percentage of the prevailing minimum journeyman wages (Davis-Bacon Act). Minimum pay shall be as follows:

60 percent	of the journeyman wage for the first half of the training period
75 percent	of the journeyman wage for the third quarter of the training period
90 percent	of the journeyman wage for the last quarter of the training period

*In no case, will the trainee be paid less than the prevailing rate for general laborer as shown in the contract wage decision (must be approved by the Department of Labor).*

## **Achieving or Failing to Meet Training Goals**

The Contractor will be credited for each trainee currently enrolled or who becomes enrolled in the approved training program and providing they receive the required training under the specific training program. Trainees will be allowed to be transferred between projects if required by the Contractor's schedule and workload. The OJT Program Coordinator must be notified of transfers within five (5) days of the transfer or reassignments by e-mail ([Phylisha.Coles@ct.gov](mailto:Phylisha.Coles@ct.gov)).

Where a contractor does not or cannot achieve its annual training goal with female or minority trainees, they must produce adequate Good Faith Efforts documentation. Good Faith Efforts are those designed to achieve equal opportunity through positive, aggressive, and continuous result-oriented measures. 23 CFR § 230.409(g) (4). Contractors should request minorities and females from unions when minorities and females are under-represented in the contractor's workforce.

Whenever a contractor requests ConnDOT approval of someone other than a minority or female, the contractor must submit documented evidence of its Good Faith Efforts to fill that position with a minority or female. When a non-minority male is accepted, a contractor must continue to attempt to meet its remaining annual training goals with females and minorities.

Where a contractor has neither attained its goal nor submitted adequate Good Faith Efforts documentation, ConnDOT will issue a letter of non-compliance. Within thirty (30) days of receiving the letter of non-compliance, the contractor must submit a written Corrective Action Plan (CAP) outlining the steps that it will take to remedy the non-compliance. The CAP must be approved by ConnDOT. Failure to comply with the CAP may result in your firm being found non-responsive for future projects.

### **Measurement and Payment**

Optional reimbursement will be made to the contractor for providing the required training under this special provision on ConnDOT Federal-Aid funded projects only.

Contractor will be reimbursed at \$0.80 for each hour of training given to an employee in accordance with an approved training or apprenticeship program. This reimbursement will be made even though the Contractor receives additional training program funds from other sources, provided such other source does not specifically prohibit the contractor from receiving other reimbursement.

Reimbursement for training is made annually or upon the trainees completion and not on a monthly basis. No payment shall be made to the Contractor if either the failure to provide the required training, or the failure to hire the trainee as a journeyman, is caused by the Contractor.

Program reimbursements will be made directly to the prime contractor on an annual basis. To request reimbursement, prime contractors must complete the Voucher for OJT Workforce Development Pilot Hourly Reimbursement for each trainee in the OJT Program. This form is included in the OJT Workforce Development Pilot package and is available on the Department's web site at:

[www.ct.gov/dot](http://www.ct.gov/dot)

The completed form must be submitted to the Office of Contract Compliance for approval. The form is due on the 15<sup>th</sup> day of January for each trainee currently enrolled and for hours worked on ConnDOT Federal-Aid funded projects only.

## **D.B.E. SUBCONTRACTORS AND MATERIAL SUPPLIERS OR MANUFACTURERS**

**January 2013**

### **I. ABBREVIATIONS AND DEFINITIONS AS USED IN THIS SPECIAL PROVISION**

A. *CTDOT* means the Connecticut Department of Transportation.

B. *USDOT* means the U.S. Department of Transportation, including the Office of the Secretary, the Federal Highway Administration (“FHWA”), the Federal Transit Administration (“FTA”), and the Federal Aviation Administration (“FAA”).

C. *Broker* means a party acting as an agent for others in negotiating Contracts, Agreements, purchases, sales, etc., in return for a fee or commission.

D. *Contract, Agreement or Subcontract* means a legally binding relationship obligating a seller to furnish supplies or services (including but not limited to, construction and professional services) and the buyer to pay for them. For the purposes of this provision, a lease for equipment or products is also considered to be a Contract.

E. *Contractor* means a consultant, second party or any other entity under Contract to do business with CTDOT or, as the context may require, with another Contractor.

F. *Disadvantaged Business Enterprise (“DBE”)* means a for profit small business concern:

1. That is at least 51 percent owned by one or more individuals who are both socially and economically disadvantaged or, in the case of a corporation, in which 51 percent of the stock is owned by one or more such individuals; and
2. Whose management and daily business operations are controlled by one or more of the socially and economically disadvantaged individuals who own it; and
3. Certified by CTDOT under Title 49 of the Code of Federal Regulations, Part 26, (Title 49 CFR Part 23 of the Code of Federal Regulations for Participation of Disadvantaged Business Enterprise in Airport Concessions)

G. *USDOT-assisted Contract* means any Contract between CTDOT and a Contractor (at any tier) funded in whole or in part with USDOT financial assistance.

H. *Good Faith Efforts (“GFE”)* means all necessary and reasonable steps to achieve a DBE goal or other requirement which by their scope, intensity, and appropriateness to the objective, can reasonably be expected to fulfill the program requirement.

I. *Small Business Concern* means, with respect to firms seeking to participate as DBEs in USDOT-assisted Contracts, a small business concern as defined pursuant to Section 3 of the Small Business Act and Small Business Administration (“SBA”) regulations implementing it (13 CFR Part 121) that also does not exceed the cap on average annual gross receipts in 49 CFR Part 26, Section 26.65(b).

GENERAL

J. *Socially and Economically Disadvantaged Individual* means any individual who is a citizen (or lawfully admitted permanent resident) of the United States and who is:

1. Any individual who CTDOT finds, on a case-by-case basis, to be a socially and economically disadvantaged individual.
2. Any individuals in the following groups, members of which are rebuttably presumed to be socially and economically disadvantaged:
  - “Black Americans”, which includes persons having origins in any of the Black racial groups of Africa;
  - “Hispanic Americans”, which includes persons of Mexican, Puerto Rican, Cuban, Dominican, Central or South American, or other Spanish or Portuguese culture or origin, regardless of race;
  - “Native Americans”, which includes persons who are American Indians, Eskimos, Aleuts, or Native Hawaiians.
  - “Asian-Pacific Americans”, which includes persons whose origins are from Japan, China, Taiwan, Korea, Burma (Myanmar), Vietnam, Laos, Cambodia (Kampuchea), Thailand, Malaysia, Indonesia, the Philippines, Brunei, Samoa, Guam, the U.S. Trust Territories of the Pacific Islands (Republic of Palau), the Commonwealth of the Northern Marianas Islands, Macao, Fiji, Tonga, Kiribati, Juvalu, Nauru, or Federated States of Micronesia;
  - “Subcontinent Asian Americans”, which includes persons whose origins are from India, Pakistan, Bangladesh, Bhutan, the Maldives Islands, Nepal or Sri Lanka;
  - Women;
  - Any additional groups whose members are designated as socially and economically disadvantaged by the SBA, at such time as the SBA designation becomes effective.

K. *Commercially Useful Function (“CUF”)* means the DBE is responsible for the execution of the work of the contract and is carrying out its responsibilities by actually performing, managing, and supervising the work involved with its own forces and equipment. The DBE must be responsible for procuring, determining quantity, negotiating price, determining quality and paying for all materials (where applicable) associated with their work. The DBE must also perform at least 30% of the total cost of its contract with its own workforce.

## **II. ADMINISTRATIVE REQUIREMENTS**

### **A. General Requirements**

A DBE goal percentage equaling **13** percent (%) of the Contract value has been established for this Contract. This DBE goal percentage will be applied to the final Contract value to ultimately determine the required DBE goal. If additional work is required, DBE firms should be provided the appropriate opportunities to achieve the required DBE goal.

In order to receive credit toward the Contract DBE goal, the firms utilized as DBE subcontractors or suppliers must be certified as DBEs in the type of work to be counted for credit by CTDOT’s Office of Contract Compliance prior to the date of the execution of the subcontract. Neither CTDOT nor the State of Connecticut’s Unified Certification Program (UCP) makes any representation as to any DBE’s technical or financial ability to perform the work. Prime contractors are solely responsible for performing due diligence in hiring DBE subcontractors.

All DBEs shall perform a CUF for the work that is assigned to them. The Contractor shall monitor and ensure that the DBE is in compliance with this requirement. The Connecticut DBE UPC Directory of certified firms can

be found on the CTDOT website <http://www.ct.gov/dot>. The directory lists certified DBE firms with a description of services that they are certified to perform. Only work identified in this listing may be counted towards the project's DBE goal. A DBE firm may request to have services added at any time by contacting CTDOT's Office of Contract Compliance. No credit shall be counted for any DBE firm found not to be performing a CUF.

Once a Contract is awarded, all DBEs that were listed on the pre-award DBE commitment document must be utilized. The Contractor is obligated to provide the value and items of the work originally established in the pre-award documentation to the DBE firms listed in the pre-award documentation. Any modifications to the pre-award commitment must follow the procedure established in Section II-C.

The Contractor shall designate a liaison officer who will administer the Contractor's DBE program. Upon execution of this Contract, the name of the liaison officer shall be furnished in writing to CTDOT's unit administering the Contract, CTDOT's Office of Contract Compliance and CTDOT's Office of Construction ("OOC"). Contact information for the designated liaison officer shall be furnished no later than the scheduled date for the pre-construction meeting.

**The Contractor shall submit a bi-monthly report to the appropriate CTDOT unit administering the Contract. This report shall indicate what work has been performed to date, with the dollars paid and percentage of DBE goal completed.**

**Verified payments made to DBEs shall be included in this bi-monthly report. A sample form is included on the CTDOT website.**

In addition, the report shall include:

1. A projected time frame of when the remaining work is to be completed for each DBE.
2. A statement by the Contractor either confirming that the approved DBEs are on schedule to meet the Contract goal, or that the Contractor is actively pursuing a GFE.
3. If retainage is specified in the Contract specifications, then a statement of certification that the subcontractors' retainage is being released in accordance with 1.08.01 (Revised or supplemented).

Failure by the Contractor to provide the required reports may result in CTDOT withholding an amount equal to one percent (1%) of the monthly estimate until the required documentation is received.

The Contractor shall receive DBE credit when a DBE, or any combination of DBEs, perform work under the Contract in accordance with this specification.

Only work actually performed by and/or services provided by DBEs which are certified for such work and/or services, as verified by CTDOT, can be counted toward the DBE goal. Supplies and equipment a DBE purchases or leases from the Contractor or its affiliate cannot be counted toward the goal.

Monitoring of the CUF will occur by CTDOT throughout the life of the project. If it is unclear that the DBE is performing the work specified in its subcontract with the prime Contractor, further review may be required. If it is determined that the DBE is not performing a CUF, then the work performed by that DBE will not be counted towards the DBE goal percentage.

## **B. Subcontract Requirements**

The Contractor shall submit to CTDOT's OOC all requests for subcontractor approvals on the standard CLA-12 forms provided by CTDOT. The dollar amount and items of work identified on the CLA-12 form must, at minimum, equal the dollar value submitted in the pre-award commitment. CLA-12 forms can be found at <http://www.ct.gov/dot/construction> under the "Subcontractor Approval" section. All DBE subcontractors must be identified on the CLA-12 form, regardless of whether they are being utilized to meet a Contract goal percentage. A copy of the legal Contract between the Contractor and the DBE subcontractor/supplier, a copy of the Title VI Contractor Assurances and a copy of the Required Contract Provision for Federal Aid Construction Contracts (Form FHWA-1273) (Federal Highway Administration projects only) must be submitted along with a request for subcontractor approval. These attachments cannot be substituted by reference.

If retainage is specified in the Contract specifications, then the subcontract agreement must contain a prompt payment mechanism that acts in accordance with Article 1.08.01 (Revised or supplemented).

If the Contract specifications do not contain a retainage clause, the Contractor shall not include a retainage clause in any subcontract agreement, and in this case, if a Contractor does include a retainage clause, it shall be deemed unenforceable.

In addition, the following documents are to be included with the CLA-12, if applicable:

- An explanation indicating who will purchase material.
- A statement explaining any method or arrangement for utilization of the Contractor's equipment.

The subcontract must show items of work to be performed, unit prices and, if a partial item, the work involved by all parties. If the subcontract items of work or unit prices are modified, the procedure established in Section II-C must be followed.

Should a DBE subcontractor further sublet items of work assigned to it, only lower tier subcontractors who are certified as a DBE firm will be counted toward the DBE goal. If the lower tier subcontractor is a non-DBE firm, the value of the work performed by that firm will not be counted as credit toward the DBE goal.

The use of joint checks between a DBE firm and the Contractor is acceptable, provided that written approval is received from the OOC prior to the issuance of any joint check. Should it become necessary to issue a joint check between the DBE firm and the Contractor to purchase materials, the DBE firm must be responsible for negotiating the cost, determining the quality and quantity, ordering the material and installing (where applicable), and administering the payment to the supplier. The Contractor should not make payment directly to suppliers.

Each subcontract the Contractor signs with a subcontractor must contain the following assurance:

"The subcontractor/supplier/manufacture shall not discriminate on the basis of race, color, national origin, or sex in the performance of this contract. The contractor shall carry out applicable requirements of 49 CFR Part 26 in the award and administration of DOT-assisted contracts. Failure by the contractor/subcontractor/supplier/manufacture to carry out these requirements is a material breach of this contract, which may result in the termination of this contract or such other remedy as the recipient deems appropriate."

## **C. Modification to Pre-Award Commitment**

Contractors may not terminate for convenience any DBE subcontractor or supplier that was listed on the pre-award DBE commitment without prior written approval of the OOC. This includes, but is not limited to, instances



in which a Contractor seeks to perform work originally designated for a DBE subcontractor with its own forces or those of an affiliate, a non-DBE firm, or with another DBE firm. Prior to approval, the Contractor must demonstrate to the satisfaction of the OOC, that it has good cause, as found in 49CFR Part 26.53 (f)(3), for termination of the DBE firm.

Before transmitting its request for approval to terminate pre-award DBE firms to the OOC, the Contractor must give written notice to the DBE subcontractor and include a copy to the OOC of its notice to terminate and/or substitute, and the reason for the notice.

The Contractor must provide five (5) days for the affected DBE firm to respond. This affords the DBE firm the opportunity to advise the OOC and the Contractor of any reasons why it objects to the termination of its subcontract and why the OOC should not approve the Contractor's action.

Once the Contract is awarded, should there be any amendments or modifications of the approved pre-award DBE submission other than termination of a DBE firm, the Contractor shall follow the procedure below that best meets the criteria associated with the reason for modification:

1. If the change is due to a scope of work revision or non-routine quantity revision by CTDOT, the Contractor must notify CTDOT's OOC in writing or via electronic mail that their DBE participation on the project may be impacted as soon as they are aware of the change. In this case, a release of work from the DBE firm may not be required; however the Contractor must concurrently notify the DBE firm in writing, and copy the OOC for inclusion in the project DBE file. This does not relieve the Contractor of its obligation to meet the Contract specified DBE goal, or of any other responsibility found in this specification.
2. If the change is due to a factor other than a CTDOT directive, a request for approval in writing or via electronic mail of the modification from the OOC must be submitted, along with an explanation of the change(s), prior to the commencement of work. The Contractor must also obtain a letter of release from the originally named DBE indicating their concurrence with the change, and the reason(s) for their inability to perform the work. In the event a release cannot be obtained, the Contractor must document all efforts made to obtain it.
3. In the event a DBE firm that was listed in the pre-award documents is **unable** or **unwilling** to perform the work assigned, the Contractor shall:
  - Notify the OOC Division Chief immediately and make efforts to obtain a release of work from the firm.
  - Submit documentation that will provide a basis for the change to the OOC for review and approval prior to the implementation of the change.
  - Use the DBE Directory to identify and contact firms certified to perform the type of work that was assigned to the unable or unwilling DBE firm. The Contractor should also contact CTDOT's Office of Contract Compliance for assistance in locating additional DBE firms to the extent needed to meet the contract goal.

Should a DBE subcontractor be terminated or fail to complete work on the Contract for any reason, the Contractor must make a GFE to find another DBE subcontractor to substitute for the original DBE. The DBE replacement shall be given every opportunity to perform at least the same amount of work under the Contract as the original DBE subcontractor.

If the Contractor is unable to find a DBE replacement:

- The Contractor should identify other contracting opportunities and solicit DBE firms in an effort to meet the Contract DBE goal requirement, if necessary, and provide documentation to support a GFE. (Refer to GFE in Section III.)
- The Contractor must demonstrate that the originally named DBE, who is unable or unwilling to perform the work assigned, is in default of its subcontract, or identify other issues that affected the DBE firm's ability to perform the assigned work. **The Contractor's ability to negotiate a more advantageous agreement with another subcontractor is not a valid basis for change.**

### **III. GOOD FAITH EFFORTS**

The DBE goal is **NOT** reduced or waived for projects where the Contractor receives a Pre-Award GFE determination from the Office of Contract Compliance prior to the award of the Contract. It remains the responsibility of the Contractor to make a continuing GFE to achieve the specified Contract DBE goal. The Contractor shall pursue every available opportunity to obtain additional DBE firms and document all efforts made in such attempts.

At the completion of all Contract work, the Contractor shall submit a final report to CTDOT's unit administering the Contract indicating the work done by and the dollars paid to DBEs. Only verified payments made to DBEs performing a CUF will be counted towards the Contract goal.

Goal attainment is based on the total Contract value, which includes all construction orders created during the Contract. If the Contractor does not achieve the specified Contract goal for DBE participation or has not provided the value of work to the DBE firms originally committed to in the pre-award submission, the Contractor shall submit documentation to CTDOT's unit administering the Contract detailing the GFE made during the performance of the Contract to satisfy the goal.

A GFE should consist of the following, where applicable (CTDOT reserves the right to request additional information):

1. A detailed statement of the efforts made to replace an unable or unwilling DBE firm, and a description of any additional subcontracting opportunities that were identified and offered to DBE firms in order to increase the likelihood of achieving the stated goal.
2. A detailed statement, including documentation of the efforts made to contact and solicit bids from certified DBEs, including the names, addresses, and telephone numbers of each DBE firm contacted; the date of contact and a description of the information provided to each DBE regarding the scope of services and anticipated time schedule of work items proposed to be subcontracted and the response from firms contacted.
3. Provide a detailed explanation for each DBE that submitted a subcontract proposal which the Contractor considered to be unacceptable stating the reason(s) for this conclusion.
4. Provide documentation, if any, to support contacts made with CTDOT requesting assistance in satisfying the specified Contract goal.

5. Provide documentation of all other efforts undertaken by the Contractor to meet the defined goal. Additional documentation of efforts made to obtain DBE firms may include but will not be limited to:
  - Negotiations held in good faith with interested DBE firms, not rejecting them without sound reasons.
  - Written notice provided to a reasonable number of specific DBE firms in sufficient time to allow effective participation.
  - Those portions of work that could be performed by readily available DBE firms.

**In instances where the Contractor can adequately document or substantiate its GFE and compliance with other DBE Program requirements, the Contractor will have satisfied the DBE requirement and no administrative remedies will be imposed.**

#### **IV. PROJECT COMPLETION**

At the completion of all Contract work, the Contractor shall:

1. Submit a final report to CTDOT's unit administering the Contract indicating the work done by, and the dollars paid to DBEs.
2. Submit verified payments made to all DBE subcontractors for the work that was completed.
3. Submit documentation detailing any changes to the DBE pre-award subcontractors that have not met the original DBE pre-award commitment, including copies of the Department's approvals of those changes.
4. Retain all records for a period of three (3) years following acceptance by CTDOT of the Contract and those records shall be available at reasonable times and places for inspection by authorized representatives of CTDOT and Federal agencies. If any litigation, claim, or audit is started before the expiration of the three (3) year period, the records shall be retained until all litigation, claims, or audit findings involving the records are resolved.

If the Contractor does not achieve the specified Contract goal for DBE participation in addition to meeting the dollar value committed to the DBE subcontractors identified in the pre-award commitment, the Contractor shall submit documentation to CTDOT's unit administering the Contract detailing the GFE made during the performance of the Contract to satisfy the goal.

#### **V. SHORTFALLS**

##### **A. Failure to meet DBE goals**

**As specified in (II-A) above, attainment of the Contract DBE goal is based on the final Contract value.** The Contractor is expected to achieve the amount of DBE participation originally committed to at the time of award; however, additional efforts must be made to provide opportunities to DBE firms in the event a Contract's original value is increased during the life of the Contract.

The Contractor is expected to utilize the DBE subcontractors originally committed in the DBE pre-award documentation for the work and dollar value that was originally assigned.

If a DBE is terminated or is unable or unwilling to complete its work on a Contract, the Contractor shall make a GFE to replace that DBE with another certified DBE to meet the Contract goal.

The Contractor shall immediately notify the OOC of the DBE's inability or unwillingness to perform, and provide reasonable documentation and make efforts to obtain a release of work from the firm.

If the Contractor is unable to find a DBE replacement, then the Contractor should identify other contracting opportunities and solicit DBE firms in an effort to meet the Contract DBE goal requirement, if necessary, and provide documentation to support a GFE.

When a DBE is unable or unwilling to perform, or is terminated for just cause, the Contractor shall make a GFE to find other DBE opportunities to increase DBE participation to the extent necessary to at least satisfy the Contract goal.

For any DBE pre-award subcontractor that has been released appropriately from the project, no remedy will be assessed, provided that the Contractor has met the criteria described in Section II-C.

#### **B. Administrative Remedies for Non-Compliance:**

In cases where the Contractor has failed to meet the Contract specified DBE goal or the DBE pre-award commitment, and where no GFE has been demonstrated, then one or more of the following administrative remedies will be applied:

1. A reduction in Contract payments to the Contractor as determined by CTDOT, not to exceed the shortfall amount of the **DBE goal**. The maximum shortfall will be calculated by multiplying the Contract DBE goal (adjusted by any applicable GFE) by the final Contract value, and subtracting any verified final payments made to DBE firms by the Contractor.
2. A reduction in Contract payments to the Contractor determined by CTDOT, not to exceed the shortfall amount of the **pre-award commitment**. The maximum shortfall will be calculated by subtracting any verified final payments made by the Contractor to each DBE subcontractor from the amount originally committed to that subcontractor in the pre-award commitment.
3. A reduction in Contract payments to the Contractor determined by CTDOT for any pre-award DBE subcontractor who has not obtained the dollar value of work identified in the DBE pre-award commitment and has not followed the requirements of Section II-C or for any DBE firm submitted for DBE credit that has not performed a CUF.
4. The Contractor being required to submit a written DBE Program Corrective Action Plan to CTDOT for review and approval, which is aimed at ensuring compliance on future projects.
5. The Contractor being required to attend a Non-Responsibility Meeting on the next contract where it is the apparent low bidder.
6. The Contractor being suspended from bidding on contracts for a period not to exceed six (6) months.

## **VI. CLASSIFICATIONS OTHER THAN SUBCONTRACTORS**

### **A. Material Manufacturers**

Credit for DBE manufacturers is 100% of the value of the manufactured product. A manufacturer is a firm that operates or maintains a factory or establishment that produces on the premises the materials or supplies obtained by the Contractor.

If the Contractor elects to utilize a DBE manufacturer to satisfy a portion of, or the entire specified DBE goal, the Contractor must provide the OOC with:

- Subcontractor Approval Form (CLA-12) indicating the firm designation,
- An executed "Affidavit for the Utilization of Material Suppliers or Manufacturers" (sample attached), and
- Substantiation of payments made to the supplier or manufacturer for materials used on the project.

### **B. Material Suppliers (Dealers)**

Credit for DBE dealers/suppliers is limited to 60% of the value of the material to be supplied, provided such material is obtained from an approved DBE dealer/supplier.

In order for a firm to be considered a regular dealer, the firm must own, operate, or maintain a store, warehouse, or other establishment in which the materials, supplies, articles or equipment of the general character described by the specifications and required under the contract are bought, kept in stock, and regularly sold or leased to the public in the usual course of business. At least one of the following criteria must apply:

- To be a regular dealer, the firm must be an established, regular business that engages, as its principal business and under its own name, in the purchase and sale or lease of the products in question.
- A person may be a regular dealer in such bulk items as petroleum products, steel, cement, gravel, stone, or asphalt without owning, operating or maintaining a place of business if the person both owns and operates distribution equipment for the products. Any supplementing of the regular dealers' own distribution equipment shall be by long term lease agreement, and not on an ad hoc or contract to contract basis.
- Packagers, brokers, manufacturers' representatives, or other persons who arrange or expedite transactions are not regular dealers within the meaning of this paragraph.

If the Contractor elects to utilize a DBE supplier to satisfy a portion or the entire specified DBE goal, the Contractor must provide the OOC with:

- Subcontractor Approval Form (CLA-12) indicating the firm designation,
- An executed "Affidavit for the Utilization of Material Suppliers or Manufacturers" (sample attached), and
- Substantiation of payments made to the supplier or manufacturer for materials used on the project.

### **C. Brokering**

- Brokering of work for DBE firms who have been listed by the Department as certified brokers is allowed. Credit for those firms shall be applied following the procedures in Section VI-D.
- Brokering of work by DBEs who have been approved to perform subcontract work with their own workforce and equipment is not allowed, and is a Contract violation.

- Firms involved in the brokering of work, whether they are DBEs and/or majority firms who engage in willful falsification, distortion or misrepresentation with respect to any facts related to the project shall be referred to the U.S. DOT, Office of the Inspector General for prosecution under Title 18, U.S. Code, Part I, Chapter 47, Section 1020.

#### **D. Non-Manufacturing or Non-Supplier DBE Credit**

Contractors may count towards their DBE goals the following expenditures with DBEs that are not manufacturers or suppliers:

- Reasonable fees or commissions charged for providing a bona fide service such as professional, technical, consultant or managerial services and assistance in the procurement of essential personnel, facilities, equipment materials or supplies necessary for the performance of the Contract, provided that the fee or commission is determined by the OOC to be reasonable and consistent with fees customarily allowed for similar services.
- The fees charged only for delivery of materials and supplies required on a job site when the hauler, trucker, or delivery service is a DBE, and not the manufacturer, or regular dealer of the materials and supplies, and provided that the fees are determined by the OOC to be reasonable and not excessive as compared with fees customarily allowed for similar services.
- The fees or commissions charged for providing bonds or insurance specifically required for the performance of the Contract, provided that the fees or commissions are determined by CTDOT to be reasonable and not excessive as compared with fees customarily allowed for similar services.

#### **E. Trucking**

While technically still considered a subcontractor, the rules for counting credit for DBE trucking firms are as follows:

- The DBE must own and operate at least one fully licensed, insured, and operational truck used on the Contract.
- The DBE receives credit for the total value of the transportation services it provides on the Contract using trucks it owns, insures and operates using drivers it employs.
- The DBE may lease trucks from another DBE firm, including an owner-operator who is certified as a DBE. The DBE who leases trucks from another DBE receives credit for the total value of the transportation services the lessee DBE provides on the Contract.
- The DBE may lease trucks from a non-DBE firm; however the DBE may only receive credit for any fees or commissions received for arranging transportation services provided by the non-DBE firms. Additionally, the DBE firm must demonstrate that they are in full control of the trucking operation for which they are seeking credit.

#### **VII. Suspected DBE Fraud**

In appropriate cases, CTDOT will bring to the attention of the USDOT any appearance of false, fraudulent, or dishonest conduct in connection with the DBE program, so that USDOT can take the steps, e.g. referral to the

Department of Justice for criminal prosecution, referral to USDOT Inspector General, action under suspension and debarment or Program Fraud and Civil Penalties rules provided in 49 CFR Part 31.

**CONNECTICUT DEPARTMENT OF TRANSPORTATION  
(OFFICE OF CONSTRUCTION)  
BUREAU OF ENGINEERING AND CONSTRUCTION**

This affidavit must be completed by the State Contractor's DBE notarized and attached to the contractor's request to utilize a DBE supplier or manufacturer as a credit towards its DBE contract requirements; failure to do so will result in not receiving credit towards the contract DBE requirement.

State Contract No.

Federal Aid Project No.

Description of Project

I, \_\_\_\_\_, acting in behalf of \_\_\_\_\_,  
(Name of person signing Affidavit) (DBE person, firm, association or corporation)

of which I am the \_\_\_\_\_ certify and affirm that \_\_\_\_\_  
(Title of Person) (DBE person, firm, association or corporation)

is a certified Connecticut Department of Transportation DBE. I further certify and affirm that I have read and understand 49 CFR, Sec. 26.55(e)(2), as the same may be revised.

I further certify and affirm that \_\_\_\_\_ will assume the actual and  
(DBE person, firm, association or Corporation)

for the provision of the materials and/or supplies sought by \_\_\_\_\_.

If a manufacturer, I operate or maintain a factory or establishment that produces, on the premises, the materials, supplies, articles or equipment required under the contract an of the general character described by the specifications.

If a supplier, I perform a commercially useful function in the supply process. As a regular dealer, I, at a minimum, own and operate the distribution equipment for bulk items. Any supplementing of my distribution equipment shall be by long-term lease agreement, and not on an ad hoc or contract-by-contract basis.

I understand that false statements made herein are punishable by Law (Sec. 53a-157), CGS, as revised).

(Name of Corporation or Firm)

(Signature & Title of Official making the Affidavit)

Subscribed and sworn to before me, this \_\_\_\_\_ day of \_\_\_\_\_ 20 \_\_\_\_\_.

Notary Public (Commissioner of the Superior Court)

My Commission Expires \_\_\_\_\_

**CERTIFICATE OF CORPORATION**

I, \_\_\_\_\_, certify that I am the \_\_\_\_\_  
(Official) (President)

of the Corporation named in the foregoing instrument; that I have been duly authorized to affix the seal of the Corporation to such papers as require the seal; that \_\_\_\_\_, who signed said instrument on behalf of the Corporation, was then \_\_\_\_\_ of said corporation; that said instrument was duly signed for and in behalf of said Corporation by authority of its governing body and is within the scope of its corporation powers.

\_\_\_\_\_  
(Signature of Person Certifying)

\_\_\_\_\_  
(Date)

GENERAL



## **ITEM #0020903A – LEAD COMPLIANCE FOR MISCELLANEOUS EXTERIOR TASKS**

### **Description:**

Work under this item shall include the special handling measures and work practices required for miscellaneous exterior tasks that impact materials containing or covered by lead paint. Lead paint includes paint found to contain **any** detectable amount of lead by Atomic Absorption Spectrophotometry (AAS) or X-Ray Fluorescence (XRF). Examples of typical miscellaneous exterior tasks includes; work impacting signs, guiderails, minor bridge rehabilitation, catenary structures, canopy structures, spot paint removal, etc.

All activities shall be performed in accordance with the OSHA Lead in Construction Regulations (29 CFR 1926.62), the USEPA RCRA Hazardous Waste Regulations (40 CFR Parts 260 through 274), and the CTDEEP Hazardous Waste Regulations (RCSA 22a-209-1 and 22a-449(c)).

All activities shall be performed by individuals with appropriate levels of OSHA lead awareness and hazard communication training and shall supervised by the Contractors Competent Person on the job site at all times. The Contractors Competent Person is one who is capable of identifying existing and predictable hazards in the surroundings or working conditions which are unsanitary, hazardous or dangerous to employees, and who has authorization to take prompt corrective measures to eliminate them.

Deviations from these Specifications require the written approval of the Engineer.

### **Materials:**

All materials shall be delivered to the job site in the original packages, containers, or bundles bearing the name of the manufacturer, the brand name and product technical description, with MSDS sheets as applicable.

No damaged or deteriorating materials shall be used. If material becomes contaminated with lead, the material shall be decontaminated or disposed of as lead-containing waste material. The cost to decontaminate and dispose of this material shall be at the expense of the Contractor.

The following material requirements are to be met if to be used during the work:

Fire retardant polyethylene sheet shall be in roll size to minimize the frequency of joints, with factory label indicating minimum six (6) mil thickness.

Polyethylene disposable bags shall be minimum six (6) mils thick.

Tape (or equivalent) product capable of sealing joints in adjacent polyethylene sheets and for the attachment of polyethylene sheets to finished or unfinished surfaces must be capable of adhering under both dry and wet conditions.

Cleaning Agents and detergent shall be lead specific, such as TriSodium Phosphate (TSP).

Chemical strippers and chemical neutralizers shall be compatible with the substrate as well as with each other. Such chemical stripper shall contain less than 50% Volatile Organic Compounds (VOCs) by weight in accordance with RCSA 22a-174-40 Table 40-1.

Labels and warning signs shall conform to 29 CFR 1926.62, 40 CFR 260 through 274 and 49 CFR 172 as appropriate.

Air filtration devices and vacuum units shall be equipped with High-Efficiency Particulate Air (HEPA) filters.

### **Construction Methods:**

#### **(1) Pre-Abatement Submittals and Notices**

A. Prior to the start of **any** work on a contiguous per site basis that will generate hazardous lead waste above conditionally exempt small quantities (greater than 100 kg/month or greater than 1000 kg at any time), the Contractor shall obtain from the Engineer on a contiguous per site basis a temporary EPA Hazardous Waste Generators ID number, unless otherwise directed by the Engineer.

B. Fifteen (15) working days prior to beginning work that impacts lead paint, the Contractor shall submit the following to the Engineer:

1. Work plan for work impacting lead paint including engineering controls, methods of containment of debris and work practices to be employed, as needed, to minimize employee exposure and prevent the spread of lead contamination outside the Regulated Area.
2. Copies of all employee certificates, dated within the previous twelve (12) months, relating to OSHA lead awareness and hazard communication training and training in the use of lead-safe work practices. SSPC training programs may be accepted as meeting these requirements if it can be demonstrated that such training addressed all required topics.

This information shall be updated and resubmitted annually, or as information changes, for the duration of the activities impacting lead to verify continued compliance.

3. Name and qualifications of Contractor's OSHA Competent Person under 29 CFR 1926.62.
4. Documentation from the Contractor, typed on company letterhead and signed by the Contractor, certifying that all employees listed therein have received the following:
  - a. medical monitoring within the previous twelve (12) months, as required in 29 CFR 1926.62;
  - b. biological monitoring within the previous six (6) months, as required in 29 CFR 1926.62;
  - c. respirator fit testing within the previous twelve (12) months, as required in 29 CFR 1910.134 (for those who don a tight-fitting face piece respirator)

This information shall be updated and resubmitted annually, or as information changes, for the duration of the activities impacting lead to verify continued compliance.

5. Names of the proposed non-hazardous construction and demolition (C&D) lead debris bulky waste disposal facility (CTDEEP-permitted Solid Waste landfill).
6. Names of the proposed scrap metal recycling facilities. The Contractor shall submit to the Engineer all documentation necessary to demonstrate the selected facility is able to accept lead-painted scrap metal.
7. Names of the proposed hazardous waste disposal facility (selected from the Department approved list provided herein), and copies of each facilities acceptance criteria and sampling frequency requirements.
8. Copies of the proposed hazardous waste transporters current USDOT Certificate of Registration for Hazardous Materials Transport, and the proposed transporters current Hazardous Waste Transporter Permits for the State of Connecticut and the waste destination State.
9. Negative exposure assessments conducted within the previous 12 months documenting that employee exposure to lead for each task is below the OSHA Action Level of  $30 \mu\text{g}/\text{m}^3$ . If a negative exposure assessment has not been conducted, the Contractor shall submit its air monitoring program for the work tasks as part of the Work Plan. Until a negative exposure assessment is developed for each task impacting lead paint, the Contractor shall ensure that all workers and authorized persons entering the Regulated Area wear protective clothing and respirators in accordance with OSHA 29 CFR 1926.62.

No activity shall commence until all required submittals have been received and found acceptable to the Engineer. Those employees added to the Contractor's original list will be

allowed to perform work only upon submittal of acceptable documentation to, and review by, the Engineer.

Contractor shall provide the Engineer with a minimum of 48 hours notice in advance of scheduling, changing or canceling work activities.

## **(2) Lead Abatement Provisions**

### **A. General Requirements:**

All employees of the Contractor who perform work impacting lead paint shall be properly trained to perform such duties. In addition, the Contractor shall instruct all workers in all aspects of personnel protection, work procedures, emergency evacuation procedures and use of equipment including procedures unique to this project.

Contractor shall provide all labor, materials, tools, equipment, services, testing, and incidentals which are necessary or required to perform the work in accordance with applicable governmental regulations, industry standards and codes, and these Specifications.

Prior to beginning work, the Engineer and Contractor shall perform a visual survey of each work area and review conditions.

As necessary, the Contractor shall:

Shut down and lock out electrical power, including all receptacles and light fixtures, where feasible. The use or isolation of electrical power will be coordinated with all other ongoing uses of electrical power at the site.

If adequate electrical supply is not available at the site, the Contractor shall supply temporary power. Such temporary power shall be sufficient to provide adequate lighting and power the Contractor's equipment. The Contractor is responsible for proper connection and installation of electrical wiring and shall ensure safe installation of electrical equipment in compliance with applicable electrical codes and OSHA requirements.

If water is not available at the site for the Contractor's use, the Contractor shall supply sufficient water for each shift to operate the wash facility/decontamination shower units in addition to the water needed at the work area.

The Engineer may provide a Project Monitor to monitor compliance of the Contractor and protect the interests of the Department. In such cases, no activity impacting lead paint shall be performed until the Project Monitor is on-site. Where no Project Monitor will be provided, Contractor shall proceed at the direction of the Engineer. Environmental sampling, including ambient air sampling, TCLP waste stream sampling, and dust wipe sampling, will be conducted by the State as it deems necessary throughout the project. Air monitoring to comply with the Contractor's obligations under OSHA remains solely responsibility of the Contractor.

If at any time, procedures for engineering, work practice, administrative controls or other topics are anticipated to deviate from those documented in the submitted and accepted Lead Work Plan, the Contractor shall submit a modification of its existing plan for review and acceptance by the Engineer prior to implementing the change.

If air samples collected outside of the Regulated Area during activities impacting lead paint indicate airborne lead concentrations greater than original background levels or  $30 \mu\text{g}/\text{m}^3$ , whichever is larger, or if at any time visible emissions of lead paint extend out from the Regulated Area, an examination of the Regulated Area shall be conducted and the cause of such emissions corrected. Cleanup of surfaces outside the Regulated Area using HEPA vacuum equipment or wet cleaning techniques shall be done prior to resuming work.

Work outside the initial designated area(s) will not be paid for by the Engineer. The Contractor will be responsible for all costs incurred from these activities including repair of any damage.

#### B. Regulated Area

The Contractor shall establish a Regulated Area through the use of appropriate barrier tape or other means to control unauthorized access into the area where activities impacting lead paint are occurring. Warning signs meeting the requirements of 29 CFR 1926.62 shall be posted at all approaches to Regulated Areas. These signs shall read:

WARNING  
LEAD WORK AREA  
POISON  
NO SMOKING OR EATING

The Contractor shall implement appropriate engineering controls such as poly drop cloths, local exhaust ventilation, wet dust suppression methods, etc. as necessary, and as approved by the Engineer, to prevent the spread of lead contamination beyond the Regulated Area in accordance with the Contractor's approved work plan. Should the previously submitted work plan prove to be insufficient to contain the contamination, the Contractor shall modify its plan and submit it for review by the Engineer.

#### C. Wash Facilities:

The Contractor shall provide handwash facilities in compliance with 29 CFR 1926.51(f) and 29 CFR 1926.62 regardless of airborne lead exposure.

If employee exposure to airborne lead exceeds the OSHA Permissible Exposure Limit of 50 micrograms per cubic meter ( $\mu\text{g}/\text{m}^3$ ), shower rooms must be provided. The Shower Room shall be of sufficient capacity to accommodate the number of workers. One shower stall shall be provided for each eight (8) workers. Showers shall be equipped with hot and cold or warm

running water. Shower water shall be collected and filtered using best available technology and disposed of in accordance with all Federal, State and local laws, regulations and ordinances.

#### D. Personal Protection:

The Contractor shall initially determine if any employee performing construction tasks impacting lead paint may be exposed to lead at or above the OSHA Action Level of  $30 \mu\text{g}/\text{m}^3$ . Assessments shall be based on initial air monitoring results as well as other relevant information. The Contractor may rely on historical air monitoring data obtained within the past 12 months under workplace conditions closely resembling the process, type of material, control methods, work practices and environmental conditions used and prevailing in the Contractor's current operations to satisfy the exposure assessment requirements. Monitoring shall continue as specified in the OSHA standard until a negative exposure assessment is developed.

Until a negative exposure assessment is developed for each task impacting lead paint, the Contractor shall ensure that all workers and authorized person entering the Regulated Area wear protective clothing and respirators in accordance with OSHA 29 CFR 1926.62. Protective clothing shall include impervious coveralls with elastic wrists and ankles, head covering, gloves and foot coverings. Sufficient quantities shall be provided to last throughout the duration of the project.

Protective clothing provided by the Contractor and used during chemical removal operations shall be impervious to caustic materials. Gloves provided by the Contractor and used during chemical removal shall be of neoprene composition with glove extenders.

Respiratory protective equipment shall be provided and selection shall conform to 42 CFR Part 84, 29 CFR Part 1910.134, and 29 CFR Part 1926.62. A formal respiratory protection program must be implemented in accordance with 29 CFR Part 1926.62 and Part 1910.134.

#### E. Air Monitoring Requirements

The Contractor shall:

1. Provide air monitoring equipment including sample filter cassettes of the type and quantity required to properly monitor operations and personnel exposure surveillance throughout the duration of the project.
2. Conduct initial exposure monitoring to determine if any employee performing construction tasks impacting lead paint may be exposed to lead at or above the OSHA Action Level of 30 micrograms per cubic meter. Monitoring shall continue as specified in the OSHA standard until a negative exposure assessment is developed.
3. Conduct personnel exposure assessment air sampling, as necessary, to assure that workers are using appropriate respiratory protection in accordance with OSHA Standard 1926.62. Documentation of air sampling results must be recorded at the

work site within twenty-four (24) hours and shall be available for review until the job is complete.

#### F. Lead Abatement Procedures

The Contractor's Competent Person shall be at the job site at all times during work impacting lead.

Work impacting lead paint shall not begin until authorized by the Engineer, following a pre-work visual inspection by the Project Monitor or Engineer to verify existing conditions.

Any activity impacting lead painted surfaces shall be performed in a manner which minimizes the spread of lead dust contamination and generation of airborne lead.

**The Contractor shall conduct exposure assessments for all tasks which impact lead paint in accordance with 29 CFR 1926.62(d) and shall implement appropriate personal protective equipment until negative exposure assessments are developed.**

**All work impacting the materials identified below shall be conducted within an established Regulated Area with a remote wash facility/decontamination system in accordance with "C. Wash Facilities" and the OSHA Lead in Construction Standard. In accordance with 29 CFR 1926.62, engineering controls and work practices shall be utilized to prevent the spread of lead dust and debris beyond the Regulated Area and limit the generation of airborne lead. All wastes containing lead paint shall be properly contained and secured for storage, transportation and disposal.**

The Contractor shall ensure proper entry and exit procedures for workers and authorized persons who enter and leave the Regulated Area. All workers and authorized persons shall leave the Regulated Area and proceed directly to the wash or shower facilities where they will HEPA vacuum gross debris from work suit, remove and dispose of work suit, wash and dry face and hands, and vacuum clothes. Lead chips and dust must not be removed by blowing or shaking of clothing. Wash water shall be collected, filtered, and disposed of in accordance with Federal, State and local water discharge standards. Any permit required for such discharge shall be the responsibility of the Contractor.

No one shall eat, drink, smoke, chew gum or tobacco, or apply cosmetics while in the Regulated Area.

Data from the limited lead testing performed by the Engineer is documented in the reports listed in the "Notice to Contractor – Hazardous Materials Investigations" or is presented herein. Under no circumstances shall this information be the sole means used by the Contractor for determining the extent of lead painted materials. The Contractor shall be responsible for verification of all field conditions affecting performance of the work as described in these Specifications in accordance with OSHA, USEPA, USDOT and CTDEEP standards. Compliance with the applicable requirements is solely the responsibility of the Contractor.

The following details the extent of each phase of operation designated for this project. Phase areas may be combined or divided at the direction of the Engineer. Proceed through the sequencing of the work phases under the direction of the Engineer.

**Bridge No. 00196, I-95 over Route 1, Branford**

- Detectable amounts of lead were identified on the painted structural steel/metal bridge surfaces of Bridge No. 00196.

<b>Girders, Cross Beams, Beam Ends, Bearings, Rockers, Connection Plates, Diaphragms, etc.</b>	<b>Metal</b>	<b>Grey</b>	<b>5.4-13.2 mg/cm<sup>2</sup></b>
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- TCLP waste stream sampling/analysis of the paint associated with the structural steel/metal bridge component surfaces characterized the paint waste as RCRA/CTDEEP hazardous waste.

<b>Paint debris (railing components)</b>	<b>230 mg/l</b>
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**Traffic Signal Int. No. 14-233, Branford**

- Span poles were either wood or galvanized (unpainted).
- Pedestrian crosswalk pedestals were galvanized (unpainted).
- Detectable amounts of lead in paint were found on the metal yellow & green traffic signals themselves and the metal yellow crosswalk push buttons.
- No detectable amounts of lead in paint were found on the metal controller cabinet.

<b>Traffic light components</b>	<b>Metal</b>	<b>Green</b>	<b>0.1 mg/cm<sup>2</sup></b>
<b>Traffic light components &amp; Cross Walk Push Buttons</b>	<b>Metal</b>	<b>Yellow</b>	<b>0.1 mg/cm<sup>2</sup> 9.1% by weight</b>
<b>Control Cabinet</b>	<b>Metal</b>	<b>Grey</b>	<b>0.0 mg/cm<sup>2</sup> ND&lt;0.10% by weight</b>

- TCLP waste stream sampling/analysis of the paint associated with the metal green traffic signals themselves characterized the paint waste as non-hazardous, non-RCRA waste.

<b>Paint debris (green traffic components)</b>	<b>0.25 mg/l</b>
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- **TCLP waste stream sampling/analysis of the paint associated with the metal yellow traffic signals themselves and metal yellow crosswalk push buttons characterized the paint waste as non-hazardous, non-RCRA waste.**

<b>Paint debris (yellow traffic components)</b>	<b>0.61 mg/l</b>
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- **Since no detectable amounts of lead were present on painted metal controller cabinet any paint waste generated would be classified as non-hazardous, non-RCRA waste.**

**Traffic Signal Int. No. 14-237, Branford**

- **Span poles were galvanized (unpainted).**
- **Pedestrian crosswalk pedestals were galvanized (unpainted).**
- **Detectable amounts of lead in paint were found on the metal green traffic signals themselves and metal green crosswalk push buttons.**
- **No detectable amounts of lead in paint were found on the metal controller cabinet.**

<b>Traffic light components &amp; Cross Walk Push Buttons</b>	<b>Metal</b>	<b>Green</b>	<b>0.1 mg/cm<sup>2</sup></b>
<b>Control Cabinet</b>	<b>Metal</b>	<b>Grey</b>	<b>0.0 mg/cm<sup>2</sup> ND&lt;0.10% by weight</b>

- **TCLP waste stream sampling/analysis of the paint associated with the metal green traffic signals themselves and green crosswalk push buttons characterized the paint waste as non-hazardous, non-RCRA waste.**

<b>Paint debris (green traffic components)</b>	<b>0.25 mg/l</b>
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- **Since no detectable amounts of lead were present on painted metal controller cabinet any paint waste generated would be classified as non-hazardous, non-RCRA waste.**

**While conducting work to the bridge/traffic signal intersections, where it is necessary to impact the lead painted surfaces, the Contractor shall either:**

- Remove the paint to be impacted prior to impacting the substrate in accordance with OSHA Lead in Construction Standard 29CFR 1926.62, or**
- Impact the substrate using mechanical means with the paint in place in accordance with OSHA Lead in Construction Standard 29CFR 1926.62.**

**The Contractor shall submit a Work Plan to ConnDOT outlining the exact procedures that will be used to perform the work, contain the spread of lead debris and protect the employees performing the required renovation work impacting the lead paint. No work shall be started by the Contractor until the Work Plan is approved by the Engineer.**

**All work impacting the lead paint materials shall be conducted within an established Regulated Area with a remote wash facility/decontamination system in accordance with “C. Wash Facilities” and the OSHA Lead in Construction Standard. In accordance with 29 CFR 1926.62, engineering controls and work practices shall be utilized to prevent the spread of lead dust and debris beyond the Regulated Area and limit the generation of airborne lead. All wastes containing lead paint shall be properly contained and secured for storage, transportation and disposal.**

**The Engineer has characterized the paint waste stream associated with the structural steel/metal bridge components at Bridge No. 00196 as RCRA hazardous waste. If the paint is removed from the metal bridge surfaces, the paint shall be handled and disposed of in accordance with USEPA/CTDEEP Hazardous Waste Regulations as described under this Item 0020903A.**

**At Intersection Nos. 14-233 & 14-237, the Engineer has characterized the paint waste stream associated with the yellow & green metal traffic signals themselves and the yellow & green metal crosswalk push buttons as non-hazardous. If the paint is required to be removed from the metal surfaces of the green traffic signal components, the paint shall be handled and disposed of as non-hazardous, non-RCRA waste as described under this Item 0020903A.**

**All steel and metal components generated from the miscellaneous exterior work tasks (painted or not) shall be segregated and recycled as scrap metal. The recycling of scrap metal (regardless of lead paint concentration) is exempt from USEPA RCRA and CTDEEP Hazardous Waste Regulation.**

Should lead contamination be discovered outside of the Regulated Area, the Contractor shall immediately stop all work in the Regulated Area, eliminate causes of such contamination and take steps to decontaminate non-work areas.

Special Requirements:

1. Demolition/Renovation:
  - a. Demolish/renovate in a manner which minimizes the spread of lead contamination and generation of lead dust.
  - b. Implement dust suppression controls, such as misters, local exhaust ventilation, etc. to minimize the generation of airborne lead dust.

- c. Segregate work areas from non-work areas through the use of barrier tape, drop cloths, etc.
  - d. Clean up immediately after renovation/demolition has been completed
2. Chemical Removal:
- a. Apply chemical stripper in quantities and for durations specified by manufacturer.
  - b. Where necessary, scrape lead paint from surface down to required level of removal (i.e. stabilized surface, bare substrate with no trace of residual pigment, etc.). Use sanding, hand scraping, and dental picks to supplement chemical methods as necessary.
  - c. Apply neutralizer compatible with substrate and chemical agent to substrate following removal in accordance with manufacturer's instructions.
  - d. Protect adjacent surfaces from damage from chemical removal.
  - e. Maintain a portable eyewash station in the work area.
  - f. Wear respirators that will protect workers from chemical vapors.
  - g. Do not apply caustic agents to aluminum surfaces.
3. Mechanical Paint Removal:
- a. Provide sanders, grinders, rotary wire brushes, or needle gun removers equipped with a HEPA filtered vacuum dust collection system. Cowling on the dust collection system for orbital-type tools must be capable of maintaining a continuous tight seal with the surface being abated. Cowling on the dust collection system for reciprocating-type tools shall promote an effective vacuum flow of loosened dust and debris. Inflexible cowlings may be used on flat surfaces only. Flexible contoured cowlings are required for curved or irregular surfaces.
  - b. Provide HEPA vacuums that are high performance designed to provide maximum static lift and maximum vacuum system flow at the actual operating vacuum condition with the shroud in use. The HEPA vacuum shall be equipped with a pivoting vacuum head.
  - c. Remove lead paint from surface down to required level of removal (i.e. stabilized surface, bare substrate with no trace of residual pigment, etc.). Use chemical methods, hand scraping, and dental picks to supplement abrasive removal methods as necessary.

- d. Protect adjacent surfaces from damage from abrasive removal techniques.
  - e. “Sandblasting” type removal techniques shall not be allowed.
4. Component Removal/Replacement:
- a. Wet down components which are to be removed to reduce the amount of dust generated during the removal process.
  - b. Remove components utilizing hand tools, and follow appropriate safety procedures during removal. Remove the components by approved methods which will provide the least disturbance to the substrate material. Do not damage adjacent surfaces.
  - c. Clean up immediately after component removals have been completed. Remove any dust located behind the component removed.

#### G. Prohibited Removal Methods:

The use of heat guns in excess of 700 degrees Fahrenheit to remove lead paint is prohibited.

The use of sand, steel grit, air, CO<sub>2</sub>, baking soda, or any other blasting media to remove lead or lead paint without the use of a HEPA ventilated contained negative pressure enclosure is prohibited.

Power/pressure washing shall not be used to remove lead paint.

Compressed air shall not be utilized to remove lead paint.

Chemical strippers containing Methylene Chloride are prohibited. Any chemical stripping may be prohibited on a project by project basis.

Power tool assisted grinding, sanding, cutting, or wire brushing of lead paint without the use of cowled HEPA vacuum dust collection systems is prohibited.

Lead paint burning, busting of rivets painted with lead paint, welding of materials painted with lead paint, and torch cutting of materials painted with lead paint is prohibited. Where cutting, welding, busting, or torch cutting of materials is required, lead paint in the affected area must be removed first.

Chemical stripping of coatings from bridge components is generally prohibited unless specifically allowed on a project by project basis.

#### H. Clean-up and Visual Inspection:

The Contractor shall remove and containerize all lead waste material and visible accumulations of debris, paint chips and associated items.

During clean-up the Contractor shall utilize rags and sponges wetted with lead-specific detergent and water as well as HEPA filtered vacuum equipment.

The Engineer will conduct a visual inspection of the work areas in order to document that all surfaces have been maintained as free as practicable of accumulations of lead in accordance with 29 CFR 1926.62(h). If visible accumulations of waste, debris, lead paint chips or dust are found in the work area, the Contractor shall repeat the cleaning, at the Contractor's expense, until the area is in compliance. The visual inspection will detect incomplete work, damage caused by the abatement activity, and inadequate clean up of the work site.

#### I. Post-Work Regulated Area Deregulation:

Following an acceptable visual inspection, any engineering controls implemented may be removed.

A final visual inspection of the work area shall be conducted by the Competent Person and the Project Monitor or Engineer to ensure that all visible accumulations of suspect materials have been removed and that no equipment or materials associated with the lead paint removal remain. If this final visual inspection is acceptable, the Contractor will reopen the Regulated Area and remove all signage.

The Contractor shall restore all work areas and auxiliary areas utilized during work to conditions equal to or better than original. Any damage caused during the performance of the work activity shall be repaired by the Contractor at no additional expense to the State.

#### J. Waste Disposal/Recycling:

Non-metallic building debris waste materials tested and found to be non-hazardous shall be disposed of properly at a CTDEEP approved Solid Waste landfill as described under this Item 0020903A.

Metallic debris shall be segregated and recycled as scrap metal at an approved metal recycling facility.

Concrete, brick, etc. coated with any amount of lead paint cannot be crushed, recycled or buried on-site to minimize waste disposal unless tested and found to meet the RSR GA/Residential standards.

Hazardous lead debris shall be disposed of as described under this Item 0020903A.

The Contractor shall comply with the latest requirements of the USEPA RCRA Hazardous Waste Regulations 40 CFR 260-274 and the DEEP Hazardous/Solid Waste Management Standards 22a-449(c).

**Hazardous lead debris shall be transported from the Project by a licensed hazardous waste transporter approved by the Department and disposed of at an EPA-permitted and Department-approved hazardous waste landfill within 90 days from the date of generation.**

The Contractor must use one or more of the following Department-approved disposal facilities for the disposal of hazardous waste:

Clean Earth of North Jersey, Inc., (CENJ) 115 Jacobus Avenue, South Kearny, NJ 07105 Phone: (973) 344-4004; Fax: (973) 344-8652	Clean Harbors Environmental Services, Inc. 2247 South Highway 71, Kimball, NE 69145 Phone: (308) 235-8212; Fax: (308) 235-4307
Clean Harbors of Braintree, Inc. 1 Hill Avenue, Braintree, MA 02184 Phone: (781) 380-7134; Fax: (781) 380-7193	ACV Enviro(CycleChem)(General Chem Co) 217 South First Street, Elizabeth, NJ 07206 Phone: (908) 355-5800; Fax (908) 355-0562
Triumverate (EnviroSafe Corp Northeast) (Jones Environmental Services (NE), Inc.) 263 Howard Street, Lowell, MA 01852 Phone: (978) 453-7772; Fax: (978) 453-7775	US Ecology Environmental Quality Detroit, Inc. 1923 Frederick Street, Detroit, MI 48211 Phone: (800) 495-6059; Fax: (313) 923-3375
Stericycle (Republic Environmental Systems) 2869 Sandstone Drive, Hatfield, PA 19440 Phone: (215) 822-8995; Fax: (215) 997-1293	Clean Harbors – Spring Grove Facility 4879 Spring Grove Ave, Cincinnati OH 45322 Phone: (513) 681-6242; Fax: (513) 681-0869
Envirite of PA (US Ecology) 730 Vogelsong Road, York, PA 17404 Phone: (717) 846-1900; Fax: (717) 854-6757	Stablex, Canada, Inc. 760 Industrial Bl, Blainville Quebec J7C3V4 Phone: (451) 430-9230; Fax: (451) 430-4642
Environmental Quality Company: Wayne Disposal Facility 49350 North I-94 Service Drive Belleville, MI 48111 Phone: (800) 592-5489; Fax: (800) 592-5329	Stericycle (Northland Environmental, Inc.) (PSC Environmental Systems) 275 Allens Avenue, Providence, RI 02905 Phone: (401) 781-6340; Fax: (401) 781-9710

The Contractor shall submit in writing (1) a letter listing the names of the hazardous waste disposal facilities (from the above list) that the Contractor will use to receive hazardous material from this Project, and (2) a copy of each facility's acceptance criteria and sampling frequency requirements.

**Failure to comply with all of the above requirements may result in the rejection of the bid.**

No facility may be substituted for the one(s) designated in the Contractor's submittal without the Engineer's prior approval. If the material cannot be accepted by any of the Contractor's designated facilities, the Department will supply the Contractor with the name(s) of other acceptable facilities.

**Prior to the generation of any hazardous waste**, the Contractor shall notify the Engineer of its selected hazardous waste transporter and disposal facility. The Contractor must submit to the Engineer (1) the transporter's current US DOT Certificate of Registration and (2) the transporter's current Hazardous Waste Transporter Permits for the State of Connecticut, the hazardous waste destination state and any other applicable states. The Engineer will then obtain on a contiguous per site basis a temporary EPA Generators ID number for the site that he will forward to the Contractor. Any changes in transporter or facility shall be immediately forwarded to the Engineer for review.

Handling, storage, transportation and disposal of hazardous waste materials generated as a result of execution of this project shall comply with all Federal, State and Local regulations including the USEPA RCRA Hazardous Waste Regulations (40 CFR Parts 260-271), the CTDEEP Hazardous Waste Regulations (22a-209 and 22a-449(c)), and the USDOT Hazardous Materials Regulations (49 CFR Part 171-180).

All debris shall be contained and collected daily or more frequently as directed by the Engineer, due to debris buildup. Debris shall be removed by HEPA vacuum collection. Such debris and paint chips shall be stored in leak-proof storage containers in the secured storage site, or as directed by the Engineer. The storage containers and storage locations shall be reviewed by the Engineer and shall be located in areas not subject to ponding. Storage containers shall be placed on pallets and closed and covered with tarps at all times except during placement, sampling and disposal of the debris.

Hazardous waste materials are to be properly packed and labeled for transport by the Contractor in accordance with EPA, CTDEEP and USDOT regulations. The disposal of debris characterized as hazardous waste shall be completed within 90 calendar days of the date on which it began to be accumulated in the lined containers. Storage of containers shall be in accordance with current DEEP/EPA procedures.

The Contractor shall label hazardous waste storage containers with a 6-inch square, yellow, weatherproof, Hazardous Waste sticker in accordance with USDOT regulations.

Materials other than direct paint related debris which are incidental to the paint removal work activities (tarps, poly, plywood, PPE, gloves, decontamination materials, etc.) which may be contaminated with lead, shall be stored separately from the direct paint debris, and shall be sampled by the Engineer for waste disposal characterization testing. Such materials characterized as hazardous shall be handled/disposed of as described herein, while materials characterized as non-hazardous shall be disposed of as non-hazardous CTDEEP Solid Waste.

Direct paint related debris materials not previously sampled and characterized for disposal, which may be originally presumed to be hazardous waste, shall also be stored separately and sampled by the Engineer for ultimate waste disposal characterization testing and handled/disposed of based on that testing.

Project construction waste materials unrelated to the paint removal operations shall NOT be combined/stored with paint debris waste and/or incidental paint removal materials as they are not lead contaminated and shall NOT be disposed of as hazardous waste. The Engineer's on-site Inspectors shall conduct inspections to verify materials remain segregated.

The Contractor shall obtain and complete all paperwork necessary to arrange for material disposal, including disposal facility waste profile sheets. It is solely the Contractor's responsibility to co-ordinate the disposal of hazardous materials with its selected treatment/recycling/disposal facility(s). Upon receipt of the final approval from the facility, the Contractor shall arrange for the loading, transport and treatment/recycling/disposal of the materials in accordance with all Federal and State regulations. **No claim will be considered based on the failure of the Contractor's disposal facility(s) to meet the Contractor's production rate or for the Contractor's failure to select sufficient facilities to meet its production rate.**

The Contractor shall process the hazardous waste such that the material conforms with the requirements of the selected treatment/disposal facility, including but not limited to specified size and dimension. Refusal on the part of the treatment/disposal facility to accept said material solely on the basis of non-conformance of the material to the facility's physical requirements is the responsibility of the Contractor and no claim for extra work shall be accepted for reprocessing of said materials to meet these requirements.

All DOT shipping documents, including the Uniform Hazardous Waste Manifests utilized to accompany the transportation of the hazardous waste material shall be prepared by the Contractor and reviewed/signed by an authorized agent representing ConnDOT, as Generator, for each load of hazardous material that is packed to leave the site. The Contractor shall not sign manifests on behalf of the State as Generator. The Contractor shall forward the appropriate original copies of all manifests to the Engineer the same day the material leaves the Project site.

Materials not related to lead paint removal and/or characterized as non-hazardous waste shall NOT be shipped for hazardous waste disposal in accordance with USEPA RCRA hazardous waste minimization requirements.

A load-specific certificate of disposal, signed by the authorized agent representing the waste disposal facility, shall be obtained by the Contractor and promptly delivered to the Engineer for each load.

In addition to all pertinent Federal, State and local laws or regulatory agency polices, the Contractor shall adhere to the following precautions during the transport of hazardous materials off-site:

- All vehicles departing the site are to be properly logged to show the vehicle identification, driver's name, time of departure, destination, and approximate volume, and contents of materials carried. Vehicles shall display the proper USDOT placards for the type and quantity of waste;



- No materials shall leave the site unless a disposal facility willing to accept all of the material being transported has agreed to accept the type and quantity of waste;
- Documentation must be maintained indicating that all applicable laws have been satisfied and that the materials have been successfully transported and received at the disposal facility; and,
- The Contractor shall segregate the waste streams (i.e. concrete, wood, etc.) as directed by the receiving disposal facility.

Any spillage of debris during disposal operations during loading, transport and unloading shall be cleaned up in accordance with EPA 40 CFR 265 Subparts C & D, at the Contractor's expense.

The Contractor is liable for any fines, costs or remediation costs incurred as a result of their failure to be in compliance with this Item and all Federal, State and Local laws.

#### K. Project Closeout Data:

Provide the Engineer, within thirty (30) days of completion of the project site work, a compliance package; which shall include, but not be limited to, the following:

1. Competent persons (supervisor) job log;
2. OSHA-compliant personnel air sampling data;
3. Completed waste shipment papers for non-hazardous lead construction and demolition (C&D) waste disposal or recycling and scrap metal recycling.
4. Copies of completed Hazardous Waste Manifests (signed by authorized disposal facility representative).

#### **Method of Measurement:**

The completed work shall be paid as a lump sum. This item will include all noted services, equipment, facilities, testing and other associated work for up to three (3) ConnDOT project representatives. Services provided to any ConnDOT project representatives in excess of three (3) representatives will be measured for payment in accordance with Article 1.09.04 – “Extra and Cost-Plus Work.”

#### **Basis of Payment:**

The lump sum price bid for this item shall include: services, materials, equipment, all permits, notifications, submittals, personal air sampling, personal protection equipment, temporary enclosures, incidentals, fees and labor incidental to activities impacting lead removal, treatment and handling of lead contaminated materials, and the transport and disposal of any hazardous and/or non-hazardous lead construction and demolition (C&D) bulky waste.

Final payment will not be made until all project closeout data submittals have been completed and provided to the Engineer. Once the completed package has been received in its entirety and accepted by the Engineer, final payment will be made to the Contractor.

<u>Pay Item</u>	<u>Pay Unit</u>
Lead Compliance for Miscellaneous Exterior Tasks	Lump Sum

END OF SECTION

**ITEM #0097773A – SPARE PARTS**

**Description:** This work consists of furnishing additional quantities of specific Contract item components to be used as replacement parts for future maintenance.

The Contractor shall furnish the quantities of each spare part as indicated. It shall be the responsibility of the Contractor to purchase, transfer ownership of, and deliver the spare parts to the Connecticut Department of Transportation (CTDOT).

**Materials:** Each spare part furnished shall be new, from the same manufacturer and have the identical model number as each item component furnished for installation as described in the item special provision.

The Contractor shall deliver the following quantities of each item component as a spare part:

ITEM NO.	SPARE PART DESCRIPTION	QTY.	Ownership and Delivery
1112286A	360-Degree Camera Assembly	1	CTDOT
1112289A	360 Degree Closed Loop System Video Detection Processor	1	CTDOT
1112285A	Thermal Video Detector Assembly	1	CTDOT
1107011A	Accessible Pedestrian Signal and Detector (Type A)	1	CTDOT

**Construction Methods:** All provisions outlined in the Contract shall be complied with for each component furnished from the spare parts list. Each component furnished under this item shall be provided by the Contractor prior to beginning any 30-day working test periods. The Contractor shall deliver the spare parts to the Connecticut Department of Transportation Signal Lab, 280 West Street, Rocky Hill, CT. Each spare part shall be tagged with the model number, date manufactured, manufacturer's name, and project number on the original sealed packaging provided by the manufacturer. Transfer of ownership and delivery shall be coordinated with Mr. Don Assard (860) 258-0346 or Mr. Mark Zampini (860) 258-0349.

**Method of Measurement:** The sum of money shown on the estimate and in the itemized proposal as "Estimated Cost" for this work will be considered the price bid even though payment will be made only for actual work performed. The estimated cost figure is not to be altered in any manner by the bidder. Should the bidder alter the amount shown, the altered figures will be disregarded and the original price will be used to determine the total amount bid for the item.

**Basis of Payment:** "Spare Parts" furnished, transferred and delivered will be paid for under Article 1.09.04—Extra and Cost Plus Work.

Pay Item	Pay Unit
Spare Parts	est.

## **ITEM #0101000A – ENVIRONMENTAL HEALTH AND SAFETY**

### **Description:**

Under this item, the Contractor shall establish protocols and provide procedures to protect the health and safety of its employees and subcontractors as related to the proposed construction activities performed within the Project AOEC(s). Work under this Item consists of the development and implementation of a written health and safety plan (HASP) that addresses the relative risk of exposure to documented hazards present within Project limits. The HASP shall establish health and safety protocols that address the relative risk of exposure to regulated substances in accordance with 29 CFR 1910.120 and 29 CFR 1926.65. Such protocols shall only address those potential concerns directly related to site conditions.

Note: The Engineer will prepare a site-specific HASP which is compatible with the Contractor's HASP and will be responsible for the health and safety of all Project Inspectors, Department employees and consulting engineers.

### **Materials:**

The Contractor must provide chemical protective clothing (CPC) and personal protective equipment (PPE) as stipulated in the Contractor's HASP during the performance of work in areas identified as potentially posing a risk to worker health and safety for workers employed by the Contractor and all subcontractors.

### **Construction Methods:**

**1-Existing Information:** The Contractor shall utilize all available information and existing records and data pertaining to chemical and physical hazards associated with any of the regulated substances identified in the environmental site investigations to develop the HASP. The documents containing this data are referenced in "Notice to Contractor – Environmental Investigations".

**2-General:** The requirements set forth herein pertain to the provision of workers' health and safety as it relates to proposed Project activities when performed in the presence of hazardous or regulated materials or otherwise environmentally sensitive conditions. THE PROVISION OF WORKER HEALTH AND SAFETY PROTOCOLS WHICH ADDRESS POTENTIAL AND/OR ACTUAL RISK OF EXPOSURE TO SITE SPECIFIC HAZARDS POSED TO CONTRACTOR EMPLOYEES IS SOLELY THE RESPONSIBILITY OF THE CONTRACTOR.

The Contractor shall be responsible for the development, implementation and oversight of the HASP throughout the performance of work within the limits of the AOEC(s), as identified in the Contract Documents, and in other areas identified by the Engineer or by the HASP where site

conditions may pose a risk to worker health and safety and/or the environment. **No physical aspects of the work within the AOEC shall begin until the HASP is reviewed by the Engineer and is determined to meet the requirements of the specifications. However, the Contract time, in accordance with Article 1.03.08, will begin on the date stipulated in the Notice to Proceed.**

**3-Regulatory Requirements:** All construction related activities performed by the Contractor within the limits of the AOEC(s) or in other areas where site conditions may pose a risk to worker health and safety and/or the environment shall be performed in conformance with 29 CFR 1926, Safety and Health Regulations for Construction and 29 CFR 1910, Safety and Health Regulations for General Industry. Conformance to 29 CFR 1910.120, Hazardous Waste Site Operations and Emergency Response (HAZWOPER) may also be required, where appropriate.

**4-Submittals:** Three copies of the HASP shall be submitted to the Engineer within four (4) weeks after the Award of Contract or four (4) weeks prior to the start of any work in the AOEC, whichever is first, but not before the Award of the Contract.

The HASP shall be developed by a qualified person designated by the Contractor. This qualified person shall be a Certified Industrial Hygienist (CIH), Certified Hazardous Material Manager (CHMM), or a Certified Safety Professional (CSP). He/she shall have review and approval authority over the HASP and be identified as the Health and Safety Manager (HSM). The HASP shall bear the signature of said HSM indicating that the HASP meets the minimum requirements of 29 CFR 1910.120 and 29 CFR 1926.65.

The Engineer will review the HASP(s) within four (4) weeks of submittal and provide written comments as to deficiencies in and/or exceptions to the plan(s), if any, to assure consistency with the specifications, applicable standards, policies and practices and appropriateness given potential or known site conditions. Items identified in the HASP which do not conform to the specifications will be brought to the attention of the Contractor, and the Contractor shall revise the HASP to correct the deficiencies and resubmit it to the Engineer for determination of compliance with this item. The Contractor shall not be allowed to commence work activities in the AOEC(s), as shown on the Plans, or where site conditions exist which may pose a risk to worker health and safety and/or the environment, until the HASP has been reviewed and accepted by the Engineer. No claim for delay in the progress of work will be considered for the Contractor's failure to submit a HASP that conforms to the requirements of the Contract.

**5-HASP Provisions:**

(a) General Requirements: The Contractor shall prepare a HASP covering all Project site work regulated by 29 CFR 1910.120(b)/ 1926.65(b) to be performed by the Contractor and all subcontractors under this Contract. The HASP shall establish in detail, the protocols necessary for the recognition, evaluation, and control of all hazards associated with each task performed under this Contract. The HASP shall address site-specific safety and health hazards of each phase of site operation and include the requirements and procedures for employee protection. The level of detail provided in the HASP shall

be tailored to the type of work, complexity of operations to be performed, and hazards anticipated. Details about some activities may not be available when the initial HASP is prepared and submitted. Therefore, the HASP shall address, in as much detail as possible, all anticipated tasks, their related hazards and anticipated control measures.

The HASP shall interface with the Contractor's Safety and Health Program. Any portions of the Safety and Health Program that are referenced in the HASP shall be included as appendices to the HASP. All topics regulated by the 29 CFR 1910.120(b)(4) and those listed below shall be addressed in the HASP. Where the use of a specific topic is not applicable to the Project, the HASP shall include a statement to justify its omission or reduced level of detail and establish that adequate consideration was given the topic.

(b) Elements:

(i) Site Description and Contamination Characterization: The Contractor shall provide a site description and contaminant characterization in the HASP that meets the requirements of 29 CFR 1910.120/1926.65.

(ii) Safety and Health Risk Analysis/Activity Hazard Analysis: The HASP shall address the safety and health hazards on this site for every operation to be performed. The Contractor shall review existing records and data to identify potential chemical and physical hazards associated with the site and shall evaluate their impact on field operations. Sources, concentrations (if known), potential exposure pathways, and other factors as noted in CFR 1910.120/126.65, paragraph (c)(7) employed to assess risk shall be described. The Contractor shall develop and justify action levels for implementation of engineering controls and PPE upgrades and downgrades for controlling worker exposure to the identified hazards. If there is no permissible exposure limit (PEL) or published exposure level for an identified hazard, available information from other published studies may be used as guidance. Any modification of an established PEL must be fully documented.

The HASP shall include a comprehensive section that discusses the tasks and objectives of the site operations and logistics and resources required to complete each task. The hazards associated with each task shall be identified. Hazard prevention techniques, procedures and/or equipment shall be identified to mitigate each of the hazards identified.

(iii) Staff Organization, Qualifications and Responsibilities: The HASP shall include a list of personnel expected to be engaged in site activities and certify that said personnel have completed the educational requirements stipulated in 29 CFR 1910.120 and 29 CFR 1926.65, are currently monitored under a medical surveillance program in compliance with those regulations, and that they are fit for work under "level C" conditions.

The Contractor shall assign responsibilities for safety activities and procedures. An outline or flow chart of the safety chain of command shall be provided in the HASP. Qualifications, including education, experience, certifications, and training in safety and

health for all personnel engaged in safety and health functions shall be documented in the HASP. Specific duties of each on-site team member should be identified. Typical team members include but are not limited to Team Leader, Scientific Advisor, Site Safety Officer, Public Information Officer, Security Officer, Record Keeper, Financial Officer, Field Team Leader, and Field Team members.

The HASP shall also include the name and qualifications of the individual proposed to serve as Health and Safety Officer (HSO). The HSO shall have full authority to carry out and ensure compliance with the HASP. The Contractor shall provide a competent HSO on-site who is capable of identifying existing and potential hazards in the surroundings or working conditions which are unsanitary, hazardous or dangerous to employees and who has authorization to take prompt corrective measures to eliminate or control them. The qualifications of the HSO shall include completion of OSHA 40-hour HAZWOPER training, including current 8-hour refresher training, and 8-hour HAZWOPER supervisory training; a minimum of one year of working experience with the regulated compounds that have been documented to exist within Project limits; a working knowledge of Federal and State safety regulations; specialized training or documented experience (one year minimum) in personal and respiratory protective equipment program implementation; the proper use of air monitoring instruments, air sampling methods and procedures; and certification training in first aid and CPR by a recognized, approved organization such as the American Red Cross.

The primary duties of the HSO shall be those associated with worker health and safety. The Contractor's HSO responsibilities shall be detailed in the written HASP and shall include, but not be limited to the following:

(A) Directing and implementing the HASP.

(B) Ensuring that all Project personnel have been adequately trained in the recognition and avoidance of unsafe conditions and the regulations applicable to the work environment to control or eliminate any hazards or other exposure to illness or injury (29 CFR 1926.21). All personnel shall be adequately trained in procedures outlined in the Contractor's written HASP.

(C) Authorizing Stop Work Orders, which shall be executed upon the determination of an imminent health and safety concern.

(D) Contacting the Contractor's HSM and the Engineer immediately upon the issuance of a Stop Work order when the HSO has made the determination of an imminent health and safety concern.

(E) Authorizing work to resume, upon approval from the Contractor's HSM.

(F) Directing activities, as defined in the Contractor's written HASP, during emergency situations; and

(G) Providing personal monitoring where applicable, and as identified in the HASP.

(iv) Employee Training Assignments: The Contractor shall develop a training program to inform employees, supplier's representatives, and official visitors of the special hazards and procedures (including PPE, its uses and inspections) to control these hazards during field operations. Official visitors include but are not limited to Federal Agency Representatives, State Agency Representatives, Municipal Agency Representatives, Contractors, subcontractors, etc. This program shall be consistent with the requirements of 29 CFR 1910.120 and 29 CFR 1926.65.

(v) Personal Protective Equipment: The plan shall include the requirements and procedures for employee protection and should include a detailed section on respiratory protection. The Contractor shall describe in detail and provide appropriate PPE to insure that workers are not exposed to levels greater than the action level for identified hazards for each operation stated for each work zone. The level of protection shall be specific for each operation and shall be in compliance with all requirements of 29 CFR 1910 and 29 CFR 1926. The Contractor shall provide, maintain, and properly dispose of all PPE.

(vi) Medical Surveillance Program: All on-site Contractor personnel engaged in 29 CFR 1910.120/1926.65 operations shall have medical examinations meeting the requirements of 29 CFR 1910.120(f) prior to commencement of work.

The HASP shall include certification of medical evaluation and clearance by the physician for each employee engaged in 29 CFR 1910.120/1926.65 operations at the site.

(vii) Exposure Monitoring/Air Sampling Program: The Contractor shall submit an Air Monitoring Plan as part of the HASP which is consistent with 29 CFR 1910.120, paragraphs (b)(4)(ii)(E), (c)(6), and (h). The Contractor shall identify specific air sampling equipment, locations, and frequencies in the air-monitoring plan. Air and exposure monitoring requirements shall be specified in the Contractor's HASP. The Contractor's CIH shall specify exposure monitoring/air sampling requirements after a careful review of the contaminants of concern and planned site activities.

(viii) Site Layout and Control: The HASP shall include a map, work zone delineation (support, contamination, reduction and exclusion), on/off-site communications, site access controls, and security (physical and procedural).

(ix) Communications: Written procedures for routine and emergency communications procedures shall be included in the Contractor's HASP.

(x) Personal Hygiene, Personal Decontamination and Equipment Decontamination: Decontamination facilities and procedures for PPE, sampling equipment, and heavy equipment shall be discussed in detail in the HASP.



(xi) Emergency Equipment and First Aid Requirements: The Contractor shall provide appropriate emergency first aid kits and equipment suitable to treat exposure to the hazards identified, including chemical agents. The Contractor will provide personnel that have certified first aid/CPR training on-site at all times during site operations.

(xii) Emergency Response Plan and Spill Containment Program: The Contractor shall establish procedures in order to take emergency action in the event of immediate hazards (i.e., a chemical agent leak or spill, fire or personal injury). Personnel and facilities supplying support in emergency procedures will be identified. The emergency equipment to be present on-site and the Emergency Response Plan procedures, as required 29 CFR 1910.120, paragraph (1)(1)(ii) shall be specified in the Emergency Response Plan. The Emergency Response Plan shall be included as part of the HASP. This Emergency Response Plan shall include written directions to the closest hospital as well as a map showing the route to the hospital.

(xiii) Logs, Reports and Record Keeping: The Contractor shall maintain safety inspections, logs, and reports, accident/incident reports, medical certifications, training logs, monitoring results, etc. All exposure and medical monitoring records are to be maintained according to 29 CFR 1910 and 29 CFR 1926. The format of these logs and reports shall be developed by the Contractor to include training logs, daily logs, weekly reports, safety meetings, medical surveillance records, and a phase-out report. These logs, records, and reports shall be maintained by the Contractor and be made available to the Engineer.

The Contractor shall immediately notify the Engineer of any accident/ incident. Within two working days of any reportable accident, the Contractor shall complete and submit to the Engineer an accident report.

(xiv) Confined space entry procedures: Confined space entry procedures, both permit required and non permit required, shall be discussed in detail.

(xv) Pre-entry briefings: The HASP shall provide for pre-entry briefings to be held prior to initiating any site activity and at such other times as necessary to ensure that employees are apprised of the HASP and that this plan is being followed.

(xvi) Inspections/audits: The HSM or HSO shall conduct Inspections or audits to determine the effectiveness of the HASP. The Contractor shall correct any deficiencies in the effectiveness of the HASP.

**6-HASP Implementation:** The Contractor shall implement and maintain the HASP throughout the performance of work. In areas identified as having a potential risk to worker health and safety, and in any other areas deemed appropriate by the HSO, the Contractor shall be prepared to immediately implement the appropriate health and safety measures, including but not limited to the use of PPE, and engineering and administrative controls.

If the Engineer observes deficiencies in the Contractor's operations with respect to the HASP, they shall be assembled in a written field directive and given to the Contractor. The Contractor shall immediately correct the deficiencies and respond, in writing, as to how each was corrected. Failure to bring the work area(s) and implementation procedures into compliance will result in a Stop Work Order and a written directive to discuss an appropriate resolution(s) to the matter. When the Contractor demonstrates compliance, the Engineer shall remove the Stop Work Order. If a Stop Work Order has been issued for cause, no delay claims on the part of the Contractor will be honored.

Disposable CPC/PPE, i.e. disposable coveralls, gloves, etc., which come in direct contact with hazardous or potentially hazardous material shall be placed into 55 gallon USDOT 17-H drums and disposed of in accordance with Federal, State, and local regulations. The drums shall be temporarily staged and secured within the WSA until the material is appropriately disposed.

**7-HASP Revisions:** The HASP shall be maintained on-site by the Contractor and shall be kept current with construction activities and site conditions under this Contract. The HASP shall be recognized as a flexible document which shall be subject to revisions and amendments, as required, in response to actual site conditions, changes in work methods and/or alterations in the relative risk present. All changes and modifications shall be signed by the Contractor's HSM and shall require the review and acceptance by the Engineer prior to the implementation of such changes.

Should any unforeseen hazard become evident during the performance of the work, the HSO shall bring such hazard to the attention of the Contractor and the Engineer as soon as possible. In the interim, the Contractor shall take action, including Stop Work Orders and/or upgrading PPE as necessary to re-establish and maintain safe working conditions and to safeguard on-site personnel, visitors, the public and the environment. The HASP shall then be revised/amended to reflect the changed condition.

**Method of Measurement:**

1-Within thirty (30) calendar days of the award of the Contract, the Contractor shall submit to the Engineer for acceptance a breakdown of its lump sum bid price for this item detailing:

- (a) The development costs associated with preparing the HASP in accordance with these Specifications.
- (b) The cost per month for the duration of the Project to implement the HASP and provide the services of the HSM and the HSO.

2-If the lump sum bid price breakdown is unacceptable to the Engineer; substantiation showing that the submitted costs are reasonable shall be required.

3-Upon acceptance of the payment schedule by the Engineer, payments for work performed will be made as follows:

- (a) The lump sum development cost will be certified for payment.
- (b) The Contractor shall demonstrate to the Engineer monthly that the HASP has been kept current and is being implemented and the monthly cost will be certified for payment.
- (c) Any month where the HASP is found not to be current or is not being implemented, the monthly payment for the Environmental Health and Safety Item shall be deferred to the next monthly payment estimate. If the HASP is not current or being implemented for more than thirty calendar days, there will be no monthly payment.
- (d) Failure of the Contractor to implement the HASP in accordance with this Specification shall result in the withholding of all Contract payments.

**Basis of Payment:**

This work will be paid for at the Contract lump sum price for “Environmental Health and Safety” which shall include all materials, tools, equipment and labor incidental to the completion of this item for the duration of the Project to maintain, revise, monitor and implement the HASP. Such costs include providing the services of the HSM and HSO, Contractor employee training, CPC, PPE, disposal of PPE and CPC, medical surveillance, decontamination facilities, engineering controls, monitoring and all other HASP protocols and procedures established to protect the Health and Safety for all on-site workers.

Pay Item	Pay Unit
Environmental Health and Safety	L.S.

**ITEM #0108100A – LUMP SUM INCENTIVE PAYMENT (ESTIMATED COST)**

**Description:** Under this item, the Contractor will receive a Lump Sum Incentive Payment if earned in accordance with the MILESTONE INCENTIVE AND MILESTONE LIQUIDATED DAMAGES PROVISIONS included in this Contract.

**Basis of Payment:** The “Lump Sum Incentive Payment” will be calculated using the method indicated in the MILESTONE INCENTIVE AND MILESTONE LIQUIDATED DAMAGES PROVISIONS.

The sum of money shown on the estimate and in the itemized proposal as “Estimated Cost” for this item will be considered the bid price although payment will be made as described above. The estimated cost figure is not to be altered in any manner by the bidder. If the bidder should alter the amount shown, the altered figure will be disregarded and the original cost figure will be used to determine the amount of the bid for this Contract.

Pay Item	Pay Unit
Lump Sum Incentive Payment (Estimated Cost)	est.

## **ITEM #0204213A – HANDLING CONTAMINATED GROUNDWATER**

### **Description:**

Under this Item, the Contractor shall collect, manage, treat, and dispose of contaminated groundwater generated during dewatering operations within the Project limits.

Contaminated groundwater is defined as “groundwater which has been generated from excavations within the Project limits containing substances at concentrations that exceed the effluent limits for the CT DEEP General Permit for the Discharge of Groundwater Remediation Wastewater Directly to Surface Water”. The presence of contaminants removable through control of settleable solids does not constitute contaminated groundwater. Groundwater contamination caused by the Contractor’s activities or work practices is also not considered contaminated groundwater. Note that treatment of surface water encountered during construction activities is not required under this Item.

The contamination and groundwater depth at the time of the investigation is documented in the reports listed in the “Notice to Contractor – Environmental Investigations”. Contaminants and depth to groundwater is provided for the Contractor’s information and may be influenced by factors such as seasonal groundwater table changes, tidal changes, drought or flooding conditions, local withdrawals from the aquifer, local construction, etc. Additional information with regard to soil descriptions and groundwater observations may also be available if geotechnical investigations were conducted for the project. The Contractor shall contain contaminated groundwater and 1) treat it on-site prior to discharge to sanitary sewer; 2) treat it on-site prior to discharge to surface water; or 3) transport water to an off-site treatment/disposal facility.

This Item does not apply to the possible diversion of existing storm water flow around the construction site during Project activities. Diversion of existing storm water or surface flows shall be completed in accordance with the Contract and all applicable permits. This item also does not include process water or wastewater generated by the Contractor’s work activities.

### **Construction Methods:**

#### **A. General**

It is the Contractor’s responsibility to determine the expected groundwater generation rate from construction activities, select the appropriate groundwater management method, and size its system capacity to meet those dewatering needs. The contractor is hereby notified that utility companies are expected to convey any contaminated groundwater they remove from their excavation work into the contractor’s selected groundwater treatment system and that the contractor should factor this additional treatment processing into their bid price.

All equipment required as a part of this Item shall be installed in a location and manner acceptable to the Engineer and in accordance with the manufacturer's recommendations. Equipment shall be decontaminated prior to arrival at the Project, decontaminated prior to being moved to another area of the project, and then decontaminated before it leaves the Project, at no additional cost to the State. Solids (soil or sediment) generated by on-site dewatering activities shall be brought to the designated soil reuse area located within the Project limits.

The Contractor is responsible for operating and maintaining the equipment at all times when dewatering occurs. This includes providing appropriate supervision during evenings, weekends, and holidays. If the system is intended to operate unattended, a remote alarm system acceptable to the Engineer shall be installed to monitor critical system operating parameters and the Contractor shall be responsible for providing rapid emergency response during non-working hours in the event a system malfunction occurs. A list of names and phone numbers shall be displayed in the immediate vicinity of the system for emergency contacts.

The Contractor shall report releases from the groundwater treatment system due to overflowing or equipment/piping failure to the CT DEEP Spill Response Unit in accordance with RCSA 22a-450 and provide the Engineer with all information, including the CT DEEP case number. All costs related to spill response associated with the Contractor's on-site containment or treatment system will be the responsibility of the Contractor.

The Contractor shall collect all samples related to permit compliance in the presence of the Engineer. The Contractor shall provide informational copies of all groundwater analytical results and discharge monitoring reports to the Engineer as they are generated.

The Contractor shall operate the dewatering equipment at a rate that removes the groundwater that naturally infiltrates the excavation. The Contractor shall not cause a hydraulic gradient that draws groundwater into the excavation at an excessive rate. Additional treatment required due to the mobilization of off-site contaminants caused by the Contractor dewatering at an excessive rate will be the responsibility of the Contractor.

Additional treatment related to the Contractor's work activities (i.e. treatment or increased charges due to changes in pH or introduction of different contaminants into the groundwater) and management and disposal of excess water related to the Contractor's process water or waste water will not be included under this item but will be considered a part of the Contractor's cost for the item under which the work is being performed.

#### B. Groundwater Management Methods

The Contractor shall use one or more of the following methods for the management and disposal of contaminated groundwater. Based on project specifics and site constraints, the Contractor may choose to use more than one of the following methods on a single project. All methods may not be possible at the site due to sanitary sewer or permitting restrictions.

1. On-Site Treatment System with Discharge to Sanitary Sewer

a. Contractor Submittals

At least 14 days prior to any submittal to the Publicly Owned Treatment Works (POTW) or CT DEEP, the Contractor shall submit the treatment system design, which has been sealed by a Professional Engineer licensed in the State of Connecticut to the Engineer for review and comment. Equipment shall prevent sediments and solids, as well as contaminants in excess of the permit allowable effluent concentrations, from entering the sanitary sewer. This submittal shall include a schematic or diagram that shows all treatment system equipment, well point locations, pump set-ups in excavations, sedimentation control methods, system location, method of conveyance, flow rates, pipe sizes, valve locations, sampling ports, discharge locations, electrical power connection, etc.

The Contractor shall submit the manufacturer's data sheets, assembly details and performance data on all treatment equipment. If dewatering equipment is to remain on site between October 15 and April 15, the Contractor shall include its method to prevent the treatment system equipment from freezing (heat tape, immersion heaters, etc.).

The Contractor shall detail its method to collect and contain water in its excavations. The Contractor shall also describe in detail its methods for limiting the quantity of water entering the excavation, including shoring, location of well points, limiting excavation size, preventing entry of surface water into the excavation, etc. The Contractor shall also include its assumptions and flow rate calculations related to the sizing of the system.

It is the Contractor's responsibility to design and properly size the system to accommodate the anticipated contaminants and dewatering rates based on its construction activities, POTW limitations, and permit requirements. The Contractor is alerted that construction activities may be limited based on permit restrictions or POTW limitations.

**No claim for delay or request for additional time will be considered based upon the Contractor's failure to accommodate the review process.**

b. Permits

Groundwater generated by construction activities within the project limits shall be appropriately treated and discharged to the sanitary sewer system within Project limits. Management and discharge of contaminated groundwater shall be accomplished in accordance with a CT DEEP General Permit and POTW requirements. The Contractor shall be responsible for registering under the General Permit, any other necessary State or local permits, and all associated fees.

The CT DEEP General Permit for the Discharge of Groundwater Remediation Wastewater to Sanitary Sewer is available at [www.ct.gov/deep](http://www.ct.gov/deep). The Contractor shall

submit the most current permit registration form to the CT DEEP. A minimum lead-time of six (6) weeks can be expected to process and submit the registration, in addition to coordination time with the POTW. **No claim for delay or request for additional time will be considered based upon the Contractor's failure to accommodate the permitting process.** The Contractor shall not submit the permit registration to the CT DEEP prior to the Engineer's review of and comment on the treatment system.

The Contractor shall submit a copy of the CT DEEP permit certificate of registration to the Engineer prior to initiating any discharge.

All testing required by the general permit shall be conducted by a laboratory certified by the Connecticut Department of Public Health (DPH) for the method specified in the permit. The Contractor shall submit copies of the analytical results to the all parties specified in the permit terms and conditions and to the Engineer.

**No claim for delay or request for additional time will be considered based upon the Contractor's failure to design a system to meet this performance specification.** It is the Contractor's responsibility to properly size the treatment system and temporary containment tanks based on its anticipated flow rates from construction activities and to determine the level of treatment required to meet permit discharge limits.

c. Treatment System Operation

The Contractor shall ensure that all personnel involved in the groundwater treatment operations understand the terms of the General Permit. In the event of a conflict between the requirements of the Contract and the permit, the more stringent will apply.

The Contractor shall not commence work activities below the groundwater table within the project limits until such time as:

- i. the temporary groundwater treatment system design is reviewed by the Engineer and comments are adequately addressed,
- ii. the system is installed in accordance with the accepted design and is completely operational, and
- iii. a copy of the Contractor's permit certificate of registration has been submitted to the Engineer.

The Contractor shall make any sanitary sewer tie-in modifications necessary to accommodate the treatment unit only after obtaining approval from the Engineer and the POTW.

The Contractor shall take all meter readings required by the permit and forward them to the appropriate parties.



The Contractor shall collect all samples related to permit compliance in the presence of the Engineer and shall submit copies of the analytical results and discharge monitoring reports to the appropriate agency(ies) as required by the General Permit terms and conditions. The Contractor shall provide informational copies of all analytical results and discharge monitoring reports to the Engineer as they are generated. In the event of an exceedance, the Contractor shall immediately comply with the “*Duty to Correct, Record, and Report Violations*” section of the General Permit. The Contractor shall provide the Engineer a copy of the required CT DEEP reporting and then document its review of the treatment system and all actions taken to correct the exceedance in writing to the Engineer within 48 hours of receiving laboratory data documenting the exceedance.

If the discharge must be suspended due to an effluent violation, the Contractor shall only restart the discharge after obtaining all necessary approvals from the CT DEEP/POTW and in full compliance with the General Permit and any amendments imposed thereto.

**No claim for delay, request for additional time, or request for additional design/redesign costs for the system will be considered based upon the Contractor’s failure to design/redesign a system to meet this performance specification.**

## 2. On-Site Treatment System with Discharge to Surface Water

### a. Contractor Submittals

At least 14 days prior to any submittal to the CT DEEP, the Contractor shall submit the treatment system design, which has been sealed by a Professional Engineer licensed in the State of Connecticut, to the Engineer for review and comment. Equipment shall prevent sediments and solids, as well as contaminants in excess of the permit allowable effluent concentrations, from discharging. This submittal shall include a schematic or diagram that shows all treatment system equipment, well point locations, pump set-ups in excavations, sedimentation control methods, system location, method of conveyance, flow rates, pipe sizes, valve locations, sampling ports, discharge locations, electrical power connection, etc.

The Contractor shall submit the manufacturer’s data sheets, assembly details and performance data on all treatment equipment. If dewatering equipment is to remain on site between October 15 and April 15, the Contractor shall include its method to prevent the treatment system equipment from freezing (heat tape, immersion heaters, etc.).

The Contractor shall detail its method to collect and contain water in its excavations. The Contractor shall also describe in detail its methods for limiting the quantity of water entering the excavation, including shoring, location of well points, limiting excavation size, preventing entry of surface water into the excavation, etc. The Contractor shall also include its assumptions and flow rate calculations related to the sizing of the system.

It is the Contractor's responsibility to design and properly size the system to accommodate the anticipated contaminants and dewatering rates based on its construction activities and permit requirements. The Contractor is alerted that construction activities may be limited based on permit restrictions.

**No claim for delay or request for additional time will be considered based upon the Contractor's failure to accommodate the review process.**

b. Permits

Groundwater generated by construction activities within the project limits shall be appropriately treated and discharged to surface water within Project limits. Management and discharge of contaminated groundwater shall be accomplished in accordance with a CT DEEP General Permit. The Contractor shall be responsible for registering under the General Permit and all associated fees.

The CT DEEP General Permit for the Discharge of Groundwater Remediation Wastewater Directly to Surface Water is available at [www.ct.gov/deep](http://www.ct.gov/deep). The Contractor shall submit the most current permit registration form to the CT DEEP. A minimum lead-time of six (6) weeks can be expected to process and submit the registration. **No claim for delay or request for additional time will be considered based upon the Contractor's failure to accommodate the permitting process.** The Contractor shall not submit the permit registration to the CT DEEP prior to review of and comment on the treatment system by the Engineer.

The Contractor shall submit a copy of the CT DEEP permit certificate of registration to the Engineer prior to initiating any discharge.

All testing required by the General Permit shall be conducted by a laboratory certified by the Connecticut Department of Public Health (DPH) for the method specified in the permit. The Contractor shall submit copies of the analytical results to the all parties specified in the permit terms and conditions and to the Engineer.

**No claim for delay or request for additional time will be considered based upon the Contractor's failure to design a system to meet this performance specification.** It is the Contractor's responsibility to properly size the treatment system and temporary containment tanks based on its anticipated flow rates from construction activities and to determine the level of treatment required to meet permit discharge limits.

For sites where the receiving water body does not qualify the site for registration under the CT DEEP General Permit for the Discharge of Groundwater Remediation Wastewater Directly to Surface Water and the discharge is anticipated to continue for 30 days or less, the Contractor may qualify for a CT DEEP Temporary Authorization (TA) to discharge to surface water. The Contractor will be bound to the terms and conditions of the TA the same as if it were a permit. If the Contractor applies for, and receives, a TA from the CT

DEEP, all other requirements of this specification will apply, except that where the specification refers to a permit, the TA will be substituted.

c. Treatment System Operation

The Contractor shall ensure that all personnel involved in the groundwater treatment operations understand the terms of the General Permit. In the event of a conflict between the requirements of this Item and the permit, the more stringent will apply.

The Contractor shall not commence work activities below the groundwater table within the Project limits until such time as:

- i. the temporary groundwater treatment system design is reviewed by the Engineer and comments are adequately addressed,
- ii. the system is installed in accordance with the accepted design and is completely operational, and
- iii. a copy of the Contractor's permit certificate of registration has been submitted to the Engineer.

The Contractor shall take all meter readings required by the permit and forward them to the appropriate parties.

The Contractor shall submit copies of the analytical results and discharge monitoring reports to the appropriate agency(ies) as required by the General Permit terms and conditions. The Contractor shall provide informational copies of all analytical results and discharge monitoring reports to the Engineer as they are generated. In the event of an exceedance, the Contractor shall immediately comply with the "***Duty to Correct, Record, and Report Violations***" section of the General Permit. The Contractor shall provide the Engineer a copy of the required CT DEEP reporting and then document its review of the treatment system and all actions taken to correct the exceedance in writing to the Engineer within 48 hours of receiving laboratory data documenting the exceedance.

If the discharge must be suspended due to an effluent violation, the Contractor shall only restart the discharge after obtaining all necessary approvals from the CT DEEP and in full compliance with the General Permit and any amendments imposed thereto.

**No claim for delay, request for additional time, or request for additional design/redesign costs for the system will be considered based upon the Contractor's failure to design/redesign a system to meet this performance specification.**

### 3. Off-Site Treatment and Disposal

At least 14 days prior to any work involving the dewatering of contaminated groundwater, the Contractor shall submit for the Engineer's review and comment its proposed system to collect and contain the contaminated groundwater. This submittal shall include schematics of proposed pump set-ups in excavations; sedimentation control measures; probable location of temporary containment tanks; schematics of proposed method to transfer liquids from temporary containment tanks to transport vehicles; schematic of proposed method to off-load liquids at the off-site permitted treatment/disposal facility; documentation that transport vehicles hold a "Waste Transportation Permit" for contaminated liquids per CGS 22a-454; and the name of the disposal facility from the following list of Department-approved and CT DEEP-permitted treatment facilities for State-regulated liquid disposal:

Clean Harbors of CT  
51 Broderick Rd.  
Bristol, CT 06010  
(860)224-7600

Tradebe Environmental Services, LLC  
50 Cross St.  
Bridgeport, CT 06610  
(203)238-6754

Tradebe Environmental Services, LLC  
Gracey Avenue  
Meriden, CT 06450  
(203)238-6754

All testing required to meet facility acceptance parameters shall be conducted by the Contractor in the presence of the Engineer. The Contractor is hereby notified that laboratory turnaround time is expected to be fifteen (15) working days. The Contractor shall provide informational copies of the laboratory results to the Engineer. **No delay claim will be considered based upon the Contractor's failure to accommodate the laboratory turnaround time as identified above or to design its system with sufficient holding capacity to accommodate this requirement.**

The Contractor shall obtain and complete all paperwork necessary to arrange for disposal of the contaminated groundwater (such as disposal facility waste profile sheets). It is solely the Contractor's responsibility to coordinate the disposal with its selected facility. Upon receipt of the final approval from the facility, the Contractor shall arrange for the loading, transport and disposal in accordance with all Federal and State regulations. **No claim will be considered based on the failure of the Contractor's selected disposal facility(s) to meet the Contractor's production rate or for the Contractor's failure to select sufficient facilities to meet its production rate.**

The Contractor will be responsible for the cleaning of the water treatment system and the disposal of the entire shipment as the Hazardous Waste Generator for water that undergoes a change in waste classification due to the Contractor's work activities or processes (i.e. contaminated groundwater being classified characteristically hazardous for pH due to grouting operations).

**Method of Measurement:**

Within fourteen (14) calendar days after addressing the Engineer's comments on the proposed system(s) for Handling Contaminated Groundwater, the Contractor shall submit to the Engineer for approval a cost breakdown of its lump sum bid price. The submission must include substantiation showing that the cost breakdown submitted is reasonable based on the Contractor's lump sum bid. The cost breakdown shall be in accordance with the following payment schedule:

- a. The cost to prepare the design for proposed system(s) for Handling Contaminated Groundwater, including preparation and submittal of all permit registration applications, in accordance with these specifications. Design costs shall not exceed 10% of the total cost of the item.
- b. The procurement and installation cost for the proposed system(s) for Handling Contaminated Groundwater in accordance with these specifications. Procurement and installation costs shall not exceed 20% of the total cost of the item.
- c. Equipment decontamination and demobilization and restoration of site. Decontamination and demobilization costs shall not exceed 10% of the total cost of the item.
- d. The remaining costs for operation (including processing of contaminated groundwater conveyed to the system by utility companies), monitoring, permit compliance, sampling and analysis, disposal costs, and maintenance of the proposed system(s), including cleaning of the temporary containment tanks of settled solids, replacement of carbon filters, transporting of solids to the designated soil reuse area located within the Project limits, and transportation of the contaminated dewatering wastewater to an off-site permitted treatment/disposal facility in accordance with these specifications shall be divided evenly throughout the duration of the project work involving contaminated groundwater at the discretion of the Engineer.

Increased costs directly related to the Contractor's operation (i.e. treatment or increased charges due to changes in pH or additional contaminants, treatment and disposal of excess water related to process or waste water, etc.) will not be paid under this item but will be considered a part of the Contractor's cost for the item under which the work is being performed.

**Basis of Payment:**

This work will be paid for at the Contract lump sum price for “Handling Contaminated Groundwater” which price shall include: all work and materials involved with handling contaminated groundwater from within the project limits and shall include all equipment, materials, tools and labor incidental to removal of the contaminated groundwater from the excavation; conveying contaminated groundwater from the dewatering point to the temporary containment tanks and groundwater treatment facility (utility companies will be responsible for conveying any contaminated groundwater they generate to the contractor’s system); treatment of both contractor and utility company-generated contaminated groundwater); conveying discharge of contaminated wastewater to a sanitary sewer, surface water or off-site disposal at a permitted treatment/disposal facility (including transportation); disposal or recycling of used treatment media (i.e. bag filters and spent carbon); permit applications; disposal and permit fees; POTW fees; electrical costs; sampling and documentation costs; laboratory costs; design and monitoring; mobilization, operation, and maintenance of the system; site work; all required equipment decontamination; transportation of solids to the designated soil reuse area located within the project limits; and equipment demobilization.

Sedimentation control associated with work under this Item will be paid under the appropriate items of the Contract.

Pay Item	Pay Unit
Handling Contaminated Groundwater	Lump Sum

## **ITEM #0219011A – SEDIMENT CONTROL AT CATCH BASIN**

**Description:** This work shall consist of furnishing, installing, cleaning, maintaining, replacing, and removing sedimentation control at catch basins at the locations and as shown on plans and as directed by the engineer.

### **Materials:**

Sack shall be manufactured from a specially designed woven polypropylene geotextile sewn by a double needle machine, using a high strength nylon thread. Sack shall be manufactured by one of the following or an approved equal:

#### **Siltsack®**

SI Geosolutions: [www.sigeosolutions.com](http://www.sigeosolutions.com)  
(800)621-0444

#### **DandySack™**

Dandy Products Inc.  
P.O. Box 1980  
Westerville, Ohio 43086  
Phone: 800-591-2284  
Fax: 740-881-2791  
Email: [dlc@dandyproducts.com](mailto:dlc@dandyproducts.com)  
Website: [www.dandyproducts.com](http://www.dandyproducts.com)

#### **FLeXstormInletFilters**

Inlet & Pipe Protection  
24137 W. 111th St - Unit A  
Naperville, IL 60564  
Telephone: (866) 287-8655  
Fax: (630) 355-3477

The sack shall be manufactured to fit the opening of the catch basin or drop inlet. Sack shall have the following features: two dump straps attached at the bottom to facilitate the emptying of sack and lifting loops as an integral part of the system to be used to lift sack from the basin. The sack shall have a restraint cord approximately halfway up the sack to keep the sides away from the catch basin walls, this cord is also a visual means of indicating when the sack should be emptied. Once the strap is covered with sediment, the sack shall be emptied, cleaned and placed back into the basin.

### **ConstructionMethods:**

Installation, removal, and maintenance shall be per manufacturer instructions and recommendations.

**Method of Measurement:**

Sediment Control at Catch Basin will be measured as each installed, maintained, accepted, and removed. There will be no separate measurement for maintenance or replacement associated with this item.

**Basis of Payment**

Payment for this work will be made at the Contract unit price per each for “Sediment Control at Catch Basin” complete in place and accepted, which price shall include all materials, equipment, tools and labor incidental to installation, maintenance throughout construction, replacement, removal and disposal of the sediment control material and surplus material.

**Pay Item**

Sediment Control at Catch Basin

**Pay Unit**

Each



**ITEM #0406275A – FINE MILLING OF BITUMINOUS CONCRETE (0 TO 4 INCHES)**

**Description:** This work shall consist of the milling, removal, and disposal of existing bituminous concrete pavement.

**Construction Methods:** The Contractor shall remove the bituminous concrete material using means acceptable to the Engineer. The pavement surface shall be removed to the line, grade, and existing or typical cross-section shown on the plans or as directed by the Engineer.

The bituminous concrete material shall be disposed of offsite by the Contractor at an approved disposal facility unless otherwise stated in the Contract.

Any milled surface, or portion thereof, that is exposed to traffic shall be paved within five (5) calendar days unless otherwise stated in the plans or Contract.

The equipment for milling the pavement surface shall be designed and built for milling bituminous concrete pavements. It shall be self propelled with sufficient power, traction, and stability to maintain depth and slope and shall be capable of removing the existing bituminous concrete pavement.

The milling machine shall be equipped with a built-in automatic grade averaging control system that can control the longitudinal profile and the transverse cross-slope to produce the specified results. The longitudinal controls shall be capable of operating from any longitudinal grade reference, including string line, contact ski (30 feet minimum), non-contact ski (20 feet minimum), or mobile string line (30 feet minimum). The transverse controls shall have an automatic system for controlling cross-slope at a given rate. The Engineer may waive the requirement for automatic grade or slope controls where the situation warrants such action.

The machine shall be able to provide a 0 to 4 inch deep cut in one pass. The rotary drum of the machine shall use carbide or diamond tipped tools spaced not more than  $\frac{5}{16}$  inch apart. The forward speed of the milling machine shall be limited to no more than 45 feet/minute. The tools on the revolving cutting drum must be continually maintained and shall be replaced as warranted to provide a uniform pavement texture.

The machine shall be equipped with an integral pickup and conveying device to immediately remove material being milled from the surface of the roadway and discharge the millings into a truck, all in one operation. The machine shall also be equipped with a means of effectively limiting the amount of dust escaping from the milling and removal operation.

When milling smaller areas or areas where it is impractical to use the above described equipment, the use of a lesser equipped milling machine may be permitted when approved by the Engineer.

Protection shall be provided around existing catch basin inlets, manholes, utility valve boxes, and any similar structures. Any damage to such structures as a result of the milling operation is the Contractor's responsibility and shall be repaired at the Contractor's expense.

To prevent the infiltration of milled material into the storm drainage system, the Contractor shall take special care to prevent the milled material from falling into the inlet openings or inlet grates. Any milled material that has fallen into inlet openings or inlet grates shall be removed at the Contractor's expense.

**Surface Tolerance:** The milled surface shall provide a satisfactory riding surface with a uniform textured appearance. The milled surface shall be free from gouges, longitudinal grooves and ridges, oil film, and other imperfections that are a result of defective equipment, improper use of equipment, or poor workmanship. The Contractor, under the direction of the Inspector, shall perform random spot-checks with a Contractor supplied ten-foot straightedge to verify surface tolerances at a minimum of five (5) locations per day. The variation of the top of two ridges from the testing edge of the straightedge, between any two ridge contact points, shall not exceed ¼ inch. The variation of the top of any ridge to the bottom of the groove adjacent to that ridge shall not exceed ¼ inch. Any unsatisfactory surfaces produced are the responsibility of the Contractor and shall be corrected at the Contractor's expense and to the satisfaction of the Engineer.

The depth of removal will be verified by taking measurements every 250 feet per each pass of the milling machine, or as directed by the Engineer. These depth measurements shall be used to monitor the average depth of removal.

Where a surface delamination between bituminous concrete layers or a surface delamination of bituminous concrete on Portland cement concrete causes a non-uniform texture to occur, the depth of milling shall be adjusted in small increments to a maximum of +/- ½ inch to eliminate the condition.

When removing bituminous concrete pavement entirely from an underlying Portland cement concrete pavement, all of the bituminous concrete pavement shall be removed leaving a uniform surface of Portland cement concrete, unless otherwise directed by the Engineer.

Any unsatisfactory surfaces produced by the milling operation are the Contractor's responsibility and shall be corrected at the Contractor's expense and to the satisfaction of the Engineer.

No vertical faces, transverse or longitudinal, shall be left exposed to traffic unless the requirements below are met. This shall include roadway structures (catch basins, manholes, utility valve boxes, etc.). If any vertical face is formed in an area exposed to traffic, a temporary paved transition shall be established according to the requirements shown on the plans. If the milling machine is used to form a temporary transition, the length of the temporary transition shall conform to Special Provision Section 4.06 –Bituminous Concrete, "Transitions for Roadway Surface," the requirements shown on the plans, or as directed by the Engineer. At all

permanent limits of removal, a clean vertical face shall be established by saw cutting prior to paving.

Roadway structures shall not have a vertical face of greater than one (1) inch exposed to traffic as a result of milling. All structures within the roadway that are exposed to traffic and greater than one (1) inch above the milled surface shall receive a transition meeting the following requirements:

For roadways with a posted speed limit of 35 mph or less\*:

1. Round structures with a vertical face of greater than 1 inch to 2.5 inches shall be transitioned with a hard rubber tapered protection ring of the appropriate inside diameter designed specifically to protect roadway structures.
2. Round structures with a vertical face greater than 2.5 inches shall receive a transition of bituminous concrete formed at a minimum 24 to 1 (24:1) taper in all directions.
3. All rectangular structures with a vertical face greater than 1 inch shall receive a transition of bituminous concrete formed at a minimum 24 to 1 (24:1) taper in all directions.

\*Bituminous concrete tapers at a minimum 24 to 1 (24:1) taper in all directions may be substituted for the protection rings if approved by the Engineer.

For roadways with a posted speed limit of 40, 45 or 50 mph:

1. All structures shall receive a transition of bituminous concrete formed at a minimum 36 to 1 (36:1) taper in the direction of travel. Direction of travel includes both the leading and trailing side of a structure. The minimum taper shall be 24 to 1 (24:1) in all other directions.

For roadways with a posted speed limit of greater than 50 mph:

1. All structures shall receive a transition of bituminous concrete formed at a minimum 60 to 1 (60:1) taper in the direction of travel. Direction of travel includes both the leading and trailing side of a structure. The minimum taper shall be 24 to 1 (24:1) in all other directions.

All roadway structure edges and bituminous concrete tapers shall be clearly marked with fluorescent paint. The paint shall be maintained throughout the exposure to traffic.

The milling operation shall proceed in accordance with the requirements of the "Maintenance and Protection of Traffic" and "Prosecution and Progress" specifications, or other Contract requirements. The more stringent specification shall apply.

Prior to opening an area which has been milled to traffic, the pavement shall be thoroughly swept with a sweeper truck. The sweeper truck shall be equipped with a water tank and be capable of removing the millings and loose debris from the surface. The sweeper truck shall operate at a forward speed that allows for the maximum pickup of millings from the roadway surface. Other

sweeping equipment may be provided in lieu of the sweeper truck where acceptable by the Engineer.

Any milled area that will not be exposed to live traffic for a minimum of 48 hours prior to paving shall require a vacuum sweeper truck in addition to, or in lieu of, mechanical sweeping. The vacuum sweeper truck shall have sufficient power and capacity to completely remove all millings from the roadway surface including any fine particles within the texture of the milled surface. Vacuum sweeper truck hose attachments shall be used to clean around pavement structures or areas that cannot be reached effectively by the main vacuum. Compressed air may be used in lieu of vacuum attachments if approved by the Engineer.

**Method of Measurement:** This work will be measured for payment by the number of square yards of area from which the milling of asphalt has been completed and the work accepted. No area deductions will be made for minor unmilled areas such as catch basin inlets, manholes, utility boxes and any similar structures.

**Basis of Payment:** This work will be paid for at the Contract unit price per square yard for “Fine Milling of Bituminous Concrete (0 to 4 Inches).” This price shall include all equipment, tools, labor, and materials incidental thereto.

No additional payments will be made for multiple passes with the milling machine to remove the bituminous surface.

No separate payments will be made for cleaning the pavement prior to paving; providing protection and doing handwork removal of bituminous concrete around catch basin inlets, manholes, utility valve boxes and any similar structures; repairing surface defects as a result of the Contractors negligence; providing protection to underground utilities from the vibration of the milling operation; removal of any temporary milled or paved transition; removal and disposal of millings; furnishing a sweeper truck and sweeping after milling. The costs for these items shall be included in the Contract unit price.

Pay Item  
Fine Milling of Bituminous Concrete (0 to 4 Inches)

Pay Unit  
S.Y.

## **ITEM #0406287A – RUMBLE STRIPS - AUTOMATED**

### **Description:**

Work under this item shall consist of installing rumble strips on asphalt highway shoulders where shown on the plans or where directed by the Engineer, and in conformance with these specifications.

### **Construction Methods:**

The Contractor shall pre-mark the location of the edge of the cut, and the beginning and ending points of the sections, prior to the installation of the rumble strips. The Engineer shall review and approve the locations.

The Contractor shall arrange for a technical representative, from the company which produces the milling machine to be used on the project, who will be required to be on-site from the beginning of the operation in order to ensure results that meet the requirements of the plans and specifications until such time the Engineer is satisfied.

Rumble strips should not be installed on bridge decks, in acceleration and deceleration lanes, at drainage structures, at loop detector sawcut locations, or in other areas identified by the Engineer.

### **Automated (Wide Shoulders):**

The equipment shall be able to install the rumble strips in sections where the shoulder width from the edge line to an obstruction is greater than or equal to 4 feet. Where there are no obstructions, the equipment shall be used in sections where the shoulder width from the edge line is a minimum of 3 feet. The equipment shall consist of a rotary type cutting head with a maximum outside diameter of 24" and shall be a minimum of 16" long. The cutting head(s) shall have the cutting tips arranged in such a pattern as to provide a relatively smooth cut (approximately 1/16 of an inch between peaks and valleys) in one pass. The cutting head shall be on its own independent suspension from that of the power unit to allow the tool to self align with the slope of the shoulder or any irregularities in the shoulder surface. The equipment shall include suitable provisions for the application of water to prevent dusting. The Contractor shall use a machine capable of creating the finished pattern at a minimum output of 60 rumble strips per minute.

### **Manual (Narrow Shoulders):**

The equipment shall be able to install the rumble strips in sections where the shoulder width from the edge line to an obstruction is between 3 feet and 4 feet. The cutting head(s) shall have the cutting tips arranged in such a pattern as to provide a relatively smooth cut (approximately 1/16 of an inch between peaks and valleys) in one pass. The equipment shall include suitable provisions for the application of water to prevent dusting.

### **Finished Cut (Automated or Manual)**

The rumble strips shall have finished dimensions of 7" (+/- 1/2") wide in the direction of travel and shall be a 16" (+/- 1/2") long measured perpendicular to the direction of travel. The depressions shall have a concave circular shape with a minimum 1/2" depth at center (maximum allowable depth is 5/8" measured to a valley). The rumble strips shall be placed in relation to the roadway according to the patterns shown in the plans or on the Rumble Strip Details. Alignment of the edge of the cut shall be checked and verified by the Engineer.

The cutting tool shall be equipped with guides to provide consistent alignment of each cut in relation to the roadway.

The Contractor shall pick up any waste material resulting from the operation in a manner acceptable to the Engineer. This waste material shall be disposed of in accordance with Subarticle 2.02.03-10(a).

The work area shall be returned to a debris-free state prior to re-opening to traffic.

The Contractor shall provide all traffic control according to the Maintenance and Protection of Traffic Specification included elsewhere in the contract.

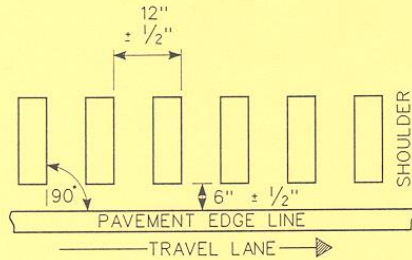
**Method of Measurement:**

This work will be measured for payment by the actual number of feet of shoulder where the rumble strips are placed and accepted. This distance shall be measured longitudinally along the edge of pavement with deductions for bridge decks, acceleration and deceleration lanes, drainage structures, loop detector sawcut locations, and other sections where the rumble strips were not installed.

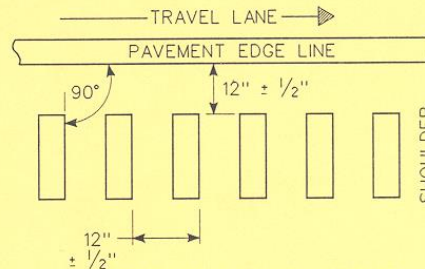
**Basis of Payment:**

This work will be paid for at the Contract unit price per foot for "Rumble Strips - Automated" or "Rumble Strips - Manual." The price shall include furnishing all equipment, tools, labor, a technical representative and work incidental thereto and also disposal of any waste material resulting from the operation. The Contractor will not be paid under the item "Rumble Strips - Manual" if the field conditions allow for the use of the "Rumble Strips - Automated" item, even if the manual method was used.

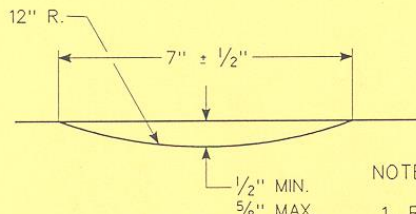
DETAILS AND SECTIONS OF RUMBLE STRIPS



LOCATION DETAIL (TYP.)  
LEFT SHOULDER



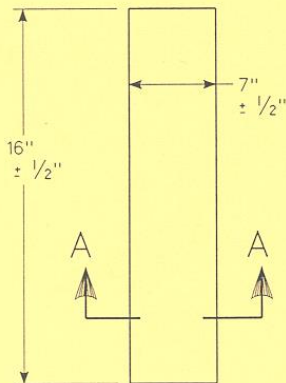
LOCATION DETAIL (TYP.)  
RIGHT SHOULDER



SECTION A-A  
NO SCALE

NOTES:

1. RUMBLE STRIP ALIGNMENT SHALL GENERALLY BE STRAIGHT AND OFFSET APPROXIMATELY 6" IN THE LEFT SHOULDER AND 12" IN THE RIGHT SHOULDER FROM THE OUTER EDGE OF THE EDGE LINE AND SHALL BE AT LEAST 12" FROM THE LONGITUDINAL JOINT IN COMPOSITE PAVEMENTS. THIS OFFSET MAY BE ADJUSTED TO ACCOMMODATE VARIATIONS IN THE EDGE LINE AND THE SHOULDER WIDTH.



PLAN DETAIL

FILE: RUMBLE.MDS

CONNECTICUT  
DEPARTMENT OF TRANSPORTATION  
BUR. OF ENGINEERING & HWY. OPERATIONS  
DIVISION OF TRAFFIC ENGINEERING

RUMBLE STRIP DETAILS

ENGINEER *Erika B. Smith* DATE 10-18-99

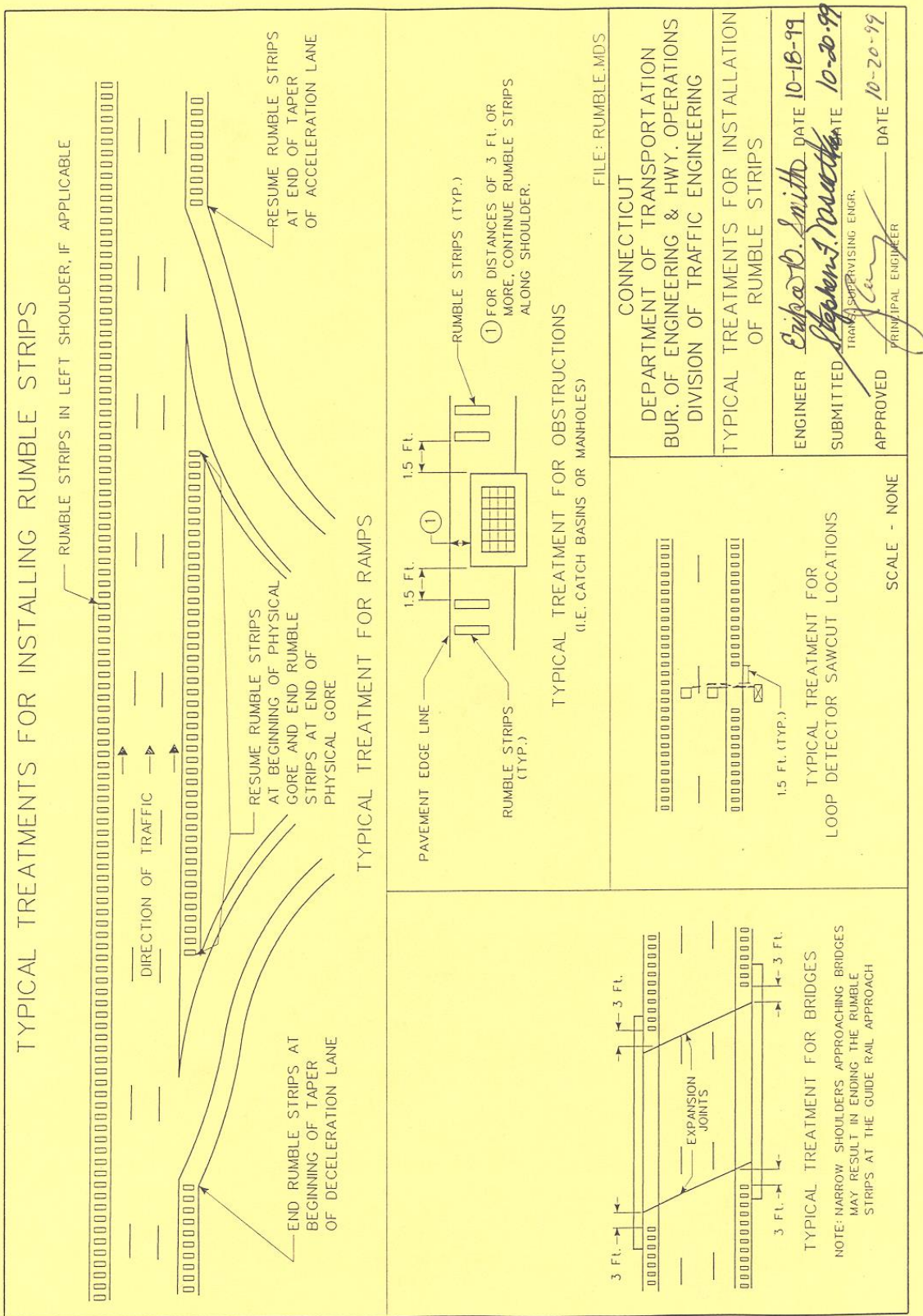
SUBMITTED *Stephen J. Masieko* DATE 10-20-99  
TRAFFIC SUPERVISING ENGR.

APPROVED *[Signature]* DATE 10-20-99  
PRINCIPAL ENGINEER

SCALE - NONE

ITEM # 0406287A

ITEM # 0406288A



ITEM # 0406287A

ITEM # 0406288A



## **ITEM #0406289A – REMOVAL OF RUMBLE STRIPS**

### **Description:**

Work under this item shall consist of removing rumble strips through milling and repaving with hot mix asphalt (HMA) where shown on the plans or where directed by the Engineer, and in conformance with these specifications. The surface lift of the existing pavement shall be removed by milling out the existing rumble strip to a depth of 1.5 to 2.5 inches. The milled surface shall be swept by hand or machine and then be blown clean with compressed air or a hot air lance. Tack coat is to be applied to the milled surface and any vertical or semi-vertical walls formed by the milling. The milled out area shall then be filled and compacted with HMA S0.375.

### **Definitions:**

Surface lift of pavement: The thickness of the last lift of pavement placed prior to performing crack sealing. A lift is defined as single bituminous-concrete mixture placed at a defined thickness in a single paver pass (or by handwork.)

### **Materials:**

Materials for this work shall consist of the following:

Hot-mix Asphalt (specifically HMA S0.375) conforming to the requirements of Sections 4.06 and M.04 of the Standard Specifications.

Tack coat conforming to the material requirements for tack coat in Sections 4.06 and M.04 of the Standard Specifications.

### **Equipment:**

Equipment for this work shall include, but is not limited to, the following:

Milling machine – A milling machine designed and built for milling HMA pavements. It shall be self propelled with sufficient power, traction, and stability to maintain depth.

The rotary drum of the machine shall utilize carbide tip tools spaced not more than 5/8 inches apart. Use of a fine-milling drum with a tighter tooth spacing of 0.3 inches is desirable, but optional. The forward speed of the milling machine shall be limited to no more than 45 feet/minute. The tools on the revolving cutting drum must be continually maintained and shall be replaced as warranted to provide a uniform pavement texture. It must include dust control equipment during the removal process.

It shall be capable of removing the existing pavement to a width of 2 to 10 inches wider than the rumble strip.

A wider milling width may be used in cases where two rumble strips are located near and parallel to each other, as may occur in a median area; see Construction Methods.

Sweeper – A hand broom is acceptable for smaller areas when approved by the Engineer. If a mechanized sweeper is used, it shall be equipped with a water tank and be capable of removing the

millings and loose debris from the surface. Other sweeping or vacuum type equipment may be provided in lieu of the sweeper where acceptable by the Engineer.

Air compressor – The unit shall consist of an air compressor capable of producing 100 psi, oil free, compressed air for blowing the milled pavement surface clean.

Hot air lance – The unit shall be designed for cleaning and drying the pavement surface. It shall consist of an air compressor capable of delivering 100 psi, oil free heated air. The compressed air emitted from the tip of the lance shall be flame free and be capable of achieving a temperature of at least 1500°F.

Paving and compaction equipment – All equipment used to place and compact the hot mix asphalt required for this work shall meet the requirements of Section 4.06 of the Standard Specifications, except no grade and slope control shall be required. Also, due to the nature of this work, it is expected that much of the placement of hot mix asphalt will require hand work. Either vibratory plate compactors or rollers may be used for compaction.

#### **Construction Methods:**

The Contractor shall pre-mark the location of the beginning and ending points of the sections, prior to the removal of the rumble strips. The Engineer shall review and approve the limits of removal.

The width of milling shall be as specified on the Plans or other specifications. If no other width specification exists, the width of milling shall be 2 to 10 inches wider than the existing rumble strip. Rumble strips are typically about 16 inches wide. If there are two rumble strips located near and parallel to one another, as may occur in median areas, and if they both can be removed by a single pass of a wider milling machine without adversely affecting drainage, safety, or quality of results, then a wider milling machine may be used. In this case the length measured for pay will be the sum of the lengths of the two individual rumble strips. Milling widths wider than specified above may be used with the written permission of the Engineer.

The depth of removal shall be as shown on the Plans, or as detailed in specifications, or as directed by the Engineer, generally from 1.5 to 2.5 inches. The intent is to remove the surface lift. If there are no Plans or other specifications, mill 1.5 to 2.5 inches as needed to match the thickness of the surface lift. The Engineer may alter the milling depth based on conditions discovered as work is in progress. It is expected that the milling depth will not exceed 2.5 inches. If the surface lift is 3 inches thick and it is in good condition, as determined by the Engineer, mill only 1.5 inches deep, unless directed otherwise by the Plans, project specifications, or Engineer.

As specified in the requirements for milling, the milled surface shall be swept clean (by hand if necessary.) Once all millings are removed by sweeping, the milled areas shall be allowed to dry if necessary. Any moisture in or on the milled areas must be allowed to evaporate or be removed with the assistance of a hot air lance as specified above. Once the milled area is deemed dry by the Engineer it shall be blown with compressed or hot lance air, as specified above, so that no debris or dust is present on or within the milled area.

Once deemed clean by the Engineer, the milled area, including the sides/walls of the milled area, shall receive an application of tack coat as specified above and in Section 4.06 of the Standard Specifications.

After the tack coat has had sufficient time to cure or break, HMA S0.375 (Superpave Level 2) shall be placed and compacted to the requirements above and in Section 4.06 of the Standard Specification. It shall be compacted to match the elevation of the surrounding pavement surface.

At all times the Contractor is required to meet the density and compaction and all other requirements specified in Sections 4.06 and M.04 of the Standard Specifications and any supplementals that have been issued by the bid date of the project.

The Contractor shall resurface the milled area prior to opening the roadway to traffic. The milled area shall be swept, cleaned with compressed air, tacked and repaved in the same day.

Precaution should be taken to avoid damage to the existing roadway materials that are to remain in place. If damage occurs, it must be repaired by the Contractor at no additional cost to the State. The methods employed in performing the work and all equipment, tools, machinery and plant used in handling material and executing any part of the work shall be subject to the approval of the Engineer before the work is started; and whenever found unsatisfactory, it shall be changed and improved as required by the Engineer.

The Contractor shall pick up any waste material resulting from the operation in a manner acceptable to the Engineer. This waste material shall be disposed of in accordance with Subarticle 2.02.03-10(a).

**Method of Measurement:**

This work will be measured for payment by the actual number of linear feet of rumble strips removed. This distance shall be measured longitudinally along the edge of pavement with deductions for bridge decks, acceleration and deceleration lanes, drainage structures, loop detector sawcut locations, and other sections where the rumble strips were not previously installed. If two rumble strips are near one another and are removed by a single milling machine pass, the length measured for pay will be the sum of the lengths of the two rumble strips.

**Basis of Payment:**

This work will be paid for at the Contract unit price per linear foot for "Removal of Rumble Strips." The price shall include the removal of the existing rumble strips, furnishing all materials, placement, and compaction of the HMA, equipment, tools, labor, and work incidental thereto and also disposal of any waste material resulting from the operation.

**Pay item**

Removal of Rumble Strips

**Pay Unit**

L.F.

**ITEM #0406314A – 80 MIL PAVEMENT MARKING GROOVE 5” WIDE**

**ITEM #0406315A – 80 MIL PAVEMENT MARKING GROOVE 7” WIDE**

**ITEM #0406316A – 80 MIL PAVEMENT MARKING GROOVE 9” WIDE**

**Description:**

Work under this item shall consist of grooving the pavement surface in a continuous or regularly spaced fashion for the placement of recessed pavement markings. Unless otherwise noted, the groove shall be 1 inch wider than the anticipated pavement marking. The groove for double-yellow centerline markings shall consist of two grooves, each 5 inches wide.

**Groove Width:** 5 inches wide for 4-inch markings  
7 inches wide for 6-inch markings  
9 inches wide for 8-inch markings

**Groove Depth:** 0.080 inches ± 0.010 inches

The groove shall not be installed continuously for intermittent pavement markings, but only where markings are to be applied.

The groove shall not be installed on metal bridge decks, on bridge joints, at drainage structures, at loop detector sawcut locations, or in other areas identified by the Engineer.

**Equipment:**

The grooving equipment shall be equipped with a free-floating, depth-controlled head which provides a consistent groove depth over irregular pavement surfaces. The grooving head shall only be equipped with diamond saw blades. Any ridges in the bottom of the groove shall have a maximum height of 0.015 inches.

The grooving equipment shall be capable of installing a groove 6 inches away from any vertical or horizontal obstruction.

**Construction Methods:**

The pavement marking groove shall be installed in accordance with the current ConnDOT pavement marking standard drawings.

The Contractor shall establish control points for measuring offsets and pre-marks along the entire distance of pavement being grooved. Prior to installation of the groove, the Contractor shall verify the equipment is capable of installing the correct width and spacing of the groove. The

ITEM #0406314A,  
#0406315A, #0406316A

control points, pre-marks, and equipment will be reviewed by the Engineer prior to commencement of the work.

The groove will be considered defective if any edge of the groove varies more than 0.25 inch in a 10-foot length, or if the alignment of the groove visibly deviates from the normal alignment of the road.

Final Cleaning: The Contractor shall immediately collect all debris and dust resulting from the grooving operation by vacuuming the pavement groove and adjacent pavement surface. Collected debris and any waste material shall be properly disposed of by the Contractor.

The work area shall be returned to a debris-free state prior to re-opening to traffic.

**Repair of Unacceptable Groove:**

The Contractor shall repair any defective groove(s) to the satisfaction of the Engineer. All work in conjunction with this repair shall be performed at no additional cost to the State.

**Pavement Marking Requirements:**

The Contractor is required to install permanent epoxy resin pavement markings in the grooves before the lane or roadway is opened to live traffic. If the permanent pavement markings cannot be installed before the lane or roadway is opened to live traffic, temporary 0.005-inch hot-applied waterborne pavement markings without glass beads shall be installed before the lane or roadway is opened to live traffic at no additional cost to the State. Within 10 calendar days, permanent epoxy resin pavement markings shall be applied in the groove over the 0.005-inch hot-applied waterborne pavement markings.

**Groove Depth Gauge:**

The Contractor shall supply the Engineer with two accurate, easily readable gauges with which to verify groove depth for the duration of the project. The gauges shall be delivered no less than one week prior to the anticipated beginning of grooving operations. Gauges shall be accompanied by manufacturer's instructions for their use. The gauges will be returned to the Contractor at the conclusion of the project.

**Method of Measurement:**

This work will be measured for payment by the number of linear feet of groove installed in the pavement as ordered and accepted by the Engineer.

**Basis of Payment:**

This work will be paid for at the contract unit price per linear feet of "Pavement Marking Groove" installed in the pavement and accepted. This price shall include cleaning of the

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#0406315A, #0406316A

pavement, all materials, equipment, tools, depth gauges, and labor incidental thereto, and disposal of any waste material resulting from the operation.

**Pay Item**

80 Mil Pavement Marking Groove 5" Wide  
80 Mil Pavement Marking Groove 7" Wide  
80 Mil Pavement Marking Groove 9" Wide

**Pay Unit**

L.F.  
L.F.  
L.F.

## **ITEM #0406999A – ASPHALT ADJUSTMENT COST**

**Description:** The Asphalt Adjustment Cost will be based on the variance in price for the performance-graded binder component of hot mix asphalt (HMA), Polymer Modified Asphalt (PMA), and Ultra-Thin Bonded Hot-Mix Asphalt mixtures completed and accepted during the Contract.

**The Asphalt Price is available on the Department of Transportation website at:**

<http://www.ct.gov/dot/asphaltadjustment>

### **Construction Methods:**

An asphalt adjustment will be applied only if all of the following conditions are met:

- I. For HMA and PMA mixtures:
  - a. The HMA or PMA mixture for which the adjustment would be applied is listed as a Contract item with a pay unit of tons.
  - b. *The total quantity for all HMA and PMA mixtures in the Contract or individual purchase order (Department of Administrative Service contract awards) exceeds 1000 tons or the Project duration is greater than 6 months.*
  - c. The difference between the posted *Asphalt Base Price* and *Asphalt Period Price* varies by more than \$5.00 per ton.
- II. For Ultra-Thin Bonded HMA mixtures:
  - a. The Ultra-Thin Bonded HMA mixture for which the adjustment would be applied is listed as a Contract item.
  - b. The total quantity for Ultra-Thin Bonded HMA mixture in the Contract exceeds:
    - i. 800 tons if the Ultra-Thin Bonded HMA item has a pay unit of tons.
    - ii. 30,000 square yards if the Ultra-Thin Bonded HMA item has a pay unit of square yards.

Note: The quantity of Ultra-Thin Bonded HMA measured in tons shall be determined from the material documentation requirements set forth in the Ultra-Thin Bonded HMA item Special Provision.
  - c. The difference between the posted *Asphalt Base Price* and *Asphalt Period Price* varies by more than \$5.00 per ton.
  - d. No Asphalt Adjustment Cost will be applied to the liquid emulsion that is specified as part of the Ultra-Thin Bonded HMA mixture system.
- III. Regardless of the binder used in all HMA or PMA mixtures, the Asphalt Adjustment Cost will be based on PG 64-22.

The Connecticut Department of Transportation (CTDOT) will post on its website, the average per ton selling price (asphalt price) of the performance-graded binder. The average is based on the high and low selling price published in the most recent available issue of the **Asphalt Weekly Monitor®** furnished by Poten & Partners, Inc. under the “East Coast Market – New England, New Haven, Connecticut area,” F.O.B. manufacturer’s terminal.

The selling price furnished from the Asphalt Weekly Monitor ® is based on United States dollars per standard ton (US\$/ST).

**Method of Measurement:**

Formula:  $HMA \times [PG\%/100] \times [(Period\ Price - Base\ Price)] = \$ \underline{\hspace{2cm}}$

where

- **HMA:**
  1. For HMA, PMA, and Ultra-Thin Bonded HMA mixtures with pay units of tons:  
The quantity in tons of accepted HMA, PMA, or Ultra-Thin Bonded HMA mixture measured and accepted for payment.
  2. For Ultra-Thin Bonded HMA mixtures with pay units of square yards:  
The quantity of Ultra-Thin Bonded HMA mixture delivered, placed, and accepted for payment, calculated in tons as documented according to the Material Documentation provision (Construction Methods, paragraph G) of the Ultra-Thin Bonded HMA Special Provision.
- **Asphalt Base Price:** The asphalt price posted on the CTDOT website 28 days before the actual bid opening posted.
- **Asphalt Period Price:** The asphalt price posted on the CTDOT website during the period the HMA or PMA mixture was placed.
- **PG%:** Performance-Graded Binder percentage
  1. For HMA or PMA mixes:
    - PG% = 4.5 for HMA S1 and PMA S1
    - PG% = 5.0 for HMA S0.5 and PMA S0.5
    - PG% = 6.0 for HMA S0.375, PMA S0.375, HMA S0.25 and PMA S0.25
  2. For Ultra-Thin Bonded HMA mixes:  
PG% = Design % PGB (Performance Graded Binder) in the approved job mix formula, expressed as a percentage to the tenth place (e.g. 5.1%)

The asphalt adjustment cost shall not be considered as a changed condition in the Contract as result of this provision since all bidders are notified before submission of bids.

**Basis of Payment:** The "Asphalt Adjustment Cost" will be calculated using the formula indicated above. A payment will be made for an increase in costs. A deduction from monies due the Contractor will be made for a decrease in costs.

The sum of money shown on the Estimate and in the itemized proposal as "Estimated Cost" for this item will be considered the bid price although the adjustment will be made as described above. The estimated cost figure is not to be altered in any manner by the bidder. If the bidder should alter the amount shown, the altered figure will be disregarded and the original cost figure will be used to determine the amount of the bid for the Contract.

Pay Item	Pay Unit
Asphalt Adjustment Cost	est.



## **ITEM #0503001A – REMOVAL OF SUPERSTRUCTURE**

Work under this item shall conform to the requirements of Section 5.03 amended as follows:

**5.03.01 - Description:** Delete the paragraph and replace with the following:

Work under this item shall consist of the removal and satisfactory disposal of the superstructure. Those items to be removed and disposed of shall include, but not be limited to, steel beams, diaphragms, concrete deck, curbs, parapets, bituminous wearing surface, metal bridge rail, under bridge utilities within the limits shown on the plans, bearings and bridge mounted sign structures, and coatings found on any of these items as shown on the plans or as directed by the Engineer.

The removal of any lead containing materials, including but not limited to paint, shall be in accordance with the “Lead Compliance for Miscellaneous Exterior Tasks” special provision.

**5.03.03 - Construction Methods:** Add the following:

1. Removal of Superstructure:
  - a. The Contactor shall submit to the Engineer for review in accordance with Article 1.05.02, his proposed demolition sequence together with working drawings, and calculations showing the governing stresses for removal of steel girders during the various sequence steps. Proper temporary vertical and horizontal girder supports shall be provided, as necessary, to suit the Contractor’s sequence. Acceptance of the Contractor’s plans shall not be considered as relieving the Contractor of any responsibility.
  - b. All plans and calculations to be signed and sealed by a Professional Engineer licensed to practice in the State of Connecticut.
  - c. A “Superstructure Demolition Method” is shown on drawings. The Contractor may propose an alternate method, to be approved by the Engineer. The alternate method is to conform to all requirements described in drawings, specifications and special provisions.
  - d. Before beginning removal of concrete and structural steel in all spans, the Contractor must have received approval of his proposed method of superstructure demolition and temporary protective shield designs and must have installed the temporary protective shield. The extent and limits of protective shield is to prevent all construction debris, material, tools, equipment or any other waste from entering into all areas below the bridge deck.
  - e. All material shall become the property of the Contractor and shall be removed and disposed of off-site by him. The Contractor is responsible for any fees and permits necessary to dispose of all materials removed as part of this item. The Contractor is responsible for the cost and securing of all permits that may be required to transport all

ITEM #0503001A

material removed under this item to the disposal site.

- f. The superstructure removal shall not result in damage to any permanent construction (new or existing) or to adjoining property. If any damage does occur, it shall be repaired by the Contractor to the satisfaction of the Engineer at no additional expense to the State.
- g. Removal of coatings, including possible lead containing paint, and disposal of associated debris shall be in compliance with the methods and processes described in the special provision for Item #0020903A – Lead Compliance for Miscellaneous Exterior Tasks.

**5.03.04 - Method of Measurement:** Delete the entire article and replace with the following:

This work, being paid for on a lump sum basis, will not be measured for payment. Contractor shall submit an anticipated schedule of values for the Engineer’s review and comment.

**5.03.05 - Basis of Payment:** Delete the second and third paragraphs and replace with the following:

This work will be paid for at the contract lump sum price for “Removal of Superstructure” which price shall include the removal and disposal of the superstructure components characterized as non-hazardous; the containment, removal, collection, and storage and removal of paint debris that does not contain lead and is characterized as non-hazardous, and all equipment, tools and labor incidental thereto.

The work to remove superstructure components that contain lead, including treatment, and handling of lead contaminated materials and transport and disposal of any hazardous and/or non-hazardous lead construction and demolition waste will be paid for under the item “Lead Compliance for Miscellaneous Exterior Tasks”.

Pay Item

Pay Unit

Removal of Superstructure

L.S

**ITEM #0514271A – PRECAST CONCRETE/STEEL COMPOSITE  
SUPERSTRUCTURE**

**Description:** Work under this item shall be in accordance with the applicable provisions of Sections 5.08, 6.01, 6.02 and 6.03, and the provisions contained herein.

This Item shall include the fabrication, delivery, temporary bracing, and installation of the Prefabricated Bridge Units (PBUs), including all necessary materials, labor and equipment to complete the work, as shown on the plans. The PBUs are comprised of steel beams made composite with a reinforced concrete deck, cast prior to the erection of the PBU. Cast-in-place concrete closure pours and link slabs shall be used to connect the deck portions of the PBUs.

This item also includes appurtenances that are incidental to the PBU or projecting from the PBU including, but not limited to, beam end plate, welded studs for semi-integral backwall, diaphragms, drip bars, sole plates, and projecting reinforcing steel.

Due to the accelerated nature of this Project, the crossover of I-95 traffic at the Site shall be initiated a minimum of two weeks after all PBUs have been accepted.

**Materials:** The materials for Prefabricated Bridge Units shall conform to the following requirements:

1. **Structural Steel:** Structural steel materials shall conform to the requirements of Section M.06. Shear stud connectors shall conform to the requirements of Subarticle M.06.02-4. All structural steel in the superstructure shall conform to the requirements of AASHTO M270, Grade 50W T2. This includes the steel girders, beam end plates, connection plates, bearing stiffeners, drip bars, sole plates, and diaphragms.
2. **Steel Hardware:** Steel hardware materials shall conform to the requirements of Section M.06. Connection bolts shall conform to the requirements of ASTM F3125 Grade A325 Type 3.
3. **Bridge Deck Concrete:** Class "50" Concrete shall be used. The concrete shall be air-entrained concrete composed of Portland cement, fly ash, fine and coarse aggregate, admixtures and water. The air-entrained property may be obtained by the use of an approved air-entraining admixture. The entrained air content of the concrete immediately before placement shall be not less than 5 percent or more than 7 percent for Class "50" concrete. The testing of air content shall be performed in accordance with the requirements of ASTM C231.

The minimum mass of cementitious materials per cubic yard of concrete shall be 660 pounds. Fly ash shall be used to replace 15% by mass of the required Portland cement and shall conform to the requirements of Subarticle M.03.01-3(c), of Form 817.

The maximum water-cementitious material ratio, using the method by mass, shall be 0.40 for Class "50" Concrete.

The coarse aggregate shall conform to the requirements of Subarticle M.01.04, of Form 817, and the mix shall be designed utilizing a maximum size of No. 8 aggregate.

The Contractor may submit, for the approval by the Engineer, a water reducing admixture for the purpose of increasing workability and reducing the water requirements for the concrete.

The addition of calcium chloride to the mix will not be permitted.

4. **Reinforcing Steel:** Reinforcing steel shall be epoxy coated deformed steel bars and conform to the requirements of Article M.06.01 of Form 817.

#### **Construction Methods:**

1. **Submittals:** Submittals for the PBUs, requiring written acceptance from the Engineer, are as follows:

(a) **Concrete Material:** Submit mix designs for Class "50" concrete.

(b) **Shop Drawings and Working Drawings:** Prior to any fabrication, the Contractor shall prepare and submit shop and working drawings in accordance with Article 1.05.02. Multiple shop drawings may be required for the PBUs since the fabrication can take place in two separate facilities. The Contractor shall coordinate the preparation of the separate shop drawings to ensure that there are no conflicting details. Acceptance of the shop drawings will be required prior to the ordering of the materials and the fabrication of the prefabricated bridge units.

In addition to the standard detailing of shop drawings and minimum requirements for working drawing submittals as specified in Article 6.03.03-2d, the Contractor shall include the following information:

- a. The stamp of the registered Professional Engineer licensed in the State of Connecticut who has reviewed and certified the shop or work drawings.
- b. All element dimensions and allowable tolerances to allow proper fit of erected elements, such that they achieve the final dimensions on the contract plans.
- c. Methods for controlling the accumulation of dimensional tolerances through the use of working points or working lines. The width of each individual unit along with the width of the closure pour shall be determined such that, when pieces are laid together, the prefabricated bridge units shall satisfy the required bridge out-to-out width and cross slopes shown on the plans.
- d. All lifting inserts, hardware, or devices and locations for Engineer's approval. All lifting devices shall be designed by the Contractor.

- e. Locations and details of the lifting devices, including supporting calculations, type, and amount of any additional reinforcing required for lifting. All lifting devices will be designed based on the no cracking criteria in Chapter 8 of the PCI Design Handbook (Seventh Edition).
  - f. Details and methods for accommodating the dimensional requirement of each PBU accounting for profile grade and cross slope.
  - g. The minimum required compressive strength of the concrete deck to be attained prior to handling the prefabricated bridge units.
- (c) **Shop Schedule:** Refer to Article 6.03.03-2b of Form 817.
- (d) **Welding Procedures:** Refer to Article 6.03.03-2c of Form 817.
- (e) **Assembly Plan:** The Assembly Plan is a document prepared by the Contractor and a qualified Professional Engineer with specific knowledge of the Contractor's equipment and "means and methods" for constructing the elements required to complete the work on the project. The development of this Assembly Plan is closely linked to the schedule of operations and the interim material strengths necessary for the work to progress. The Contractor shall coordinate the development of the Assembly Plans with the development of the Shop Drawings to ensure consistent detailing. For example, if additional lifting hooks, grout ports, leveling devices, etc. are required, they should be added to the shop drawings prior to final acceptance.

The Assembly Plan shall be considered a Working Drawing. The development and approval of the Assembly Plan shall be according to Article 1.05.02. Acceptance of the Assembly Plan will be required prior to the initiation of the crossover of I-95 traffic.

The fabrication of the prefabricated bridge units shall not commence prior to the acceptance of the Shop Drawings and the Assembly Plan, unless written permission is given by the Engineer. The Department will reject any components fabricated before receiving written acceptance or components that deviate from the accepted drawings.

At a minimum, the Assembly Plan shall include the following information:

- a) Details and/or cut sheets of all equipment that will be employed for the assembly of the prefabricated bridge units.
- b) Details of all equipment to be used to lift the PBUs including cranes, excavators, lifting slings, sling hooks, and jacks. Crane locations, operation radii, and lifting calculations shall also be included. The factors of safety for the lifting of PBUs will be achieved by using 125% of the weight of the PBU being lifted. The Contractor is responsible for determining the center of gravity for all PBUs. Special care shall be used for PBUs that are not symmetrical. These elements may require special lifting hardware to allow for installation to the grades shown on the plans.
- c) The Assembly plan shall address the potential for tension in the concrete deck during shipping and handling. Allowable tension stresses in the concrete shall be according

- to Chapter 8 of the PCI Design Handbook (seventh edition). Calculations shall be prepared for the lifting and handling in accordance with the no discernible cracking criteria. Lifting hook locations and hardware shall be coordinated with the Fabricator(s).
- d) A statement of compliance with all requirements of applicable environmental permits.
  - e) A statement of compliance with the construction timeframes specified in the “Maintenance and Protection of Traffic” and “Prosecution and Progress” specifications.
  - f) A work area plan, depicting all affected utilities, drainage, and protective measures that will be employed throughout the construction activities.
  - g) Full size 22”x34” sheets depicting the assembly procedures for the PBUs.
  - h) A detailed schedule with the hourly timeline for all operations. In development of the schedule the Contractor shall account for setting and cure times for concrete closure pours.
  - i) Methods of adjusting and securing the elements after placement.
  - j) Procedures for controlling erection tolerances for both the horizontal and vertical direction.
  - k) Methods of forming closure pours.
  - l) Methods for curing closure pours. The Contractor shall include detailed description of curing materials if casting is anticipated during times when wet weather can be anticipated.
  - m) The Assembly Plan shall be one complete document and shall be prepared and stamped by a registered Professional Engineer licensed in the State of Connecticut.

## **2. Fabrication:**

Fabrication of structural steel for PBUs shall be performed in accordance with Section 6.03 of Form 817.

On-site fabrication of the concrete deck shall conform to the requirements of Article 6.01.03 of Form 817.

At a minimum, the following requirements shall be met for off-site fabrication of the PBUs:

- a. The reinforced concrete deck on top of the girder pairs shall be constructed by a concrete fabricator with an established Quality Control Management plan that is accepted by the Department. The fabricator shall follow the quality control procedures that have been submitted to and approved by the Department.
- b. The PBUs shall be constructed to tolerances shown on the plans. Where tolerances

- for the concrete deck are not shown, follow tolerance limits in the PCI MNL 116-99, “Manual for Quality Control for Plants and Production of Structural Precast Concrete Products, 4<sup>th</sup> Edition”. Elements that are found to be out of tolerance may be subject to rejection. Rejection of the elements may be waived by the Engineer if the Contractor can demonstrate that the out of tolerance element can be installed without significant modifications to the bridge. For example, an over width element may be acceptable if the adjacent element is under width.
- c. The fabricator and Contractor shall prevent cracking or damage of the PBUs during handling, storage, transportation, and final installation in permanent position.
  - d. If damage occurs, replace defects and breakage of the PBUs in accordance with the following:
    - i. Members that sustain damage or surface defects during fabrication, handling, storage, hauling, or erection are subject to review or rejection.
    - ii. Proposed repair procedures must be submitted to the Engineer for acceptance before performing repairs.
    - iii. Repair work must re-establish the elements’ structural integrity, durability, and aesthetics to the satisfaction of the Engineer.
    - iv. Determine the cause when damage occurs and take corrective action.
    - v. Failure to take corrective action, leading to similar repetitive damage, can be cause for rejection of the damaged element.
    - vi. 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.
- 3. Quality Control:** At a minimum, the following requirements shall be met:
- a) The Contractor is required to provide field survey to determine that the PBUs are placed within the horizontal and vertical tolerances stated on the plans.
  - b) The Contractor is responsible for interim testing of concrete placed in the field to allow the work to proceed with various stages of construction. For example, if the approved Assembly Plan allows for loads to be placed on the PBU after the closure pour concrete has achieved a compressive strength of 2000 psi, the Contractor will be required to test the concrete proving that the strength has been achieved. For materials used throughout the construction that have a proven strength gain at predetermined time interval, the compressive testing requirements may be waived by the Engineer. All testing furnished by the Contractor shall be performed by an AASHTO accredited laboratory. All Quality Control test results shall be submitted to the Division of Materials Testing section for acceptance. Additional testing by the Contractor shall be performed at no additional cost and will not be

measured for payment. Final acceptance testing of concrete shall be in accordance with Article 6.01.03.

- c) The plant shall document all test results. The quality control file shall contain at least the following information:
  - i. Element identification
  - ii. Date and time of casting
  - iii. Concrete cylinder test results
  - iv. Quantity of used concrete and the batch printout
  - v. Form-stripping date and repairs if applicable
  - vi. Location/number of blockouts and lifting inserts
  - vii. Temperature and moisture of curing period
  - viii. Document lifting device details, requirements, and inserts

4. **Marking:** Permanently mark each prefabricated bridge unit with the date of casting and supplier identification. Stamp markings in fresh concrete.
5. **Handling and Storage:** Materials for this work shall be stored off the ground before, during, and after fabrication. The PBUs shall be kept free from dirt, grease and other contaminants and shall be reasonably protected from corrosion. Care shall be taken during storage, transporting, hoisting and handling of the PBUs to prevent damage to any part of the PBU. 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 State. All storage and handling operations shall be as directed by the Engineer.
6. **Dry Fit prior to Shipment:** The Contractor has two options to ensure the proper fit up of the PBUs when placed on the bridge substructure.

Option 1: Fabricate PBUs individually using geometric controls to maintain vertical and horizontal tolerances at closure pours. A dry fit of adjacent elements prior to shipment is required to ensure that they can be properly joined in the field.

Option 2: Fabricate the total number of PBUs, required to make up the full bridge width, together on temporary supports in the same orientation as they will end up in their final location supported by the bridge substructure. A separate dry fit of the PBUs is not required prior to shipping the PBUs.

7. **Installation:** The Contractor field personnel shall have knowledge of and follow the accepted Assembly Plan. If changes are warranted due to varying site conditions, resubmit the plan for review.

Working points, working lines, and benchmark elevations shall be established prior to placement of all elements. The Contractor is responsible for field survey as necessary to complete the work. The District reserves the right to perform additional independent



survey. This survey does not relieve the Contractor from performing survey for the construction. If discrepancies are found, the Contractor may be required to verify previous survey data.

The PBUs shall be placed in the sequence and according to the methods outlined in the Assembly Plan. The height of each element shall be adjusted to acceptable tolerances by means of leveling devices or shims. The Contractor shall ensure that the PBU is in the proper horizontal and vertical location prior to releasing from the crane and setting the next unit. Vertical tolerance must be checked at the top surface of the PBU. Diaphragms may be used to control geometry; however if the required setting tolerance cannot be met, the Contractor may be required to adjust or fabricate new diaphragms.

## **8. Erection Tolerances:**

### **a) Plan Alignment: Location and Clearances**

Note: the accumulation of maximum or minimum tolerances when multiple elements are joined may result in final overall dimensions that do not conform to the final dimensions shown on the contract plans. The Contractor must specifically design the element dimensions and tolerances to prevent this.

The Contractor shall adhere to the following tolerances for the final condition of the PBU after placement:

- i. Do not exceed 1/4 inch maximum deviation at each end of the span from overall longitudinal alignment after setting.
- ii. Do not exceed 1/4 inch maximum deviation from overall transverse location (i.e. longitudinal position) at each line of bearings.
- iii. Maximum deviation from alignment in both primary plan directions at each end of the span being set shall not exceed 1/4 inch or that required for the accommodation of manufactured expansion joint components or bearings, whichever is the less.
- iv. In the absence of other constraints, keep individual elements or surfaces within 1/4 inch of location with respect to similar matching surfaces.

### **b) Bridge Bearings: Elevation and Location**

The Contractor shall keep the elevation of individual bridge bearings within plus or minus 1/8 inch of required elevations. The plan location of bridge bearings shall be within a tolerance of 1/8 inch and the alignment within plus or minus 1/16 inch across the bearing.

If tolerances are not met, submit for approval of Engineer, means to adjust elevations or to correct for or accommodate errors or unintended deviations from required tolerances. Submit proposals and seek approval of the Engineer for the use of shims, injection of high strength grout or other methods to accommodate differences from required tolerance. Do likewise, for the accommodation of anchor bolts or similar restraining devices.

**Method of Measurement:** This work will be measured for payment by the actual square feet of concrete deck cast, finished, cured and accepted prior to erection of the PBU. Measurements will be made across the top (horizontal) surface of the concrete deck prior to erection. There will be no measurement for payment of any vertical face along the PBU nor any closure pour/link slab areas. Reinforcing bar extensions shall not be included in these measurements.

The development of the Assembly Plan and Shop Drawings for the PBUs will not be measured separately for payment and should be considered incidental to this Item.

**Basis of Payment:** This work will be paid for at the contract unit price per square foot for “Precast Concrete/Steel Composite Superstructure”, complete and accepted. Price shall include all tools, material, equipment, labor and work incidental to the construction.

Payment for work and materials described above or as noted on the plans as being incidental to the construction of the PBU shall be included in the unit price for “Precast Concrete/Steel Composite Superstructure”. Any expenses incidental to the revision of materials furnished, in accordance with the Shop Drawings and order lists, to make them comply with the plans and specifications, including costs incurred due to faulty detailing or fabrication, shall be borne by the Contractor.

Concrete for the closure pours and link slab shall be paid for separately under the item “High Early Strength Concrete”. Concrete for the semi-integral backwall shall be paid for separately under the item “Class F Concrete”.

<u>Pay Item</u>	<u>Pay Unit</u>
Precast Concrete/Steel Composite Superstructure	S.F.

## **ITEM #0520041A – PREFORMED JOINT SEAL**

**Description:** Work under this item shall consist of furnishing and installing a preformed joint seal as shown on the plans or as directed by the Engineer. Work shall also include a pre-installation survey for measurement of the existing joint opening width and preparation of the joint opening surfaces as needed to ensure proper performance of the preformed joint seal. The preformed joint seal shall seal the joint in accordance with the plans and prevent water from seeping through the joint area.

**Materials:** The preformed joint seal shall be one of the following:

1. Silicoflex:  
RJ Watson, Inc -- Bridge and Structural Engineered Systems  
78 John Glenn Drive  
Amherst, New York 14228  
Tel: (716) 691-3301 Fax: (716) 691-3305  
Website: <http://www.rjwatson.com>
  
2. V-Seal:  
D.S. Brown Company  
300 East Cherry Street  
North Baltimore, Ohio  
Tel: (419) 257-3561  
Website: <http://www.dsbrown.com>
  
3. Bridge Expansion Joint System (B.E.J.S.):  
EMSEAL Joint Systems Ltd.  
25 Bridle Lane,  
Westborough, MA 01581  
Tel: (508) 836-0280  
Website: <http://www.emseal.com>

A Materials Certificate for all components of the selected preformed joint seal shall be submitted by the Contractor in accordance with the requirements of Article 1.06.07

**Construction Methods:** All work at each joint location shall be accomplished in conformance with the traffic requirements in the Special Provisions, “Maintenance and Protection of Traffic” and “Prosecution and Progress.”

At all joint locations, the Contractor shall perform a survey of the existing joint openings. The information to be recorded shall include, but not be limited to:

- a) Joint opening width (taken along the length of the joint at intervals not to exceed 6 feet)
- b) Temperature at time of measurement of joint opening width.

- c) Identification of sharp discontinuities in the joint alignment or its surfaces.

At least 30 days prior to start of the work, the Contractor shall submit a detailed Quality Control Plan to the Engineer for review and comment for the installation of the selected joint system.

The submittal shall include:

- a) All information recorded during field survey.
- b) A list of all manufactured materials and their properties to be incorporated in the joint system, including the primer, bonding agent, sealant, and the sealing element.
- c) A detailed step by step installation procedure and a list of the specific equipment to be used for the installation.

The Quality Control Plan must fully comply with the specification requirements and address all known and anticipated field conditions, including periods of inclement weather.

A technical representative of the selected joint system, approved by the manufacturer, shall be notified of the scheduled installation a minimum of 2 weeks in advance and shall be present to provide direction and assistance for the first joint installation and succeeding joint installations until the Contractor becomes proficient in the work, to the satisfaction of the Engineer.

Tools, equipment, and techniques used to prepare the joints and materials shall be acceptable to the Engineer and the manufacturer's technical representative prior to the start of construction.

The minimum ambient air temperature for installing any of the qualified preformed joint seals is 40°F and rising. The joint surfaces shall be completely dry before installing any of the components of the selected joint seal. The selected joint seal cannot be installed immediately after precipitation or if precipitation is forecasted. Joint preparation and installation of the selected preformed joint seal must be done during the same day.

Any discontinuities, projections, divots or other anomalies in the joint opening surfaces that would negatively affect the performance of the preformed joint seal shall be remedied by the Contractor by methods recommended by the manufacturer and acceptable to the Engineer.

All vertical faces adjacent to the joint opening shall be abrasively blast cleaned prior to application of any of the joint seal components. All remnants of the prior existing joint sealing system (rubberized gland, silicone sealant, etc.) shall be removed from the existing headers to remain. Any discontinuities or sharp projections into the plane of the joint shall be ground smooth prior to blast cleaning. Whenever abrasive blast cleaning is performed under this Specification, the Contractor shall take adequate measures to ensure that the abrasive blast cleaning will not cause damage to adjacent traffic or other facilities. Traffic will not be allowed to pass over the joint after blast cleaning has occurred.

Following blast cleaning, the joint's surfaces shall be wiped down or blown clean as recommended by the manufacturer.

The selected joint sealing system shall be installed continuously with no splices in the preformed seal, as recommended by the manufacture of the selected preformed joint seal.

When the sealing operations are completed, the joint opening shall be effectively sealed against infiltration of water. Any seal that does not effectively seal against water shall be removed and replaced at the Contractor's expense.

**Method of Measurement:** This work will be measured for payment by the number of linear feet of preformed joint sealing system installed. The measurement will be made at the top surface and along the centerline of the joint and shall include all portions of the installation in the roadway, in the curbs and sidewalk(s), and within parapets and medians.

**Basis of Payment:** This work will be paid for at the Contract unit price per linear foot for "Preformed Joint Seal" complete in place, including all materials, equipment, tools, and labor incidental thereto.

The Contract unit price shall include the pre-installation survey of the existing joint opening and the cost of assistance from a technical representative of the selected joint system.

<u>Pay Item</u>	<u>Pay Unit</u>
Preformed Joint Seal	LF

## **ITEM #0521007A – ELASTOMERIC BEARINGS**

**Description:** Work under this item shall consist of furnishing and installing elastomeric bearings and all necessary materials and equipment to complete the work as shown on the plans.

### **Materials:**

Elastomeric Bearings: The elastomer shall have a shear modulus between 0.130 and 0.200 ksi and a nominal hardness of 60 on the Shore A scale. It shall conform to the requirements of Section 18.2 of the AASHTO LRFD Bridge Construction Specifications.

The internal steel laminae shall conform to ASTM A709M Grade 36 or approved equal. The laminae shall be sandblasted and cleaned of all surface coatings; rust and mill scale before bonding and shall be free of sharp edges and burrs.

The bearing shall be cast as a unit in a mold and shall be bonded and vulcanized under heat and pressure. The mold finish shall conform to standard shop practice.

Flash tolerance, finish and appearance shall meet the requirements of the latest edition of the Rubber Handbook, published by the Rubber Manufacturer's Association, Inc., RMA F3 and T.063.

The tests of the elastomer specified in Table 18.2 of AASHTO LRFD Bridge Construction Specifications shall be conducted on each lot of bearings. A shear modulus test shall be performed on each batch of material. (A lot consists of a single type of bearing of the same size, manufactured from the same batch of elastomer, submitted for inspection at the same time. A batch of elastomer is the quantity of elastomer prepared and compounded at one time).

In lieu of the low temperature crystallization test for each lot of bearings and a shear modulus test for each batch of material, the manufacturer may provide certificates from tests performed on identical formulations within the preceding year.

Every bearing shall be visually inspected for compliance with dimensional tolerance and for overall quality of manufacture. Buffing, cutting, or any other attempt to alter the size of the bearings to meet tolerances will not be permitted.

The elastomer shall meet the minimum requirements specified in Table 18.2 of AASHTO LRFD Bridge Construction Specifications for durometer hardness, tensile strength, ultimate elongation, heat resistance, compression set, ozone resistance, low temperature brittleness, low temperature stiffness and low temperature crystallization. The shear modulus of the material shall be tested at 73° F using the apparatus and procedure described in Annex A of ASTM D4014

The steel laminae shall develop minimum peel strength of 5.1 k/ft. as tested in accordance with ASTM D429 Method B.

Every bearing shall be tested as follows for a Short-Duration Compression Test:

1. The bearing shall be loaded in compression to 1.5 times the design load shown on the plans. The load shall be held constant for 5 minutes, removed and reapplied for another 5 minutes.
2. The bearing shall be carefully examined while under the second loading.
3. If the bulging pattern indicates laminate parallelism or layer thickness outside of specified tolerance, or poor laminate bond, the bearing shall be rejected. If there are three or more separate surface cracks greater than 3/32" wide and 3/32" deep, the bearing shall be rejected.

A Certified Test Report in accordance with Section 1.06.07 shall be required for the specified tests on the elastomer and for the specified short duration compression tests.

Each elastomeric bearing pad shall have embossed on it the following: the word "CONN", project number, manufacturer's identification code or symbol, and the month and year of manufacture. The bearing shall also have stenciled on it, with indelible ink, the lot number, bridge number, and the bearing number. The marking shall be placed on a side of the bearing that is visible after installation.

For structures requiring less than fifty (50) pads, one test pad shall be furnished. For structures requiring more than fifty (50) pads, one extra test pad shall be furnished for each additional fifty (50) pads or part thereof. If there are two or more types of pads in one structure, and only test pad is required, the test pad will be furnished for the type of which there are the greater numbers. All test pads shall be furnished without charge.

All of the pads on one structure shall be manufactured by the same firm.

The manufacturer shall furnish facilities for the test and inspection of the competed bearing in his plant or at the independent test facility and the inspectors shall be allowed free access to the manufacturer's plant and test facility.

The load plates shall conform to AASHTO M270, Grade 50WT2.

Bolts shall conform to ASTM A325 Type 3. The bolts, nuts, and washers shall be hot-dipped galvanized in accordance with ASTM 153.

**Construction Methods:** Before fabricating any materials, the Contractor shall submit shop drawings to the Engineer for approval in accordance with Subarticle 1.05.02-3. These drawings shall include but not be limited to the following information: the name of the manufacturer, complete details of the pads and pertinent material designations.

The bearing areas of the masonry upon which the elastomeric bearing pads are to be placed shall be carefully finished, by grinding if necessary, to a smooth, even level surface of the required

elevation, and shall show no variations from a true plane greater than 0.080 inches over the entire area upon which the elastomeric bearing pads are to rest.

After delivery of the bearings to the job site, the bearings shall be stored such that they are kept clean and dry at all times.

There shall be uniform bearing between the elastomeric bearing pad and the concrete seat after application of full dead load, there shall be uniform deflection of the elastomeric bearing pad.

Welding of the structural steel adjacent to elastomeric bearing pads shall not be permitted.

The elastomeric bearings shall be installed when the ambient air temperature has been within the range of 32°F - 81°F for a period of at least two hours.

**Method of Measurement:** This work will be measured for payment by the number per each of elastomeric bearings, installed and accepted.

**Basis of Payment:** This work will be paid for at the contract unit price per each of “Elastomeric Bearings”, complete, in place, which price shall include furnishing and installing elastomeric bearing assemblies (including vulcanized load plates), and all materials, equipment, tools and labor incidental thereto.

The sole plates and filler plates (including bolts, nuts and washers) will be included in the contract unit price for “Precast Concrete/Steel Composite Superstructure”.

Pay Item  
Elastomeric Bearings

Pay Unit  
EA



## **ITEM #0522178A – CONSTRUCT CONCRETE KEEPER BLOCKS**

**Description:** This item shall consist of constructing concrete keeper blocks including the furnishing and placing of reinforcing steel, steel keeper plates, welded studs and concrete. This work shall be done as indicated on the plans, in accordance with these specifications, and as directed by the Engineer.

### **Materials:**

The steel keeper plates shall conform to ASTM A36 steel.

Steel for welded studs shall conform to the requirements of Subarticle M.06.02-4.

Concrete shall be Class "F" type conforming to Article M.03.

Reinforcement shall conform to ASTM A615, Grade 60.

The steel keeper plates shall be galvanized after fabrication and welding of the studs in accordance with ASTM A123.

**Certification:** A Materials Certificate and a Certified Test Report shall be required for the adhesive bonding material and the steel keeper plates in accordance with Article 1.06.07, certifying the conformance of these materials to the requirements stated herein.

All materials shall be approved by the Engineer before use.

### **Construction Methods:**

The installation of the keeper blocks shall be done after the two adjacent elastomeric bearings have been installed.

The surface on which the concrete keeper is to be poured shall be intentionally roughened to a depth of 1/2 inch.

Fabrication and placement of reinforcing steel shall conform to the requirements of Article 6.02.03.

The installation of welded studs shall be in accordance with the requirements of Article 5.08.03. Mixing, placing, curing and finishing of the concrete shall be in accordance with Article 6.01.03.

The Contractor shall make test cylinders under the supervision of the representative of the Department. The dimensions, type of cylinder mold and number of cylinders shall be specified by the Engineer.

The Contractor, as directed by the Engineer, shall take adequate precautions to prevent any materials from dropping to the area below, which may result in damage to any existing construction or to adjoining property. Should any damage occur to the structure as a result of the Contractor's operations, the Contractor shall make repairs at his own expense. The repair work shall be approved in advance and shall be of a quality acceptable to the Engineer.

At no time during the Contractor's work will interruption in traffic carried by the structure be permitted solely as a result of constructing the keeper block.

Before fabricating any materials, the Contractor shall submit shop drawings to the Engineer to review in accordance with Article 1.05.02-3. These drawings shall include but not be limited to the following: Location and sizes of all reinforcing steel including splice lengths, steel plates and studs, material lists and material designations.

**Method of Measurement:**

This work will be measured for payment by the number of concrete keeper blocks, as described above, completed and accepted by the Engineer.

**Basis of Payment:**

This work will be paid for at the contract unit price each for “Construct Concrete Keeper Blocks”, complete in place, which price shall include furnishing and placing reinforcing steel, steel keeper plates and welded studs, concrete, and all materials, equipment, tools and labor incidental thereto.

Pay Item

Construct Concrete Keeper Blocks

Pay Unit

EA

## **ITEM #0601107A – HIGH EARLY STRENGTH CONCRETE**

Work under this item shall conform to Section 6.01 Concrete for Structures as supplemented and amended herein to provide for High Early Strength Concrete.

### **6.01.01 – Description:** Add the following

High early strength concrete shall be used to accelerate the construction of the bridge. The goal of this work is:

- Meet the required minimum compressive strength (both interim and final) in an accelerated manner.
- Reduce the cure time for the concrete
- Provide durable (low permeability) concrete for use in superstructure elements exposed to deicing chemicals.
- Provide low shrinkage properties to reduce cracking in the field

The Contractor shall develop a high early strength concrete mix design for use in the longitudinal closure pours, link slab, parapets and abutment elements as shown in the plans. This high early strength concrete may also be used in other cast-in-place concrete work.

### **6.01.02 – Materials:** Add the following:

The high early strength concrete shall conform to the requirements of M.03.01 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 0.4 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  $k\Omega$ -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 of 2000 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 2,000 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, but not limited to: 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.

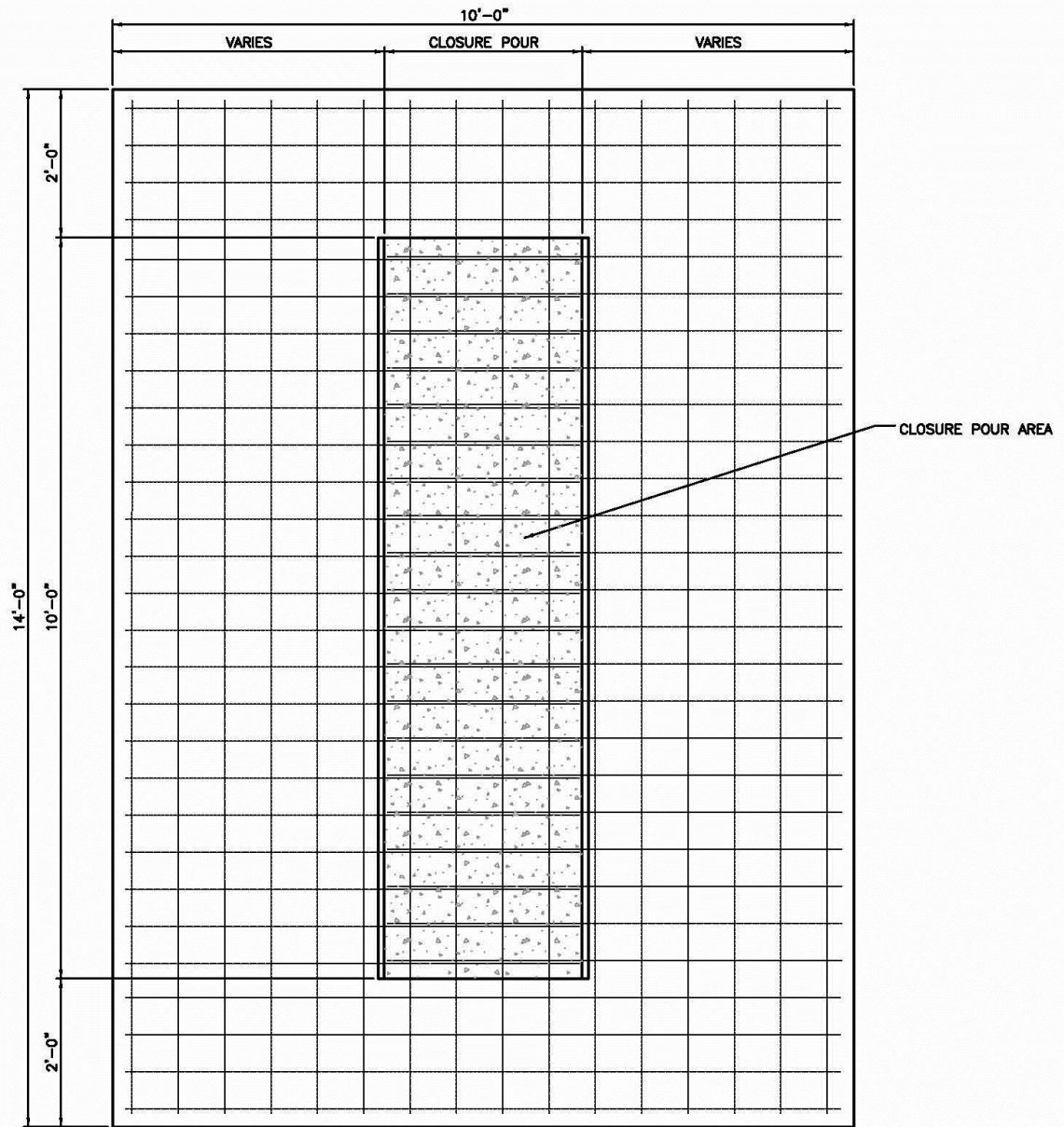
The trial shall also demonstrate the ability of the concrete to accept the installation of the membrane waterproofing system that is to be used. A representative portion of the trial concrete shall be coated with the membrane waterproofing in accordance with the specifications for the waterproofing.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

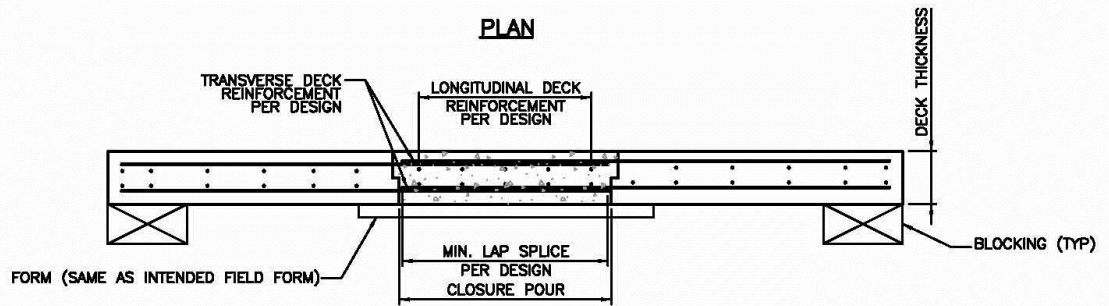
- The trial placement concrete shall not exhibit cracking or separation from the test panel in excess of 0.016 inches wide
- There shall be no more than one transverse crack in excess of 0.010 inches wide in the 10 foot long pour.
- The evaluation of the trial placement shall take place 14 days after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

<u>Pay Item</u>	<u>Pay Unit</u>
High Early Strength Concrete	C.Y.



## **ITEM #0602901A – DRILLING HOLES AND GROUTING DOWELS**

**Description:** Work under this item shall consist of drilling holes in concrete and grouting reinforcing dowels at the locations shown on the plans, in accordance with the plans, the manufacturer's recommendations, and as directed by the Engineer. For the purposes of this specification, a dowel is defined as a reinforcing bar.

**Materials:** The chemical anchoring material shall conform to Subarticle M.03.07.

**Construction Methods:** Before fabricating any materials, the Contractor shall submit manufacturer's specifications and installation for the chemical anchoring material to the Engineer for review in accordance with Article 1.05.02.

Holes for the dowels shall be located as shown on the plans. The holes shall clear the existing reinforcement and provide the minimum cover as shown on the plans. A pachometer shall be used to locate existing reinforcing steel. If existing reinforcing is encountered during the drilling operation, the holes shall be relocated and the uncompleted holes shall be filled with the chemical anchoring material and finished smooth and flush with the adjacent surface.

The depth and diameter of each hole shall be as shown on the plans. If the depth and diameter of a hole are not shown, the hole shall conform to the manufacturer's recommendations for the diameter of the dowel being anchored such that the grouted dowels will be able to develop, in tension, 100 percent of its specified yield strength.

Hole drilling methods shall not cause spalling, cracking, or other damage to the existing concrete. The weight of the drill shall not exceed 14 lbs. Those areas damaged by the Contractor shall be repaired by him in a manner suitable to the Engineer and at no expense to the State.

Prior to placing the chemical anchoring material in the holes, the holes shall be cleaned of all dirt, moisture, concrete dust and other foreign material. The dowel and the chemical anchoring material shall be installed in the holes in accordance with the chemical anchoring material manufacturer's recommendations.

The Contractor, as directed by the Engineer, shall take adequate precautions to prevent any materials from dropping to the area below, which may result in damage to any existing construction or to adjoining property. Should any damage occur to the structure as a result of the Contractor's operations, the Contractor shall make repairs at his own expense. The repair work shall be approved in advance and shall be of a quality acceptable to the Engineer.

**Method of Measurement:** This work will be measured for payment by the number of linear feet of drilled holes in which dowels are embedded and accepted.

**Basis of Payment:** This work will be paid for at the contract unit price per linear foot for "Drilling Holes and Grouting Dowels," which price shall include drilling and preparing holes, furnishing and

installing the chemical anchoring material in the holes and all material, equipment, tools and labor incidental thereto.

Reinforcing bars will be paid for under the item “Deformed Steel Bars - Epoxy Coated”.

<u>Pay Item</u>	<u>Pay Unit</u>
Drilling Holes and Grouting Dowels	LF

## **ITEM #0602936A – DRILLING AND GROUTING REINFORCING BARS**

**Description:** Work under this item shall consist of drilling holes in concrete and grouting reinforcing bars at the locations shown on the plans, in accordance with the plans, the manufacturer’s recommendations, and as directed by the Engineer.

**Materials:** The adhesive bonding material shall be a resin compound specially formulated to grout reinforcing bars in holes drilled into concrete for the purpose of resisting tension pull-out. The adhesive bonding materials shall be selected from the Connecticut Department of Transportation Qualified Products List.

Materials Certificate and a Certificate of Compliance shall be required for the adhesive bonding material in accordance with Article 1.06.07, certifying the conformance of this material to the requirements stated herein.

**Construction Methods:** The Contractor shall drill holes into the concrete to the depth and at the locations shown on the plans.

The Contractor shall submit the following to the Engineer for approval: type of drill, diameter of bit, method of cleaning holes and methods of placement of the adhesive bonding material. Specifications and recommendations for the aforementioned may be obtained from the manufacturer of the adhesive bonding material. The mass of the drill shall not exceed 20lbs.

The reinforcing bars shall be able to develop a pullout resistance of 90 percent of their nominal yields strength when bonded at the embedment depths provided.

The Contractor shall provide the minimum cover for the reinforcing bars as shown on the plans.

Drilling methods shall not cause spalling, cracking, or other damage to the concrete. Those areas damaged by the Contractor shall be repaired by the Contractor in a manner suitable to the Engineer and at no expense to the State.

**Method of Measurement:** This work will be measured for payment by the completed actual length of holes drilled with reinforcing bars grouted into them, and accepted.

**Basis of Payment:** This work will be paid for at the contract unit price per linear foot for “Drilling and Grouting Reinforcing Bars”, which price shall include drilling and preparing holes, and applying adhesive bonding material in the hole. It shall also include all material, except reinforcing bars, and all equipment, tools and labor incidental thereto.

### **Pay Item**

Drilling and Grouting Reinforcing Bars

### **Pay Unit**

L.F.

ITEM #0602936A

**ITEM #0707009A – MEMBRANE WATERPROOFING (COLD LIQUID ELASTOMERIC)**

**Description:** Work under this item consists of furnishing and installing a seamless elastomeric waterproofing membrane system applied to a concrete or steel surface as shown on the plans, in accordance with this specification and as directed by the Engineer. Work shall also include conditioning of the surface to be coated and all quality-control testing noted herein.

The completed membrane system shall be comprised of a primer coat followed by the membrane coating which is applied in one or two layers for a minimum total thickness of 80 mil, an additional 40 mil membrane layer with aggregate broadcast into the material while still wet, and a bond coat of bitumen-based adhesive material.

**Materials:** The Contractor shall select a waterproofing membrane system from the Department's current Qualified Product List (QPL) for Spray-Applied Membrane Waterproofing System. All materials incorporated in the works shall meet the Manufacturer's specification for the chosen system. The Engineer will reject any system that is not on the QPL.

**Materials Certificate:** The Contractor shall submit to the Engineer a Materials Certificate for the primer and membrane and bond coat material in accordance with the requirements of Article 1.06.07.

**Construction Methods:** At least ten days prior to installation of the membrane system, the Contractor shall submit to the Engineer, the manufacturer's recommended procedure for preparing the deck surface, pre-treatment or preparing at cracks and gaps, treatment at curbs, vertical surfaces or discontinuities, applying the primer and membrane, and placing of aggregated coat. Procedures shall also include recommended repairs of system non-compliant issues identified during application. The system shall be applied to the prepared area(s) as defined in the plans strictly in accordance with the Manufacturer's recommendations.

A technical representative, in the direct employ of the manufacturer, shall be present on-site immediately prior to and during application of the membrane. The representative shall inspect and approve the surface prior to priming, and provide guidance on the handling, mixing and addition of components and observe application of the primer and membrane. The representative shall perform all required quality-control testing and remain on the Project site until the membrane has fully cured.

All quality-control testing, including verbal direction or observations on the day of the installation, shall be recorded and submitted to the Engineer for inclusion in the Project's records. A submittal of the quality-control testing data shall be received by project personnel prior to any paving over the finished membrane or within 24 hours following completion of any staged portion of the work.

1. **Applicator Approval:** The Contractor's membrane Applicator shall be fully trained and licensed by the membrane manufacturer and shall have successfully completed at least three spray membrane projects in the past five years. The Contractor shall furnish references from those projects, including names of contact persons and the names, addresses and phone numbers of persons who supervised the projects. This information shall be submitted to the Engineer prior to the start of construction. The Engineer shall have sole authority to determine the adequacy and compliance of the submitted information. Inadequate proof of ability to perform the work will be grounds to reject proposed applicators.

2. **Job Conditions:**

(a) **Environmental Requirements:** Air and substrate temperatures shall be between 32°F and 104°F providing the substrate is above the dew point. Outside of this range, the Manufacturer shall be consulted.

The Applicator shall be provided with adequate disposal facilities for non hazardous waste generated during installation of the membrane system. The applicator shall follow safety instructions regarding respirators and safety equipment.

(b) **Safety Requirements:** All open flames and spark producing equipment shall be removed from the work area prior to commencement of application.

"No Smoking" signs shall be visibly posted at the job site during application of the membrane waterproofing.

Personnel not involved in membrane application shall be kept out of the work area.

3. **Delivery, Storage and Handling:**

(a) **Packaging and Shipping:** All components of the membrane system shall be delivered to the site in the Manufacturer's packaging, clearly identified with the products type and batch number.

(b) **Storage and Protection:** The Applicator shall be provided with a storage area for all components. The area shall be cool, dry and out of direct sunlight and shall be in accordance with the Manufacturer's recommendations and relevant health and safety regulations.

Copies of Material Safety Data Sheets (MSDS) for all components shall be kept on site for review by the Engineer or other personnel.

(c) **Shelf Life - Membrane Components:** Packaging of all membrane components shall include a shelf life date sealed by the Manufacturer. No membrane components whose shelf life has expired shall be used.

#### 4. Surface Preparation:

- (a) Protection: The Applicator shall be responsible for the protection of equipment and adjacent areas from over spray or other contamination. Parapets and bridge joints shall be masked prior to application of the materials.
- (b) Surface Preparation: Sharp peaks and discontinuities shall be ground smooth. The surface profile of the prepared substrate is not to exceed 1/4 inch (peak to valley) and areas of minor surface deterioration of 1/2 inch and greater in depth shall also be repaired. The extent and location of the surface patches require the approval of the Engineer before the membrane system is applied.

Surfaces shall be free of oil, grease, curing compounds, loose particles, moss, algae, growth, laitance, friable matter, dirt, bituminous products, and previous waterproofing materials. If required, degreasing shall be done by detergent washing in accordance with ASTM D4258.

The surface shall be abrasively cleaned, in accordance with ASTM D4259, to provide a sound substrate free from laitance.

Voids, honeycombed areas, and blow holes on vertical surfaces shall be repaired in the same manner.

All steel components to receive membrane waterproofing shall be blast cleaned in accordance with SSPC SP6 and coated with the membrane waterproofing system within the same work shift.

#### 5. Inspection and Testing: Prior to priming of the surface, the Engineer, Applicator and Manufacturer's technical representative shall inspect and approve the prepared substrate.

- (a) Random tests for deck moisture content shall be conducted on the substrate by the Applicator at the job site using a "Sovereign Portable Electronic Moisture Master Meter," a "Tramex CMEXpertII Concrete Moisture Meter" or approved equal. The minimum frequency shall be one test per 1000 s.f. but not less than three tests per day per bridge. Additional tests may be required if atmospheric conditions change and retest of the substrate moisture content is warranted.

The membrane system shall not be installed on substrate with a moisture content greater than that recommended by the system's manufacturer, but shall not be greater than 6%, whichever is less.

- (b) Random tests for adequate tensile bond strength shall be conducted on the substrate using an adhesion tester in accordance with the requirements of ASTM D4541. The minimum frequency shall be one test per 5,000 s.f. but not less than three adhesion tests per bridge.

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Adequate surface preparation will be indicated by tensile bond strengths of primer to the substrate greater than or equal to 150 psi or failure in a concrete surface and greater than or equal to 300 psi for steel surfaces.

If the tensile bond strength is lower than the minimum specified, the Engineer may request additional substrate preparation. Any primer not adequately applied shall be removed and a new primer applied at the Contractor's expense, as directed by Engineer.

- (c) Cracks and grouted joints shall be treated in accordance with the Manufacturer's recommendations, as approved or directed by the Engineer.

#### 6. Application:

- (a) The System shall be applied in four distinct steps as follows:
  - 1) Substrate preparation and gap/joint bridging preparation
  - 2) Priming
  - 3) Membrane application
  - 4) Membrane with aggregate
- (b) Immediately prior to the application of any components of the System, the surface shall be dry (see Section 5a of this specification) and any remaining dust or loose particles shall be removed using clean, dry oil-free compressed air or industrial vacuum.
- (c) Where the area to be treated is bound by a vertical surface (e.g. curb or wall), the membrane system may be continued up the vertical, as shown on the plans or as directed by the Engineer.
- (d) The handling, mixing and addition of components shall be performed in a safe manner to achieve the desired results, in accordance with the Manufacturer's recommendations or as approved or directed by the Engineer.
- (e) A neat finish with well defined boundaries and straight edges shall be provided by the Applicator.
- (f) Primer: The primer shall consist of one coat with an overall coverage rate of 125 to 175 s.f./gal unless otherwise recommended in the manufacturer's written instructions.

All components shall be measured and mixed in accordance with the Manufacturer's recommendations.

The primer shall be spray applied using a single component spray system approved for use by the Manufacturer. If required by site conditions and allowed by the manufacturer, brush or roller application will be allowed.

The primer shall be allowed to cure tack-free for a minimum of 30 minutes or as required by the Manufacturer's instructions, whichever time is greater, prior to application of the first lift of waterproofing membrane.

Porous concrete (brick) may require a second coat of primer should the first coat be absorbed.

- (g) Membrane: The waterproofing membrane shall consist of one or two coats for a total dry film thickness of 80 mils. If applied in two coats, the second coat shall be of a contrasting color to aid in quality assurance and inspection.

The membrane shall be comprised of Components A and B and a hardener powder which is to be added to Component B in accordance with the Manufacturer's recommendations.

The substrate shall be coated in a methodical manner.

Thickness checks: For each layer, checks for wet film thickness using a gauge pin or standard comb-type thickness gauge shall be carried out typically once every 100 s.f. Where rapid set time of the membrane does not allow for wet film thickness checks, ultrasonic testing (steel surfaces only), calibrated point-penetrating (destructive) testing, in-situ sampling (cutout of small sections for measuring thicknesses), or other methods approved by the Engineer shall be employed for determination of dry film thickness. The measured thickness of each and every individual test of the membrane shall be greater than or equal to the required thickness.

Bond Strength: Random tests for adequate tensile bond strength shall be conducted on the membrane in accordance with the requirements of ASTM D4541. The minimum test frequency shall be one test per 5,000 s.f. but no less than three adhesion tests per bridge. Adequate adhesion will be indicated by tensile bond strengths of the membrane to the substrate of greater than or equal to 150 psi or failure in a concrete surface and greater than or equal to 300 psi for steel surfaces.

Spark Testing: Following application of the membrane, test for pin holes in the cured membrane system over the entire application area in accordance with ASTM D4787- "Continuity Verification of Liquid or Sheet Linings Applied to Concrete Substrates." Conduct the test at voltages recommended by the manufacturer to prevent damage to the membrane.

Repair the membrane system following destructive testing and correct any deficiencies in the membrane system or substrate noted during quality-control testing in accordance with the manufacturer's recommendations to the satisfaction of the Engineer at no additional cost to the State.



- (h) Repairs: If an area is left untreated or the membrane becomes damaged, a patch repair shall be carried out to restore the integrity of the system. The damaged areas shall be cut back to sound materials and wiped with solvent (e.g. acetone) up to a width of at least four inches on the periphery, removing any contaminants unless otherwise recommended by the manufacturer. The substrate shall be primed as necessary, followed by the membrane. A continuous layer shall be obtained over the substrate with a four inches overlap onto existing membrane.

Where the membrane is to be joined to existing cured material, the new application shall overlap the existing by at least four inches. Cleaning and surface preparation on areas to be lapped shall be as recommended in the manufacturer's written instructions.

- (i) Aggregated Finish:
- 1) Apply an additional 40 mil thick layer of the membrane material immediately followed by an aggregate coating, before the membrane cures, at a rate to fully cover the exposed area. The membrane and aggregate shall be fully integrated after the aggregate has been applied and the membrane cured.
  - 2) Localized areas not fully coated shall be touched-up with additional membrane and aggregate as needed.
  - 3) Remove loose and excess aggregate from the surface to the satisfaction of the Engineer and dispose of properly after application prior to allowing traffic onto finished surface or application of tack coat.
- (j) Bond Coat:  
Prior to application of a bituminous concrete overlay, the aggregated finish shall be coated with a bonding material. The bonding material shall be per the membrane waterproofing manufacturer's recommendations.
7. Final Review: The Engineer and the Applicator shall jointly review the area(s) over which the completed System has been installed. Any irregularities or other items that do not meet the requirements of the Engineer shall be addressed at this time.

**Method of Measurement:** The quantity to be paid for under this item shall be the number of square yards of waterproofed surface completed and accepted.

**Basis of Payment:** This item will be paid for at the contract unit price per square yard of "Membrane Waterproofing (Cold Liquid Elastomeric)," complete in place, which price shall include all surface preparation, furnishing, storing and applying the system, technical representative and quality control tests, and any necessary repairs and remediation work as well as all materials, equipment, tools, labor incidental to this work.

<u>Pay Item</u>	<u>Pay Unit</u>
Membrane Waterproofing (Cold Liquid Elastomeric)	s.y.

ITEM #0707009A

**ITEM #0712011A – PERMANENT SOIL NAILS**  
**ITEM #0712012A – VERIFICATION TEST NAILS**  
**ITEM #0712013A – STRUCTURE EXCAVATION (SOIL NAIL WALL)**  
**ITEM #0712014A – SHOTCRETE CONSTRUCTION FACING**  
**ITEM #0712016A – ABANDON AND BACKFILL DRILL HOLE**

**DESCRIPTION:**

The Work shall consist of designing and constructing permanent soil nail retaining walls as specified herein and shown on the Plans. The Contractor shall furnish all labor, materials and equipment required for completing the Work. The Contractor shall select the method of excavation, drilling method and equipment, final drillhole diameter(s), and grouting procedures to meet the performance requirements specified herein.

Soil nail wall construction requires excavation in staged cuts and excavation in the vicinity of the wall face requires special care and effort compared to general earthwork excavation. The soil nails will be installed under overhead limitations and between existing steel H-piles. The Contractor should be aware that conflicts with existing steel H-piles may require abandoning and filling of a drill hole with flowable fill. The Contractor should consult the wall excavation and abandoning and filling drill hole sections of this specification prior to bidding.

Soil nailing work shall include field locating all utilities and H-Piles, excavating in accordance with the limits of excavation shown in the plans; drilling soil nail drillholes in accordance with the Contractor's soil nail wall design approved by the Engineer; providing, placing and grouting the encapsulated and epoxy coated nail bar tendons into the drillholes; placing drainage elements; placing frost protection barrier; placing shotcrete reinforcement; applying initial shotcrete facing over the reinforcement; attaching bearing plates, bearing plate shear connectors and nuts; performing nail testing; and installing monitoring instrumentation.

Soils to be retained by the soil nail walls are considered chemically aggressive and require double corrosion protection for the soil nails. Required corrosion protection level is Class A encapsulation and Class B epoxy coating.

Soils to be retained by the soil nail walls are considered susceptible to frost. The design and construction of the soil nail wall requires incorporation of frost-induced loads in the soil nail and facing system and/or frost protection measures.

The maximum horizontal and vertical displacement of the soil nail walls is limited to 1/8 inches during construction.

Soil and rock properties, and other criteria are shown on the Plans and in the contract documents. The plans also include the pile layout plan for the existing abutment.

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Shotcrete facing, wall drainage and frost protection work consists of furnishing all materials and labor required for placing and securing geocomposite drainage material, connection pipes to the footing drains, applying thermal insulation, reinforcing steel and shotcrete for the initial shotcrete construction facing and nail head bearing plates, shear connectors and nuts for the soil nail walls shown on the plans. The work shall include any preparatory trimming and cleaning of soil/rock surfaces and shotcrete cold joints to receive new shotcrete.

Soil nail wall instrumentation is covered by the “Construction Monitoring” special provision. Cast-in-Place (CIP) concrete facing construction is covered by the Standard Specifications.

Where the imperative mood is used within this Specification for conciseness, “the Contractor shall” is implied.

## 1 - References.

### Codes and Standards

- AASHTO LRFD Bridge Design Specifications (Seventh Edition, 2014)
- FHWA Geotechnical Engineering Circular No. 7, Soil Nail Wall – Reference Manual

### Contract Documents

- Connecticut Department of Transportation, Plans for Rehabilitation of Bridge No. 00196, Interstate 95 Over U.S. Route 1, prepared by Ammann & Whitney, dated August 10, 2018
- Connecticut State Highway Department, Town of Branford, Greenwich-Killingly Expressway Over Relocated Route No. 1 (As-Built), prepared by Seelye, Stevenson, Value & Knecht, dated June 1955

## 2 - Definitions.

**Contractor:** The specialty firm who is responsible for performing the soil nail design and the soil nail wall construction.

**Design Drawings:** Drawings prepared by the Contractor’s Design Engineer and submitted by the Contractor to include the detailed soil nail design.

**Design Engineer:** The Professional Engineer employed or hired by the contractor who designs the soil nail walls. This person must meet the experience requirements in Section 3.

**Engineer:** The Connecticut DOT’s project engineer, project manager, or other representative.

**Inspector:** The Connecticut DOT’s field representative on the project site.

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**Owner:** The Connecticut DOT.

**Contract Drawings:** Drawings developed by the Engineer and provided by the Owner for bidding purposes.

**Project Manager:** An employee of the Contractor supervising the work and who has a minimum of three years of experience with soil nail projects of similar size and scope.

### **3 - Soil Nail and Shotcrete Contractor's Experience Requirements and Submittal.**

The Contractor shall submit a project reference list verifying the successful construction completion of at least 3 permanent soil nail retaining wall projects during the past 3 years totaling at least 1200 square yards of wall face area and at least 500 permanent soil nails. A brief description of each project with the Owner's name and current phone number shall be included.

Provide a registered Professional Engineer in the State of Connecticut with experience in the design of permanent soil nail walls for at least 3 completed projects over the past 3 years.

The on-site supervisor and drill rig operators shall have experience installing permanent soil nails on at least 3 projects over the past 3 years. The Contractor shall not use a manufacturer's representatives to satisfy the requirements of this section.

The Contractor's workers installing the shotcrete, including foremen, nozzle men, and delivery equipment operators, shall be fully experienced to perform the work. All shotcrete nozzle men on this project shall have experience on at least 3 projects in the past 3 years in soil nail wall shotcrete application work and shall demonstrate ability to satisfactorily place the shotcrete.

Initial qualification of nozzle men will be based either on previous ACI certification or satisfactory completion of preconstruction test panels. The requirement for nozzle men to shoot preconstruction qualification test panels will be waived for nozzle men who can submit documented proof they have been certified in accordance with the ACI 506.3R Guide to Certification of Shotcrete Nozzle men. The Certification shall have been done by a ACI recognized shotcrete testing lab and/or recognized shotcreting consultant and have covered the type of shotcrete to be used (plain wet-mix, plain dry-mix or steel fiber reinforced). All nozzle men will be required to periodically shoot production test panels during the course of the work at the frequency specified herein.

Notify the Engineer not less than 2 days prior to the shooting of preconstruction test panels to be used to qualify nozzle men without previous ACI certification. Use the same shotcrete mix and equipment to make qualification test panels as those to be used for the soil nail wall shotcrete facing. Initial qualification of the nozzle men will be based on a visual inspection of the shotcrete

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density and void structure and on achieving the specified 3-day and 28-day compressive strength requirements determined from test specimens extracted from the preconstruction test panels. Preconstruction and production test panels, core extraction and compressive strength testing shall be conducted in accordance with ACI 506.2 and AASHTO T24/ASTM C42, unless otherwise specified herein. Nozzlemen without ACI Certification will be allowed to begin production shooting based on satisfactory completion of the preconstruction test panels and passing 3-day strength test requirements. Continued qualification will be subject to passing the 28-day strength tests and shooting satisfactory during production test panels.

The Contractor shall submit copies of the completed project reference list and a list identifying the soil nail wall design professional engineer, drill rig operators and on site supervisors assigned to the project, as well as written documentation of the nozzlemen's qualifications, including proof of ACI certification. The personnel list shall contain a summary of each individual's experience and be complete enough for the Engineer to determine whether each individual satisfies the required qualification. These qualifications shall be submitted along with the Shop Drawings and reviewed in accordance to Section 1.05. Work shall not be started nor materials ordered until the Engineer's written approval of the Contractor's qualification is given.

The Engineer may suspend the work if the Contractor uses non-approved personnel. If work is suspended, the Contractor shall be fully liable for all resulting costs and no adjustment in contract time will result from the suspension.

#### **4 - Construction Site Survey.**

Before bidding the work, the Contractor shall review the available subsurface information and visit the site to assess the site geometry, equipment access conditions, and location of existing structures and above ground facilities.

The Contractor is responsible for field locating and verifying the location of all utilities. Notify the Engineer of any utility locations different from shown on the Plans that may require nail relocations or wall design modification.

The Contractor is responsible for field locating and verifying the location of existing H-piles that will be within the retained zone of the soil nails. Notify the Engineer of any H-pile locations different from shown on the Design Drawings that may require nail relocations or wall design modification.

Prior to start of any wall construction activity, the Contractor and Engineer shall jointly inspect the site to observe and document the pre-construction condition of the site, existing structures and facilities. During construction, the Contractor shall observe the conditions above the soil nail

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wall on a daily basis for signs of ground movement in the vicinity of the wall. Immediately notify the Engineer if signs of movements such as new cracks in structures, increased size of old cracks or separation of joints in structures, foundations, streets or paved and unpaved surfaces are observed. If the Engineer determines that corrective actions are required, the Contractor shall stop work and take necessary steps to correct the problem. When due to the Contractor's methods or operations or failure to follow the specified/approved construction sequence, as determined by the Engineer, the costs of providing corrective actions will be borne by the Contractor.

## **5 - Design Submittals.**

### **(A) General**

1. At least 30 calendar days before the planned start of the wall construction, the Contractor shall submit complete design calculations and Design Drawings to the Engineer for review and approval. Include all details, dimensions, quantities, ground profiles and cross-sections necessary to conduct the work.
2. Design Drawings and calculations shall be signed and sealed by the Contractor's Design Engineer, previously approved by the Owner's Engineer.
3. Submit 1 set of the Design Drawings with the initial submission. The Design Drawings shall be prepared to the (Owner) standards. The Owner's Engineer will approve or reject the Contractor's submittal within 15 calendar days of the receipt of the complete submission.
4. One set will be returned with any indicated corrections. If revisions are necessary, make the necessary changes and resubmit 1 revised set. When the drawings are approved, furnish set of the approved drawings
5. The Contractor shall not begin the work until the submittal requirements are satisfied and found acceptable by the Engineer.
6. Changes or deviations from the approved submittals must be re-submitted for approval. No adjustments in contract time or delay, or impact claims will be allowed due to incomplete submittals.

### **(B) Design Calculations**

Design calculations shall include, but not be limited to, the following items.

1. A narrative describing the overall soil nail design.
2. Applicable code requirements and references.
3. Basis of design, including soil/rock shear strength parameters (friction angle and cohesion), unit weights, pullout resistances, steel resistances, and shotcrete

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resistance values. Any additional subsurface borings, laboratory work, or other subsurface data collected for the design shall also be included.

4. Soil nail critical cross-section(s) including soil/rock strata, piezometric levels, and location, magnitude, and direction of applied loads.
5. Values and associated load factors used in design for pullout resistance, surcharges, soil/rock unit weights, nail head strengths, and strengths of steel, shotcrete and concrete materials.
6. Global stability calculations of the soil nail wall and bridge abutment system including soil resistance/load factors used in LRFD verifications.
7. Seismic design coefficient and other seismic design criteria applicable for the geographic area of the project.
8. Horizontal and vertical deflection calculations.
9. Design calculation sheets with the project number, structure location, designation, date of preparation, initials of designer and checker, and page number at the top of each page. Provide an index page with the design calculations.
10. Design notes including an explanation of symbols and computer programs used in design.
11. Structural design calculations for the initial shotcrete wall facing and nail head/facing connections including consideration of facing flexural and punching shear strength, headed stud tensile strength, upper cantilever, minimum reinforcement ratio, cover, and splice requirements.
12. Other design calculations such as frost-induced loading and drainage evaluations.

**(C) Design Drawings**

Design Drawings shall include all information required for the construction and quality control of the work. Design Drawings shall include, but not be limited to, the following items unless provided in the Contract Drawings:

1. A plan view of the structure(s) identifying:
  - a. A reference baseline and elevation datum.
  - b. The offset from the construction centerline or baseline to the face of the wall at its base and at all changes in horizontal alignment.
  - c. Beginning and end station of wall.
  - d. Soil nail locations.
  - e. Right-of-way and permanent or temporary construction easement limits, location of all known active and abandoned existing utilities, adjacent

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- structure or other potential interfaces. The centerline of any drainage structure or drainage pipe behind, passing through, or passing under the wall.
- f. Subsurface exploration locations shown on a plan view of the proposed wall alignment with appropriate reference base lines to fix the locations of the explorations relative to the structure(s).
  - g. Limit of longest nails.
2. An elevation view of the structure(s) identifying:
    - a. The elevation at the top of the wall, at all horizontal and vertical break points, and at least every 50 feet along the wall.
    - b. Elevations at the base of the wall and the top of the leveling pads for casting CIP facing.
    - c. Soil nail elevations, vertical and horizontal spacing and location of wall drain elements, frost protection elements, and final facing expansion/contraction joints along the wall length.
    - d. Existing and finished grade profiles both behind and in front of the wall.
  3. All necessary cross-section(s) to construct the wall.
  4. General notes for constructing the soil nails including construction sequencing or other special construction requirements.
  5. Design parameters and applicable codes.
  6. Horizontal and vertical curve data affecting the wall and control points, including match lines or other details to relate to wall stationing to centerline stationing.
  7. A listing of the summary or quantities on the elevation drawing of each wall showing the estimated surface area and other pay items.
  8. Nail wall typical sections including staged excavation cut elevations, wall and excavation face batter, nail spacing and inclination, size of nail bars (also referred to as tendons), drainage details, frost protection details, and corrosion protection details.
  9. Typical details of production and test nails defining the location, nail length, minimum drill hole diameter, inclination, and test nail bonded and unbonded test lengths.
  10. Details, dimensions, and schedules for all nails, reinforcing steel, wire mesh, bearing plates, headed studs, etc. and/or attachment devices for shotcrete and cast-in-place facing.
  11. Dimensions and schedules for all reinforcing steel including reinforcing bar bending details.
  12. Details and dimensions for wall appurtenances such as barrier, coping, drainage gutters, fences, etc.

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13. Details for constructing walls around drainage facilities.
14. Details for terminating walls and adjacent slope construction.
15. Facing finishes, color and architectural treatment requirements for final wall facing elements.

## **6 - Construction Submittals.**

### **(A) Soil Nails**

The Contractor shall submit copies of the following information, in writing, to the Engineer for review and approval. This information shall be submitted along with the Shop Drawings and reviewed in accordance with Section 1.05 of the Standard Specifications.

1. The proposed start date and proposed detailed wall construction sequence including:
  - a. Plan describing how surface water will be diverted, controlled and disposed of.
  - b. Proposed methods and equipment for locating the existing H-piles behind the proposed soil nail walls
  - c. Proposed methods and equipment for excavating the soil and/or rock within the excavation limits indicated in the Plans, including the proposed grade elevations for each excavation cut shown on a wall elevation view.
  - d. Information on space requirements for installation equipment
  - e. Proposed nail drilling methods and equipment including drill hole diameter proposed to achieve the pullout resistance used for design and any variation of these along the wall alignment
2. Nail grout mix design including:
  - a. Type of Portland cement.
  - b. Aggregate source and gradation.
  - c. Proportions of mix by weight and water-cement ratio.
  - d. Manufacturer, brand name and technical literature for proposed admixtures.
  - e. Compressive strength test results (per AASHTO T106/ASTM C109) supplied by qualified independent testing lab verifying the specified

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minimum 3 and 28-day grout compressive strengths. Previous test results for the proposed grout mix completed within one year of the start of grouting may be submitted for initial verification and acceptance of the required compressive strengths and start of production work.

3. Proposed nail grout placement procedures and equipment.
4. Proposed nail testing methods and equipment setup including:
  - a. Details of the jacking frame and appurtenant bracing, with design calculations performed and sealed by a Professional Engineer licensed in the State of Connecticut.
  - b. Details showing methods of isolating verification and proof test nails during shotcrete application (i.e., methods to prevent bonding of the soil nail bar and the shotcrete facing during testing.
  - c. Details showing methods of providing the temporary unbonded length of verification and proof test nails and grouting the temporary unbonded length of proof test nails after completion of testing.
  - d. Equipment list.
5. Identification number and certified calibration records for each test jack and pressure gauge and load cell to be used. Jack and pressure gauge shall be calibrated as a unit. Calibration records shall include the date tested, device identification number, and the calibration test results and shall be certified for an accuracy of at least 2 percent of the applied certification loads by a qualified independent testing laboratory within 90 days prior to submittal.
6. Material Certificates for the soil nail centralizers and Certified Test Reports for the epoxy coating and encapsulation in accordance with Section 1.06.07 of the Standard Specifications.

The Contractor will not be allowed to begin wall construction or incorporate materials into the work until the submittal requirements are satisfied and found acceptable to the Engineer. Changes or deviations from the approved submittals must be re-submitted for approval.

Upon delivery of nails to the project site, provide Certified Test Reports for nail specifying the ultimate strength, yield strength, elongation and composition in accordance with Section 1.06.07 of

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the Standard Specifications.

**(B) Shotcrete**

The Contractor shall submit copies of the following information, in writing, to the Engineer. This information shall be submitted along with the Shop Drawings and reviewed in accordance with Section 1.05 of the Standard Specifications.

1. Proposed methods of shotcrete placement and of controlling and maintaining facing alignment and location and shotcrete thickness.
2. Shotcrete mix design including:
  - a. Type of Portland cement.
  - b. Aggregate source and gradation.
  - c. Proportions of mix by weight and water-cement ratio.
  - d. Proposed admixtures, manufacturer, dosage, technical literature.
  - e. Previous strength test results for the proposed shotcrete mix completed within one year of the start of shotcreting may be submitted for initial verification of the required compressive strengths at start of production work.
3. Material Certificates, manufacturers' engineering data and installation instructions for the drainage geotextile, geocomposite drain strip, and accessories in accordance with Section 1.06.07 of the Standard Specifications.
4. Material Certificates, manufacturer's engineering data and installation instructions for the thermal insulation (if applicable), and accessories in accordance with Section 1.06.07 of the Standard Specifications.
5. Material Certificates for bearing plates, nuts, and PVC drain piping in accordance with Section 1.06.07 of the Standard Specifications.

The Contractor will not be allowed to begin wall construction or incorporate materials into the work until the submittal requirements are satisfied and found acceptable to the Engineer. Changes or deviations from the approved submittals must be re-submitted for approval.

Upon delivery to the project site, provide Certified Test Report for all reinforcing steel specifying the minimum ultimate strength, yield strength, elongation and chemical composition in accordance with Section 1.06.07 of the Standard Specifications.

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**(C) Monitoring Program**

At least 30 calendar days before starting the soil nail work, the Contractor shall submit a Construction Monitoring Program to the Owner’s Engineer for approval. The Owner’s Engineer shall review the Contractor’s Construction Monitoring Program within 14 calendar days of receipt of the submission.

Monitoring during wall construction should be performed to obtain data on the overall wall performance and to monitor any potential adverse effects on the existing bridge abutment and wingwall structures. At a minimum, the performance-monitoring program should include measurement of the following quantities:

1. Vertical and horizontal movements of the existing abutment stem walls, pile caps, and wingwalls using deformation monitoring points (DMPs) with optical surveying methods. The number, locations and frequency of monitoring for the DMPs shall be in accordance with the “Construction Monitoring” special provisions. The Contractor should perform a minimum of 3 independent rounds of surveying readings for the DMPs to establish a single initial elevation or plan location and standard deviation for measurement. Address methods to achieve required accuracy of 0.01-foot and repeat measurements if error at 1 standard deviation exceeds 0.01-foot vertical or 0.01-foot horizontal for initialization rounds. Locate surface markers within a horizontal accuracy of plus or minus 0.01 feet, and elevation accuracy of plus or minus 0.01 feet at 1 standard deviation.
2. Horizontal movement of the soil nail wall face using DMPs on the initial and final facing with optical surveying methods. Surface markers should be spaced at maximum horizontal 20 foot intervals along the soil nail wall face and the adjacent abutment pile caps. The number, locations and frequency of monitoring for the DMPs shall be in accordance with the “Construction Monitoring” special provisions.
3. Ground cracks and other signs of disturbance in the ground surface behind the top of wall, through daily visual inspection during construction and, if necessary, installation of crack gauges across the cracks.
4. Cracks on the concrete faces of the existing abutments, through daily visual inspection during construction and, if necessary, installation of crack gauges across the cracks.
5. Local movements and/or deterioration of the facing using visual inspections and instruments such as crack gauges.

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6. Drainage behavior of the structure, especially if groundwater is observed during construction, by visual observation of outflow points or through standpipe piezometers installed behind the facing.

The monitoring program must indicate type and location of instruments, frequency of measurements and visual observations, and frequency of reporting. Monitoring data reporting will be submitted to the Engineer and are required to be submitted in accordance with the schedules specified in the "Construction Monitoring" special provision.

### **7 - Pre-Construction Meeting.**

A pre-construction meeting will be scheduled by the Engineer and held prior to the start of wall construction. The Engineer, Contractor, and all Subcontractors involved in the construction of the soil nail wall shall attend the meeting. Attendance is mandatory. The pre-construction meeting will be conducted to clarify the construction requirements for the work, to coordinate the construction schedule and activities, and to identify contractual relationships and delineation of responsibilities amongst the Contractor and the various Subcontractors - particularly those pertaining to wall excavation, nail installation and testing, excavation and wall alignment survey control, shotcrete, and CIP facing construction.

### **MATERIALS:**

Furnish materials new and without defects. Remove defective materials from the job site at no additional cost. Materials for soil nail structures shall consist of the following:

**1 - Solid Bar Nail Tendons:** AASHTO M31/ASTM A615, Grade 60. The deformed bar shall be continuous without splices or welds, new, straight, undamaged, epoxy coated and/or encapsulated as shown on the Plans. Threading shall be continuous spiral deformed ribbing provided by the bar deformations (e.g. continuous threadbars).

**2 - Fusion Bonded Epoxy Coating:** ASTM A775. Minimum 12 mils thickness electrostatically applied. Bend test requirements are waived. Coating at the wall anchorage end of epoxy coated bars may be omitted over the length provided for threading the nut against the bearing plate.

**3 - Encapsulation:** Minimum 40 mils thick corrugated HDPE tube conforming to AASHTO M252 or corrugated PVC tube conforming to ASTM D1784, Class 13464-B. Encapsulation shall provide at least 0.2 inch of grout cover over the nail bar and be resistant to ultra violet light degradation, normal handling stresses, and grouting pressures. Factory fabrication of the encapsulation is preferred. Upon the Engineers approval, the encapsulation may be field fabricated if done in strict

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accordance with the manufacturer's recommendations.

**4 - Centralizers:** Manufactured from Schedule 40 PVC pipe or tube, steel or other material not detrimental to the nail steel (wood shall not be used); securely attached to the nail bar; sized to position the nail bar within 1 inch of the center of the drillhole; sized to allow tremie pipe insertion to the bottom of the drillhole; and sized to allow grout to freely flow up the drillhole.

**5 -Nail Grout:** Neat cement or sand/cement mixture with a minimum 3-day compressive strength of 1500 psi and a minimum 28-day compressive strength of 3000 psi per AASHTO T106/ASTM C109.

**6 - Admixtures for Nail Grout:** AASHTO M194/ASTM C494. Admixtures which control bleed, improve flowability, reduce water content and retard set may be used in the grout subject to review and acceptance by the Engineer. Accelerators are not permitted. Expansive admixtures may only be used in grout used for filling sealed encapsulations. Admixtures shall be compatible with the grout and mixed in accordance with the manufacturer's recommendations.

**7 - Cement for Nail Grout:** AASHTO M85/ASTM C150, Type I, II, III or V.

**8 - Fine Aggregate for Nail Grout:** AASHTO M6/ASTM C33.

**9 - Film Protection:** Polyethylene film per AASHTO M171.

**10 - Shotcrete:** All materials for shotcrete shall conform to the following requirements:

- |                                       |  |
|---------------------------------------|--|
| <b>A) Cement</b>                      | AASHTO M85/ ASTM C150, Type I, II, III or V.   |
| <b>B) Fine Aggregate</b>              | AASHTO M6/ASTM C33 clean, natural.   |
| <b>C) Coarse Aggregate</b>            | AASHTO M80, Class B for quality  |
| <b>D) Water</b>                       | Clean and Potable. AASHTO M157/ASTM C94  |
| <b>E) Chemical Admixtures</b>         |  |
| 1. Accelerator                        | Fluid type, applied at nozzle, meeting requirements of AASHTO M194/ASTM C494/ASTM C1141. |
| 2. Water-reducer and Superplasticizer | AASHTO M194/ASTM C494 Type A, C, D, E, F, or G   |

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3. Retarders	AASHTO M194/ ASTM C494 Type B or D.
<b>F) Mineral Admixtures</b>	
1. Fly Ash	AASHTO M295/ASTM C618 Type F or C, cement
2. Silica Fume	ASTM C1240, 90 percent minimum silicon dioxide solids content, not to exceed 12 percent by weight of cement.
<b>G) Welded Wire Fabric</b>	AASHTO M55/ASTM A185 or A497.
<b>H) Reinforcing Bars for Shotcrete Facing</b>	AASHTO M31/ASTM A615, Grade 60, deformed.
<b>I) Bearing Plates</b>	AASHTO M183/ASTM A36.
<b>J) Bearing Plate Shear Connectors</b>	ASTM A108
<b>K) Nuts</b>	AASHTO M291, grade B, hexagonal, fitted with beveled washer or spherical seat to provide uniform bearing.
<b>L) Prepackaged Shotcrete</b>	ASTM C928.

**10.1 - Shotcrete Mix Design.** The Contractor must receive notification from the Engineer that the proposed mix design and method of placement are acceptable before shotcrete placement can begin.

**10.2 - Aggregate.** Aggregate for shotcrete shall meet the strength and durability requirements of AASHTO M6/M80 and the following gradation requirements:

<u>Sieve Size</u>	<u>Percent Passing by Weight</u>
1/2"	100
3/8"	90-100
No. 4	70-85
No. 8	50-70
No. 16	35-55
No. 30	20-35
No. 50	8-20

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**10.3 - Proportioning and Use of Admixtures.** Proportion the shotcrete to be pumpable with the concrete pump furnished for the work, with a cementing materials content of at least 25 pounds per cubic foot and water/cement ratio not greater than 0.50. Do not use admixtures unless approved by the Engineer. Thoroughly mix admixtures into the shotcrete at the rate specified by the manufacturer. Accelerators (if used) shall be compatible with the cement used, be non-corrosive to steel and not promote other detrimental effects such as cracking or excessive shrinkage. The maximum allowable chloride ion content of all ingredients shall not exceed 0.10% when tested to AASHTO T260.

**10.4 - Air Entrainment.** Air entrainment is not required for temporary shotcrete construction facings.

**10.5 - Strength Requirements.** Provide a shotcrete mix capable of attaining 2000 psi compressive strength in 3 days and 4000 psi in 28 days. The average compressive strength of each set of three test cores extracted from test panels or wall face must equal or exceed 85 percent of the specified compressive strength, with no individual core less than 75 percent of the specified compressive strength, in accordance with ACI 506.2.

**10.6 - Mixing and Batching.** Aggregate and cement may be batched by weight or by volume in accordance with the requirements of ASTM C94 or AASHTO M241/ASTM C685. Mixing equipment shall thoroughly blend the materials in sufficient quantity to maintain placing continuity. Ready mix shotcrete shall comply with AASHTO M157. Shotcrete shall be batched, delivered, and placed within 90 minutes of mixing. The use of retarding admixtures may extend application time beyond 90 minutes if approved by the Engineer.

Premixed and packaged shotcrete mix may be provided for on-site mixing. The packages shall contain materials conforming to the Materials section of this specification. Placing time limit after mixing shall be per the manufacturer's recommendations.

**10.7 - Field Quality Control.** Both preconstruction test panels (for nozzle men without previous ACI certification) and production test panels or test cores from the wall facing are required. Shotcreting and coring of test panels shall be performed by qualified personnel in the presence of the Engineer. The Contractor shall provide equipment, materials, and personnel as necessary to obtain shotcrete cores for testing including construction of test panel boxes, field curing requirements and coring. Compressive strength testing will be performed by the Engineer. Shotcrete final acceptance will be based on the 28-day strength.

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Shotcrete production work may commence upon initial approval of the design mix and nozzlemen and continue if the specified strengths are obtained. The shotcrete work by a crew will be suspended if the test results for their work does not satisfy the strength requirements. The Contractor shall change all or some of the following: the mix, the crew, the equipment, or the procedures. Before resuming work, the crew must shoot additional test panels and demonstrate that the shotcrete in the panels satisfies the specified strength requirements. The cost of all work required to obtain satisfactory strength tests will be borne by the Contractor.

**10.8 - Preconstruction Test Panels.** Each nozzleman without previous ACI certification shall furnish at least one preconstruction test panel for each proposed mixture being considered and for each shooting position to be encountered on the job. Preconstruction test panels shall be made prior to the commencement of production work using the same equipment, materials, mixture proportions and procedures proposed for the job.

Make preconstruction test panels with minimum dimensions of 30in.x30in. square and at least 4 inches thick. Slope the sides of preconstruction and production test panels at 45 degrees over the full panel thickness to release rebound.

**10.9 - Production Test Panels .** Furnish at least one production test panel or, in lieu of production test panels, six 3 inch diameter cores taken from the shotcrete facing, during the first production application of shotcrete and henceforth for every 600 square yards of shotcrete placed. Cores for testing must be taken from the nozzle and may not be taken from the mixer. Construct the production test panels simultaneously with the shotcrete facing installation at times designated by the Engineer. Make production test panels with minimum dimensions of 18in.x18in. square and at least 4 inches thick.

**10.10 - Test Panel Curing, Test Specimen Extraction and Testing.** Immediately after shooting, field moist cures the test panels by covering and tightly wrapping with a sheet of polyethelene film (material meeting the requirements of ASTM C171) until they are delivered to the testing lab or test specimens are extracted. Do not immerse the test panels in water. Do not further disturb test panels for the first 24 hours after shooting. Provide at least six 3 inch diameter core samples cut from each preconstruction test panel and production test panel. Contractor has the option of extracting test specimens from test panels in the field or transporting to another location for extraction. Keep panels in their forms when transported. Do not take cores from the outer 6 inches of test panels measured in from the top outside edges of the panel form. Trim the ends of the cores to provide test cylinders at least 3 inches long. If the Contractor chooses to take cores from the wall face in lieu of making production test panels, locations will be designated by the Engineer. Clearly mark the cores and container to identify the core locations and whether they are for preconstruction or production testing. If for production testing, mark the section of the wall represented by the cores on the cores

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and container. Immediately wrap cores in wet burlap or material meeting requirements of ASTM C171 and seal in a plastic bag. Deliver cores to the Engineer within 48 hours of shooting the panels. The remainder of the panels will become the property of the Contractor. Compressive strength testing will be performed by the Engineer. Upon delivery to the testing lab, samples will be placed in the moist room until the time of test. When the test length of a core is less than twice the diameter, the correction factors given in AASHTO T24/ASTM C42 will be applied to obtain the compressive strength of individual cores. Three cores will be tested at 3 days and three cores will be tested at 28 days in accordance with AASHTO T24/ASTM C42.

Fill core holes in the wall by dry-packing with non-shrink patching mortar after the holes are cleaned and dampened. Do not fill core holes with shotcrete.

**11 - Backwall Drainage:** All materials for backwall drainage shall conform to the following requirements:

**A) Drainage Geotextile For Drain Strip**      AASHTO M288 Class 3, Permittivity min. 0.2 per second; AOS 0.25 mm max.

**B) Geocomposite Drain Strip**      Miradrain 6000, Amerdrain 500 or approved equal.

**C) PVC Connector and Drain Pipes:**

- |                   |  |
|-------------------|--|
| 1. Pipe           | ASTM 1785 Schedule 40 PVC, solid and perforated wall, cell classification 12454-B or 12354-C, wall thickness SDR 35, with solvent weld or elastomeric gasket joints. |
| 2. Fittings       | ASTM D3034, cell classification 12454-B or 12454-C, wall thickness SDR35, with solvent weld or elastomeric gasket joints.  |
| 3. Solvent Cement | ASTM D2564   |
| 4. Primer         | ASTM F656  |

**12 - Film Protection**      Polyethylene films per AASHTO M-171.

**13 – Frost Protection**      Extruded Polystyrene (XPS) foam insulation panels per

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**14 – Flowable Fill.** The material for Flowable Fill shall conform to the requirements of Article M.03.01. Flowable Fill shall be a mixture of Portland Cement, Fly Ash (optional), Fine Aggregates, Air Entraining Agent, and Water. The Contractor shall be responsible for producing a Flowable Fill mixture and adjusting their mixture design as called for by the circumstances or as directed by the Engineer. There shall be a minimum air content of 8% in the Flowable Fill. Flowable Fill material shall be proportioned to produce a 28-day compressive strength between 50 - 100 psi.

**Materials Handling And Storage:** Store soil nail cement to prevent moisture degradation and partial hydration. Do not use cement that has become caked or lumpy. Store aggregates so that segregation and inclusion of foreign materials are prevented. Do not use the bottom 6 inches of aggregate piles in contact with the ground.

Store steel reinforcement on supports to keep the steel from contacting the ground. Damage to the nail steel as a result of abrasion, cuts, nicks, welds, and weld splatter shall be cause for rejection. Do not ground welding leads to nail bars. Protect nail steel from dirt, rust, and other deleterious substances prior to installation. Place protective wrap over anchorage end of nail bar to which bearing plate and nut will be attached to protect during handling, installation, grouting and shotcreting.

Do not move or transport encapsulated nails until the encapsulation grout has reached sufficient strength to resist damage during handling. Handle encapsulated nails in a manner that will prevent large deflections, distortions or damage. Repair encapsulated nails that are damaged or defective in accordance with the manufacturer's recommendations or remove them from the site.

Handle and store epoxy coated bars in a way that will prevent them from being damaged beyond what is permitted by ASTM 3963. Repair damaged epoxy coating in accordance with ASTM A775 and the coater's recommendations using an epoxy field repair kit approved by the epoxy manufacturer. Repaired areas shall have a minimum 12 mils coating thickness.

Materials for shotcrete shall be delivered, stored and handled to prevent contamination, segregation, corrosion or damage. Store liquid admixtures to prevent evaporation and freezing.

Drainage geotextile and geocomposite drain strips shall be provided in rolls wrapped with a protective covering and stored in a manner which protects the fabric from mud, dirt, dust, debris, and shotcrete rebound. Protective wrapping shall not be removed until immediately before the geotextile or drain strip is installed. Extended exposure to ultra-violet light shall be avoided. Each roll of

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geotextile or drain strip in the shipment shall be labelled to identify the production run.

## **CONSTRUCTION REQUIREMENTS:**

### **1 – Location of Existing H-Piles**

The Contractor shall determine the methods and equipment necessary to locate the existing H-Piles that will be behind the retained zone behind the soil nail wall. According to available historic bridge documents, the abutment foundation consists of two rows of H-Piles. The front row consists of battered piles spaced at 5 feet and the back row consists of vertical piles spaced at 8 feet. Test pits and/or a combination of test pits and probing through the existing embankment could be used to locate the H-Piles. The cost associated with labor, materials and equipment required to locate the existing H-piles will be paid for by the unit price for “Verification Test Nails”.

### **2 – Additional Subsurface Exploration**

Should the Contractor determine that additional soil borings, test pits, and laboratory testing are required to supplement the available geotechnical information for the design of the soil nail walls, the cost associated with such exploration will be paid for by the unit price for “Verification Test Nails”.

### **3 - Site Drainage Control.**

Provide positive control and discharge of all surface water that will affect construction of the soil nail retaining wall. Maintain all pipes or conduits used to control surface water during construction. Repair damage caused by surface water at no additional cost. Upon substantial completion of the wall, remove surface water control pipes or conduits from the site. Alternatively, with the approval of the Engineer, pipes or conduits that are left in place, may be fully grouted and abandoned or left in a way that protects the structure and all adjacent facilities from migration of fines through the pipe or conduit and potential ground loss.

The regional groundwater table is anticipated to be below the level of the wall excavation based on the results of the geotechnical site investigation.

### **4 - Excavation.**

Coordinate the work and the excavation so the soil nail wall is safely constructed. Perform the wall construction and excavation sequence in accordance with the approved Design Drawings and approved submittals. No excavations steeper than those shown on the approved Design Drawings

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will be made above or below the soil nail wall without written approval of the Engineer. The Contractor shall progress the excavation in a manner that will not adversely affect the stability of the excavated face. The excavation sequence shall ensure sufficient stand-up time for the period of time required for soil nail installation, grouting and construction of the initial shotcrete face along the extent of the excavation cut.

#### **4.1 - Excavation and Wall Alignment Survey Control**

The Contractor will be responsible for providing the necessary survey and alignment control during excavation of each lift, locating and drilling each drillhole within the allowable tolerances. The Contractor will be responsible for performing the wall excavation and nail installation in a manner which will allow for construction of the shotcrete facing to the design minimum thickness and such that the finish CIP structural facing can be constructed to the specified minimum thickness and to the line and grade indicated in the Plans. Where the as-built location of the front face of the shotcrete exceeds the allowable tolerance from the wall control line shown on the Plans, the Contractor will be responsible for determining and bearing the cost of remedial measures necessary to provide proper attachment of nail head bearing plate connections and satisfactory placement of the final facing, as called for on the Plans.

#### **4.2 - General Roadway Excavation.**

Complete clearing, grubbing, grading and excavation above and behind the wall before commencing wall excavation. Do not over-excavate the original ground behind the wall or at the ends of the wall, beyond the limits shown on the Contract Drawings. Do not perform general roadway excavation that will affect the soil nail wall until wall construction starts. Roadway excavation shall be coordinated with the soil nailing work and the excavation shall proceed from the top down in a horizontal staged excavation lift sequence with the ground level for each lift excavated as illustrated on the approved Design Drawings. Do not excavate the full wall height to the final wall alignment as shown on the Plans but maintain a working bench of native material to serve as a platform for the drilling equipment. The bench shall be wide enough to provide a safe working area for the drill equipment and workers.

#### **4.3 - Soil Nail Wall Structure Excavation.**

Structure excavation in the vicinity of the existing abutment wall face will require special care and effort compared to general earthwork excavation. The structure excavation pay limits are shown on the Contract Drawings.

Excavate to the final wall face using procedures that: (1) prevent over excavation; (2) prevent ground

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loss, swelling, air slaking, or loosening; (3) prevent loss of support for completed portions of the wall; (4) prevent loss of soil moisture at the face; and (5) and prevent ground freezing. Costs associated with additional thickness of shotcrete or concrete or other remedial measures required due to irregularities in the cut face, excavation overbreak or inadvertent over excavation, shall be borne by the Contractor.

The exposed unsupported final excavation face cut height shall not exceed the vertical nail spacing plus the required reinforcing lap or the short-term stand-up height of the ground, whichever is less. It would be preferable for the Contractor to complete excavation to the final wall excavation line and application of the shotcrete in the same work shift. Application of the shotcrete may be delayed up to 24 hours if the Contractor can show that the delay will not adversely affect the excavation face stability. A polyethylene film over the face of the excavation may reduce degradation of the cut face caused by changes in moisture. Damage to existing structures or structures included in the work shall be repaired by the Contractor at no cost to the State where approval is granted for the extended face exposure period.

Excavation to the next lift shall not proceed until nail installation, reinforced shotcrete placement, attachment of bearing plates and nuts and nail testing has been completed and accepted in the current lift. Nail grout and shotcrete shall have cured for at least 72 hours before excavating the next underlying lift.

Notify the Engineer immediately if raveling or local instability of the final wall face excavation occurs. Unstable areas shall be temporarily stabilized by means of buttressing the exposed face with an earth berm or other methods. Suspend work in unstable areas until remedial measures are developed.

#### **4.4 - Wall Discontinuities.**

The Contractor shall not be permitted to construct the wall in a discontinuous manner. Each row of nails shall be completed and shotcreted before the Contractor may excavate for the next lower row of nails.

#### **4.5 - Excavation Face Protrusions, Voids or Obstructions.**

Remove all or portions of cobbles, boulders, rubble or other subsurface obstructions encountered at the wall final excavation face which will protrude into the design shotcrete facing. Determine method of removal of face protrusions, including method to safely secure remnant pieces left behind the excavation face and for promptly backfilling voids resulting from removal of protrusions extending behind the excavation face. Notify the Engineer of the proposed method(s) for removal of

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face protrusions at least 24 hours prior to beginning removal. Voids overbreak or over-excavation beyond the plan wall excavation line resulting from the removal of face protrusions or excavation operations shall be backfilled with shotcrete, or other material as approved by the Engineer. Removal of face protrusions and backfilling of voids or over-excavation is considered incidental to the work.

The Contractor shall immediately notify the Engineer when a possible conflict with an existing H-pile has been encountered. The Engineer shall review the plans and inspect the drill hole to determine if an H-pile is in conflict with the soil nail. The Contractor shall provide access and equipment as necessary for the Engineer to inspect the drill hole. Should the Engineer determine that the obstruction is not an H-pile, the Contractor shall remove the obstruction as previously noted. Should the Engineer determine that an H-pile is in conflict with the soil nail, the Contractor shall abandon the hole and backfill the hole with Flowable Fill. Flowable Fill shall be produced and delivered using concrete construction equipment. Placing Flowable Fill shall be by chute, pumping, or other method approved by the Engineer. The Flowable Fill shall be placed so as to fill the entire abandoned drill hole. The Engineer in consultation with the Design Engineer will determine where to relocate the soil nail. The Contractor shall wait a minimum 24 hours after placement of the Flowable Fill before drilling the relocated soil nail. Cost of drilling and backfilling drillholes abandoned due to unanticipated obstructions with H-piles will be paid for by the linear foot at the unit price for "Abandon and Fill Drill Hole"

## **5 - Nail Installation.**

Determine the required drillhole diameter(s), drilling method, grout composition and installation method necessary to achieve the nail pullout resistance(s) used for design, in accordance with the nail testing acceptance criteria in the Nail Testing section.

No drilling or installation of production nails will be permitted until successful pre-production verification testing of nails is completed in that unit and approved by the Engineer. Install verification test nails using the same equipment, methods, nail inclination and drillhole diameter as planned for the production nails. Perform pre-production verification tests in accordance with the Verification Testing Section prior to starting wall excavation and prior to installation of production nails. The number and location of the verification tests will be as indicated on the approved Design Drawings. Verification test nails shall be installed at the verification test nail locations designated on the approved Design Drawings. Install the production soil nails before the application of the reinforced shotcrete facing.

Where necessary for stability of the excavation face, the Contractor shall have the option of placing a sealing layer (flashcoat) of unreinforced shotcrete or steel fiber reinforced shotcrete or of drilling and grouting of nails through a temporary stabilizing berm of native soil to protect and stabilize the face

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of the excavation per Section 4.3 of the Construction Requirements portion of this specification. Cost shall be incidental to the work.

The Engineer in consultation with the Design Engineer may add, eliminate, or relocate nails to accommodate actual field conditions. Cost adjustments associated with these modifications shall be made in accordance with Section 2.5 of the Construction Method portion of this specification and the General Provisions of the Contract. The cost of any redesign, additional material, or installation modifications resulting from actions of the Contractor shall be borne by the Contractor.

### **5.1 - Drilling.**

The drill holes for the soil nails shall be made at the locations, orientations, and lengths shown on the approved Design Drawings or as directed by the Engineer. Select drilling equipment and methods suitable for the ground conditions described in the geotechnical report and shown in the boring logs. Select drillhole diameter(s) required to develop the pullout resistance used for design. It is the Contractor's responsibility to determine the final drillhole diameter(s) required to provide the design pullout resistance. Use of drilling muds such as bentonite slurry to assist in drill cutting removal is not allowed but air may be used. With the Engineer's approval, the Contractor may be allowed to use water or foam flushing upon successful demonstration, at the Contractor's cost, that the installation method still provides adequate nail pullout resistance. If caving ground is encountered, use cased drilling methods to support the sides of the drillholes. Where hard drilling conditions such as rock, cobbles, boulders, or obstructions are described elsewhere in the contract documents or project Geotechnical Report, percussion or other suitable drilling equipment capable of drilling and maintaining stable drillholes through such materials, will be used.

Immediately suspend or modify drilling operations if ground subsidence is observed, if the soil nail wall is adversely affected, or if adjacent structures are damaged from the drilling operation. Immediately stabilize the adverse conditions at no additional cost to the State.

### **5.2 - Nail Bar Installation.**

Provide nail bars in accordance with the schedules included in the approved Design Drawings. Provide centralizers sized to position the bar within 1 inch of the center of the drillhole. Position centralizers so their maximum center-to-center spacing does not exceed 10 feet. Also locate centralizers within 1.5 feet from the top and bottom of the drillhole. Securely attach centralizers to the bar so they will not shift during handling or insertion into the drill hole yet will still allow grout tremie pipe insertion to the bottom of drillhole and allow grout to flow freely up the hole.

Inspect each nail bar before installation and repair or replace damaged bars or corrosion protection.

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Check uncased drillholes for cleanliness prior to insertion of the soil nail bar. Insert nail bars with centralizers into the drill hole to the required length without difficulty and in a way that prevents damage to the drill hole, bar, or corrosion protection. Do not drive or force partially inserted soil nails into the hole. Remove nails which cannot be fully inserted to the design depth and clean the drill hole to allow unobstructed installation.

### **5.3 - Nail Installation Tolerances.**

Nails shall not extend beyond the right-of-way or easement limits shown on the Plans. Nail location and orientation tolerances are:

- Nail head location, deviation from design location; 6 inches any direction.
- Nail inclination, deviation from design; + or - 3 degrees.
- Center nail bars within 1 inch of the center of the drillhole.
- Clearance from H-Piles, drillhole perimeter; minimum 6 inches from outer limit of H-Piles.
- Location tolerances are applicable to only one nail and not accumulative over large wall areas.

Soil nails which do not satisfy the specified tolerances, due to the Contractor's installation methods, will be replaced at no additional cost. Backfill abandoned nail drill holes with Flowable Fill. Nails which encounter unanticipated obstructions during drilling shall be relocated, as approved by the Engineer, in accordance with section 4.5 of the Construction Requirement portion of this specification.

## **6 - Grouting**

### **6.1 - Grout Mix Design.**

Use a neat cement grout or a sand-cement grout. Submit the proposed nail grout mix design to the Engineer for review and approval in accordance with the submittal section. The design mix submittal shall include compressive strength test results verifying that the proposed mix will have a minimum 3-day compressive strength of 1500 psi and minimum 28-day compressive strength of 3000 psi.

### **6.2 - Grout Testing.**

Previous test results for the proposed grout mix completed within one year of the start of work may be submitted for initial verification of the required compressive strengths for installation of pre-production verification test nails and initial production nails. During production, nail grout shall be tested by the Engineer in accordance with AASHTO T106/ASTM C109 at a frequency of no less than one test for every 10 cubic yards of grout placed.

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### **6.3 - Grouting Equipment.**

Grout equipment shall produce a uniformly mixed grout free of lumps and undispersed cement, and be capable of continuously agitating the mix. Use a positive displacement grout pump equipped with a pressure gauge which can measure at least twice but no more than three times the intended grout pressure. Size the grouting equipment to enable the entire nail to be grouted in one continuous operation. Neat cement grout takes may be high due to the potential for open voided coarse material. Alternative grouting methods including low slump/high viscosity sand-cement grout mixtures or neat cement grout contained in a geotextile sock encapsulation of the nail may be used, provided the specified nail pullout resistance is still successfully provided. Alternative proposed grouting methods shall be submitted to the Engineer for approval. Place the grout within 60 minutes after mixing or within the time recommended by the admixture manufacturer, if admixtures are used. Grout not placed in the allowed time limit will be rejected.

### **6.4 - Grouting Methods.**

Grout the drillhole after installation of the nail bar. Each drillhole will be grouted within 2 hours of completion of drilling, unless otherwise approved by the Engineer. Inject the grout at the lowest point of each drill hole through a grout tube, casing, hollow-stem auger, or drill rods. Keep the outlet end of the conduit delivering the grout below the surface of the grout as the conduit is withdrawn to prevent the creation of voids. Completely fill the drillhole in one continuous operation. Cold joints in the grout column are not allowed except at the top of the test bond length of proof tested production nails. At the Contractor's option, the grout tube may remain in the hole provided it is filled with grout.

During casing removal for drillholes advanced by either cased or hollow-stem auger methods, maintain sufficient grout level within the casing to offset the external groundwater/soil pressure and prevent hole caving. Maintain grout head or grout pressures sufficient to ensure that the drillhole will be completely filled with grout and to prevent unstable soil or groundwater from contaminating or diluting the grout. Record the grout pressures for soil nails installed using pressure grouting techniques. Control grout pressures to prevent excessive ground heave or fracturing.

Remove the grout and nail if grouting is suspended for more than 30 minutes or does not satisfy the requirements of this specification or the Plans, and replace with fresh grout and undamaged nail bar at no additional cost.

## **7 -Soil Nail Testing.**

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Perform both verification and proof testing of designated test nails. The Contractor shall perform pre-production verification test on sacrificial test nails at the locations shown on the approved Design Drawings. The Contractor shall perform proof tests on production nails at locations shown on the approved Design Drawings. Both the Contractor and the Engineer shall record required nail test data. Do not perform nail testing until the nail grout and shotcrete facing have cured for at least 72 hours and attained at least their specified 3-day compressive strength. The Contractor shall not apply loads greater than 80 percent of the minimum guaranteed ultimate tensile strength of the tendon for Grade 50 bars or 90 percent of the minimum guaranteed ultimate tensile strength of the tendon for Grade 60 or 75 bars. Preliminary results shall be submitted to the Owner and/or Owner's Engineer within 24 hours of the test completion. A full report containing load test results shall be submitted to the Owner and/or Owner's Engineer within 5 working days of test completion.

Refer to the latest publication of the FHWA Geotechnical Circular No. 7 "Soil Nail Walls," Chapter 9, for detailed guidance on soil nail testing.

### **7.1 Verification Testing.**

The Contractor shall perform a number of verification tests on sacrificial soil nails as established in the Design Drawings. Verification testing shall be conducted prior to installation of production soil nails on sacrificial soil nails to confirm the appropriateness of the Contractor's drilling and installation methods, and verify the require nail pullout resistance. The verification tests shall be carried to pullout failure. The verification tests must be well planned such that their locations do not interfere with the location of production nails.

The maximum test load in verification tests (VTL) shall be calculated based on as-built bonded lengths per the latest publication of the FHWA Geotechnical Circular No. 7 "Soil Nail Walls" Chapter 9. The Load Schedule for Verification Testing shall comply with the latest publication of the FHWA Geotechnical Circular No. 7 "Soil Nail Walls" Chapter 9.

The Contractor shall perform a minimum of two (2) verification tests per soil nail wall. The verification test nails shall provide sufficient bond length to verify the bond strength in any combination of strata that the production nails will engage. The verification tests shall be performed in accordance with the final number and location of test nails shown on the approved Design Drawings. If the Contractor makes substantive changes in the drilling or soil nail installation operation as shown on the approved Design Drawings, or if significant variability of the ground conditions are observed, additional verification tests may be required at no additional cost.

The verification test nails shall be installed and tested in the area where the permanent wall will be constructed so the results are representative of the actual conditions; i.e., through the H-piles and

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bonded to the soils that will provide the pullout resistance as per the approved design. The verifications tests will be performed by installing the test nail and placing the loading assembly and reaction block against a limited excavated area with temporary reinforced shotcrete face installed to provide sufficient bearing resistance at the nail head. This will be a limited excavated area just for testing purposes. The test nail is a sacrificial nail and it shall be abandoned in place after the test completion to avoid unnecessary soil disturbance. The sacrificial test nail head shall be cut at a minimum distance of 3 inches from the initial shotcrete face.

## **7.2 Proof Testing**

Successful proof testing shall be demonstrated on at least 5 percent of production soil nails in each nail row. The Contractor shall determine the locations and number of proof tests prior to nail installation in each row and shall be in accordance with the approved Design Drawings. Verification tests shall not be counted towards the minimum 5 percent of production nails.

The maximum test load in proof tests (PTL) shall be calculated based on as-built bonded lengths per the latest publication of the FHWA Geotechnical Circular No. 7 “Soil Nail Walls” Chapter 9. The Load Schedule for Proof Testing shall comply with the latest publication of the FHWA Geotechnical Circular No. 7 “Soil Nail Walls” Chapter 9.

## **7.3 Test Nail Acceptance Criteria.**

### **7.3.1 Verification Tests**

Considering that pullout is defined as the load at which attempts to further increase the test load increments simply result in continued movement of the tested nail, a test nail shall be considered acceptable when all of the following criteria are met:

1. The total creep movement is less than 0.08 in. between the 6- and 60-minute readings, and the creep rate is linear or decreasing throughout the creep test hold period.
2. The total movement ( $\Delta$ VTL) measured at VTL exceeds 80 percent of the theoretical elastic elongation of the unbonded length of the test nail, as defined in the latest publication of the FHWA Geotechnical Circular No. 7 “Soil Nail Walls” Chapter 9.
3. Pullout does not occur before achieving 1.0 x VTL.

### **7.3.2 Proof Tests**

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1. The creep movement between the 1- and the 10-minute readings is less than 0.04 in.
2. In cases when the creep movement between the 1- and the 10-minute readings is greater than 0.04 in., the creep movement between the 6- and the 60-minute readings is less than 0.08 in., and the creep rate is linear or decreasing throughout the creep test load hold period.
3. The total soil nail movement ( $\Delta$ PTL) measured at PTL exceeds 80 percent of the theoretical elastic elongation of the unbonded length, as defined in the latest publication of the FHWA Geotechnical Circular No. 7 “Soil Nail Walls” Chapter 9.
4. Pullout does not occur before the test load is 1.0 x PTL.
5. The temporary unbonded test length in proof tests is successfully maintained for subsequent satisfactory grouting. If the unbonded test length of production proof test nails cannot be satisfactorily grouted after testing, the proof test nail shall become sacrificial and shall be replaced with an additional production nail installed at no additional cost to the Owner.

## **8 Test Nail Rejection**

If a test nail does not satisfy the acceptance criterion, the Contractor shall provide corrective measures as necessary to provide nail(s) that achieves the acceptance criteria.

### **8.1 Verification Test Nail.**

The Contractor shall prepare a report summarizing the results of the verification test within 3 days upon completion of the test. The Engineer will evaluate the results of each verification test. Installation methods which do not satisfy the nail testing requirements shall be rejected. The Contractor shall propose alternative methods and install replacement verification test nails. Replacement test nails shall be installed and tested at no additional cost.

### **8.2 Proof Test Nails.**

The Contractor shall prepare a report summarizing the results of the proof test before proceeding with additional nail drilling. The Engineer may require the Contractor to replace some or all of the installed production nails between a failed proof test nail and the adjacent passing proof test nail.

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Alternatively, the Engineer may require the installation and testing of additional proof test nails to verify that adjacent previously installed production nails have sufficient load carrying capacity. Contractor modifications may include, but are not limited to; the installation of additional proof test nails; increasing the drillhole diameter to provide increased capacity; modifying the installation or grouting methods; reducing the production nail spacing from that shown on the approved Design Drawings and installing more production nails at a reduced capacity; or installing longer production nails if sufficient right-of way is available and the pullout capacity behind the failure surface controls the allowable nail design capacity. The nails may not be lengthened beyond the temporary construction easements or the permanent right-of-way shown on the Contract Drawings. Installation and testing of additional proof test nails or installation of additional or modified nails as a result of proof test nail failure(s) will be at no additional cost.

## **9 Nail Installation Records.**

Records documenting the soil nail wall construction will be maintained by the Engineer, unless specified otherwise. The Contractor shall provide the Engineer with as-built drawings showing as-built nail locations and as-built shotcrete facing line and grade within 5 days after completion of the shotcrete facing and as-built CIP facing line and grade within 5 days after completion of the CIP facing.

## **10 Wall Drainage Network.**

Install and secure all elements of the wall drainage network as shown on the Plans, specified herein, or as required by the Engineer to suit the site conditions. The drainage network shall consist of installing geocomposite drain strips and PVC connection pipes as shown on the Plans or as directed by the Engineer. All elements of the drainage network shall be installed prior to shotcreting.

### **10.1 Geocomposite Drain Strips.**

Install geocomposite drain strips centered between the columns of nails as shown on the Plans. The drain strips shall be at least 1 foot wide and placed with the geotextile side against the ground. Secure the strips to the excavation face and prevent shotcrete from contaminating the ground side of the geotextile. Drain strips will be continuous. Splices shall be made with a 1 foot minimum overlap such that the flow of water is not impeded. Repair damage to the geocomposite drain strip, which may interrupt the flow of water.

### **10.2 Connection Pipes and Weepholes.**

Install connection pipes as shown on the Plans. Connection pipes are lengths of solid PVC pipe

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installed to direct water from the geocomposite drain strips into a footing drain or to the exposed face of the wall. Connect the connection pipes to the drain strips using either prefabricated drain grates as shown on the Plans or using the alternate connection method described below. Install the drain grate per the manufacturer's recommendations. The joint between the drain grate and the drain strip and the discharge end of the connector pipe shall be sealed to prevent shotcrete intrusion. Connection pipes that end at the footing drain shall be extended to the edge of the drain. Do not puncture the drainage fabric around the footing drain.

The alternative acceptable method for connection of the connector pipe to the drain strip involves cutting a hole slightly larger than the diameter of the pipe into the strip plastic core but not through the geotextile. Wrap both ends of the connection pipe in geotextile in a manner that prevents migration of fines through the pipe. Tape or seal the inlet end of the pipe where it penetrates the drain strip and the discharge end of the connector pipe in a manner that prevents penetration of shotcrete into the drain strip or pipe. To assure passage of groundwater from the drain strip into the connector pipe, slot the inlet end of the connector pipe at every 45 degrees around the perimeter of the pipe to a depth of ¼ inch.

## **11 Frost Protection Measures**

Frost protection measures are required due to potential frost-induced loading from the frost-susceptible soils retained by the wall. Additionally to adopting appropriate bar sizes of tendons, thermal insulation such as extruded polystyrene (XPS) foam panels or equivalent can be installed to provide frost protection along the vertical face of the soil nail wall and at the ground surface behind the top of the wall.

## **12 Shotcrete Construction Facing**

### **12.1 Shotcrete Alignment and Thickness Control.**

Ensure that the thickness of shotcrete satisfies the minimum requirements shown on the Plans using shooting wires, thickness control pins, or other devices acceptable to the Engineer. Install thickness control devices normal to the surface such that they protrude the required shotcrete thickness outside the surface. Ensure that the front face of the shotcrete does not extend beyond the limits shown on the Plans.

### **12.2 Surface Preparation.**

Clean the face of the excavation and other surfaces to be shotcreted of loose materials, mud, rebound, overspray or other foreign matter that could prevent or reduce shotcrete bond. Protect

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adjacent surfaces from overspray during shooting. Avoid loosening, cracking, or shattering the ground during excavation and cleaning. Remove any surface material which is so loosened or damaged, to a sufficient depth to provide a base that is suitable to receive the shotcrete. Remove material that loosens as the shotcrete is applied. Cost of additional shotcrete is incidental to the work. Divert water flow and remove standing water so that shotcrete placement will not be detrimentally affected by standing water. Do not place shotcrete on frozen surfaces.

### **12.3 Delivery and Application.**

Maintain a clean, dry, oil-free supply of compressed air sufficient for maintaining adequate nozzle velocity at all times. The equipment shall be capable of delivering the premixed material accurately, uniformly, and continuously through the delivery hose. Control shotcrete application thickness, nozzle technique, air pressure, and rate of shotcrete placement to prevent sagging or sloughing of freshly-applied shotcrete.

Apply the shotcrete from the lower part of the area upwards to prevent accumulation of rebound. Orient nozzle at a distance and approximately perpendicular to the working face so that rebound will be minimal and compaction will be maximized. Pay special attention to encapsulating reinforcement. Do not work rebound back into the construction. Where shotcrete is used to complete the top ungrouted zone of the nail drill hole near the face, position the nozzle into the mouth of the drillhole to completely fill the void.

A clearly defined pattern of continuous horizontal or vertical ridges or depressions at the reinforcing elements after they are covered with shotcrete will be considered an indication of insufficient reinforcement cover or poor nozzle techniques. In this case the application of shotcrete shall be immediately suspended and the Contractor shall implement corrective measures before resuming the shotcrete operations. The shotcreting procedure may be corrected by adjusting the nozzle distance and orientation, by insuring adequate cover over the reinforcement, by adjusting the water content of the shotcrete mix or other means. Adjustment in water content of wet-mix will require requalifying the shotcrete mix.

### **12.4 Defective Shotcrete.**

Repair shotcrete surface defects as soon as possible after placement. Remove and replace shotcrete which exhibits segregation, honeycombing, lamination, voids, or sand pockets. In-place shotcrete determined not to meet the specified strength requirement will be subject to remediation as determined by the Engineer. Possible remediation options include placement of additional shotcrete thickness or removal and replacement, at the Contractor's cost.

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**12.5 Construction Joints.** Taper construction joints uniformly toward the excavation face over a minimum distance equal to the thickness of the shotcrete layer. Provide a minimum reinforcement overlap at reinforcement splice joints as shown on the Plans. Clean and wet the surface of a joint before adjacent shotcrete is applied. Where shotcrete is used to complete the top ungrouted zone of the nail drill hole near the face, to the maximum extent practical, clean and dampen the upper grout surface to receive shotcrete, similar to a construction joint.

**12.6 Finish.** Shotcrete finish shall be either an undisturbed gun finish as applied from the nozzle or a rough screeded finish. Remove shotcrete extending into the CIP finish face section beyond the tolerances shown on the Plans or specified herein.

**12.7 Attachment of Nail Head Bearing Plate and Nut.** Attach a bearing plate, bearing plate shear connectors and nut to each nail head as shown on the Plans. While the shotcrete is still plastic and before its initial set, uniformly seat the plate on the shotcrete by hand wrench tightening the nut. Where uniform contact between the plate and the shotcrete cannot be provided, set the plate in a bed of grout. After grout has set for 24 hours, hand wrench tighten the nut. Ensure bearing plates with headed studs are in intimate contact with the construction facing and the studs are located within the tolerances shown on the Plans or specified herein.

**12.8 Weather Limitations.** No shotcrete shall be placed when the air temperature is below 40°F or against a surface containing frost. The temperature of the shotcrete mix, when deposited, shall be not less than 50°F or more than 95°F.

Suspend shotcrete application during high winds and heavy rains unless suitable protective covers, enclosures or wind breaks are installed. Remove and replace newly placed shotcrete exposed to rain that washes out cement or otherwise makes the shotcrete unacceptable. Provide a polyethylene film or equivalent to protect the work from exposure to adverse weather.

**12.9 Curing.** Curing is not required for shotcrete construction facings.

**12.10 Construction Facing Tolerances.** Construction tolerances for the temporary shotcrete construction facing are as follows:

Horizontal Location of Wire Mesh; Rebar; Headed Studs on Bearing Plates,  
from Plan location; + or - ½ inch

Headed studs location on bearing plate, from plan location: ¼ inch

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Spacing between reinforcing bars, from plan dimension; 1 inch

Reinforcing lap, from specified dimension: - 1 inch

Thickness of shotcrete; - ½ inch

Nail head bearing plate, deviation from parallel to wall face: 10 degrees

**METHOD OF MEASUREMENT:**

The unit of measurement for Permanent Soil Nails will be per linear foot. The length to be paid will be the length measured along the bar centerline from the back face of shotcrete to the bottom tip end of nail bar as shown on the Plans. No separate measurement will be made for proof test nails, which shall be considered incidental to production nail installation.

Verification test nails will be measured on a unit basis for each verification test successfully completed. This unit price shall include the cost for materials, equipment, and labor required for the construction of the verification soil nail. Failed verification test nails or additional verification test nails installed to verify alternative nail installation methods proposed by the Contractor will not be measured. Verification test nail unit price shall include the cost associated with labor, materials, and equipment required to locate the existing H-Piles behind the soil nail wall. Verification test nail unit price shall also include the cost associated with any supplemental subsurface exploration the Contractor determines to be necessary.

Structure Excavation (Soil Nail Wall) will be measured as the theoretical plan volume in cubic yards within the structure excavation pay limits shown on the Plans. This will be the excavation volume within the zone measured from top to bottom of shotcrete wall facing and extending out 2 feet horizontally in front of the plan wall final excavation line. Additional excavation beyond the plan wall final excavation line resulting from irregularities in the cut face, excavation overbreak or inadvertent excavation, will not be measured. Removal of face protrusions and backfilling of voids or over-excavation is considered incidental to the work.

General roadway excavation will not be a separate wall pay item but will be measured and paid as part of the general roadway excavation.

The unit of measurement for Abandon and Fill Drill Holes will be per linear foot. The length to be paid will be the length measured along the hole centerline from the back face of shotcrete to the bottom tip of the hole where the steel H-pile is encountered.

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The shotcrete construction facing will be measured in square yards of the shotcrete area completed and accepted in the final work. As shown on the approved Design Drawings or as directed by the Engineer. No measurement or payment will be made for additional shotcrete or CIP concrete needed to fill voids created by irregularities in the cut face, excavation overbreak or inadvertent excavation beyond the plan final wall face excavation line, or failure to construct the facing to the specified line and grade and tolerances. The final pay quantity shall include all structural shotcrete, admixtures, reinforcement, welded wire mesh, wire holding devices, wall drainage materials, bearing plates, bearing plate shear connectors and nuts, test panels and all sampling, testing and reporting required by the Plans and this Specification.

**BASIS OF PAYMENT:**

This work will be paid for at the contract unit price for “Permanent Soil Nails”, “Verification Test Nails”, “Structure Excavation (Soil Nail Wall)”, “Abandon and Backfill Drill Hole”, and “Shotcrete Construction Facing”, complete in place, which price shall included all work shown within the pay limits shown on the contract drawings for the soil nail wall including but not limited to all labor, equipment, materials, material tests, field tests and incidentals necessary to acceptably fabricate and construct the soil nails and perform the structure excavation in accordance with all requirements of the contract, including the excavation and wall alignment survey control for the soil nail wall and work required to provide the proper shotcrete facing alignment and thickness control. All wall drainage materials and frost protection including geocomposite drain strips, connection pipes, drain grates, thermal insulation, and accessories are considered incidental to the shotcrete construction facing and will not be paid separately.

<u>Pay Item</u>	<u>Pay Unit</u>
Permanent Soil Nails	L.F
Verification Test Nails	EA.
Structure Excavation (Soil Nail Wall)	C.Y.
Abandon and Backfill Drill Hole	L.F.
Shotcrete Construction Facing	S.Y.

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 ITEM #0712013A  
 ITEM #0712014A  
 ITEM #0712016A

## **ITEM #0728014A – 3/4” CRUSHED STONE**

Section 7.28 is supplemented as follows:

**7.28.01 – Description:** Work under this item shall consist of crushed stone or gravel placed along the drainage swales to the limits and for the depth shown on the plans, or as directed by the Engineer.

**7.28-05 – Basis of Payment:** This work shall be paid for at the contract unit price per cubic yard for “3/4” Crushed Stone”, complete in place, which price shall include all materials, tools, equipment and labor incidental thereto.

ITEM #0728014

## **ITEM #0821189A – CONCRETE BARRIER TRANSITION SECTION**

**Description:** Under this item, the Contractor shall furnish and install concrete barrier transition section in the locations shown on the plans, or as directed by the Engineer.

**Materials:** Materials for the above items shall conform to all the requirements of Section 8.21.02

**Construction Methods:** The contract items listed above may be precast and follow the methods of Article 8.21.03 or cast-in-place in accordance with Article 6.01.03. The items shall be coated with a penetrating sealer protective compound that meets the requirements of Article M.03.09.

### **Method of Measurement:**

1. The Concrete Barrier Transition Section shall be measured for payment along the centerline of the top of the item being measured and will be the actual number of linear feet of the item installed and accepted.

### **Basis of Payment:**

1. The work for "Concrete Barrier Transition Section," will be paid for at the contract unit price per linear foot of the size specified, complete in place, which price shall include all backfill, sand backfill, joint seal, materials, reinforcing steel, dowels, penetrating sealer protective compound, transportation, equipment, tools and labor incidental thereto.
2. Backfill placed between a double row of concrete barrier curb and/or concrete barrier transition section shall be paid for under the item "Compacted Granular Fill."
3. The concrete cap shall be paid for under the item "Class 'A' Concrete."

Pay Item

Concrete Barrier Transition Section

Pay Unit

L.F.

ITEM #0821189A

## **ITEM #0821393A – JERSEY SHAPE TRANSITION TO F-SHAPE PRECAST CONCRETE BARRIER CURB**

Work under this item shall conform to the requirements of Section 8.21 of Form 817, amended as follows:

**8.21.01 - Description:** Delete and replace with the following:

**Description:** Under this item, the Contractor shall furnish and install Jersey Shape Transition to F-Shape Precast Concrete Barrier Curb sections along the roadway at the locations shown on the plans, or as directed by the Engineer.

Under this item the Contractor shall have the option of furnishing and installing cast in place concrete sections or precast concrete sections or any combination thereof, provided all units are properly anchored to other units or existing concrete in accordance with the Plans.

**8.21.02-Materials:** Add the following:

8. The threaded steel connection rod shall be manufactured in conformance with AASHTO M314, Grade 55. Threads shall be Unified National Coarse Series as specified in ANSI B1.1 and shall have Class 2A threaded tolerances before galvanizing.

Plain steel washers shall be manufactured in accordance with ANSI B18.22.

Heavy hex nuts shall be Grade A, manufactured in conformance with AASHTO M291 and tapped oversize for galvanizing.

The threaded rod, washers and nuts shall be hot-dip galvanized in conformance with AASHTO M232, Class C.

Connection loop bars shall be bent from smooth bars that conform to ASTM A36 and galvanized in accordance with ASTM A123.

**8.21.03-Construction Methods:** Add the following:

7. Holes shall be drilled in concrete, for installation of connecting steel dowels, where required by the plans.
8. If the Contractor elects to use cast-in-place concrete the work shall be done in accordance with Article 6.01.03.

**8.21.05 - Basis of Payment:** Delete and replace with the following:

Payment for this work will be made at the contract unit price per linear foot for “Jersey Shape Transition to F-Shape Precast Concrete Barrier Curb” constructed to the dimensions shown in the plans, which price shall include all necessary excavation, backfill, materials, reinforcing steel, dowels, connecting rods, penetrating sealer protective compound, transportation, equipment, tools, labor and work incidental thereto and as required to achieve complete installation of the sections, including the cost of field measurements prior to fabrication of the units. No additional payment will be made for furnishing and placing anchorage materials necessary for attachment of concrete barrier sections to adjacent barriers or wingwalls.

Pay Item	Pay Unit
Jersey Shape Transition to F-Shape Precast Concrete Barrier Curb	l.f.

**ITEM #0822005A – TEMPORARY PRECAST CONCRETE BARRIER CURB (STRUCTURE)**

**ITEM #0822006A – RELOCATED TEMPORARY PRECAST CONCRETE BARRIER CURB (STRUCTURE)**

**Description:**

Work under this item shall consist of furnishing, installing, relocating and removing temporary concrete barrier for use on structures as shown on the plans.

**Materials:**

1. The barrier shall be precast concrete conforming to Article 8.21.02-1.
2. Manufacturer identification and casting date shall be permanently marked on each barrier unit by means of a non-corrosive metal or plastic tag in the location shown on the plan. When used barrier is furnished, the Contractor shall provide documentation stating from where the material came, what project it will be used on, the casting dates, and certification that the barrier conforms to all State requirements.
3. Reinforcing steel shall conform to the requirements of ASTM A615M, Grade 60.
4. Lifting hooks. Keys, bolts, devices and attachments shall be of the size indicated on the plans or of a design satisfactory for the purpose intended as approved by the Engineer.
5. Anchor bolts shall conform to ASTM A307. Heavy hex nuts shall conform to AASHTO M291. The plate washers shall conform to AASHTO M232M, Grade 50. The anchor bolts, nuts, and plate washers shall be hot-dipped galvanized in accordance with ASHTO M232 and M111 as applicable.
6. Loop bars shall be bent from smooth bar steel conforming to AISI 1018 (hot rolled). Ends shall be hot-dipped galvanized in accordance with AASHTO M111.
7. Threaded connection rods shall be steel conforming to AASHTO M314 (ASTM F1554). Grade 55 except that threads and nominal diameters shall conform to ANSI B1.13M for Class 6g threads. The rod shall be threaded for a minimum of 4 inch at each end. Plain steel washers shall be manufactured in accordance with ANSI B18.22M. Heavy hex nuts shall conform to AASHTO M 291M for Class 10S and shall conform to the geometry defined in ANSI B18.2.4.6M. The threaded connection rods, washers, and nuts shall be hot-dipped galvanized after fabrication in accordance with the requirements of Class C of AASHTO M232.
8. The chemical anchor material shall be a resin compound specially formulated to secure bolts in concrete against tension pull-out. The Contractor shall select the chemical anchor material in accordance with Article M.03.07.
9. Non-shrink grout shall conform to subarticle M.03.05.
10. Barrier shall be accepted on the basis of the manufacturer's certification, as defined on Article M.08.02-4.
11. Sealant for patching holes in bituminous overlays shall be a cold-applied bituminous sealer conforming to M.08.01-15.



12. Anchor Bolts/Threaded Connection Rods-Certified Test Reports: The Contractor shall submit a Certified Test Report and a Materials Certificate in conformance with Article 1.06.07 and a sample of all anchor bolts, threaded connection rods, nuts, and washers for testing prior to their installation.  
The Contractor shall not install any anchor bolts or threaded connection rods, prior to receipt of the approved test results and approval by the Engineer.
13. Delineators shall conform to Article 8.22.02.

**Construction Methods:**

1. Fabrication: The barrier shall be precast concrete in conformance with the pertinent requirements of Article 8.21.03 and the plans, except that penetrating sealer protective compound is not required.
2. Installation: The barrier shall be placed as shown on the plans or as directed by the Engineer.

The barriers shall be anchored to the concrete deck slab in accordance with the plans and the following:

- a. Chemical Anchoring: This consists of drilling holes in concrete deck slabs, placing anchor bolts in the holes, and securing the bolts with a pre-approved chemical anchor material.

The Contractor shall submit the following to the Engineer for approval type of drill, diameter of bit, method of cleaning. Holes and method of placement of chemical anchor material. Specifications and recommendations for the aforementioned may be obtained from the manufacturer of the chemical anchor material.

Drilling methods shall not cause spalling, cracking, or other damage to the concrete. Those areas damaged by the Contractor shall be repaired by him in a manner suitable to the Engineer and at no expense to the State.

Care shall be taken not to drill holes into or through structural steel. The Contractor shall take the necessary precautions to prevent materials from falling into the brook below.

When reinforcing steel is encountered during the drilling of the holes, the Contractor shall attempt to angle the hole to by-pass the bar.

The holes shall be blown clean and wire brushed or otherwise cleaned per the manufacturer's written instructions prior to setting the anchor bolts.

The anchor bolts shall extend to the bottom of the holes and be hammer taped to insure full penetration. The chemical anchor material shall be installed in

accordance with the written directions supplied by manufacturer of the chemical anchor material.

The barrier shall be anchored down by torquing the bolts "snug tight", which is defined as the tightness attained after several impacts from an impact wrench. No part of the bolt head shall project above the outer surface of the barrier.

- b. Through-Bolting: This consists of drilling completely through the deck slab and securing anchor bolts on the underside with plate washers and nuts. Through-Bolting is not permitted on new construction or prestressed concrete. Measures shall be taken to insure that no damage occurs to property below the bridge.
  - c. Care shall be taken not to drill holes into or through structural steel. The barrier shall be anchored down by torquing the bolts 'snug tight", which is defined as the tightness attained after several impacts from an impact wrench. No part of the bolt head shall project above the outer surface of the barrier.
3. Connection of Barrier Units: The barrier shall be joined together with threaded connection rods, and heavy hex nuts in accordance with the plans.
  4. Cutting of Anchor Bolts: Where ordered by the Engineer, protruding anchor bolts shall be cut off flush with the surface of the concrete deck. The bolts shall then be ground down below the surface of the deck and the space filled in with non-shrink grout.
  5. Patching with Non-Shrink Grout: After removal of the barrier, holes in newly constructed concrete decks and threaded inserts shall be blown clean with an air jet and filled in with non-shrink grout. The non-shrink grout shall be mixed and placed in strict accordance with the manufacturer's directions. The non-shrink grout shall be finished flush with the deck surface. Allow grout to cure a minimum of 24 hours before placing sealant in any remaining hole in the bituminous wearing surface.
  6. Delineators: Delineators shall be installed on top of the barrier in accordance with Article 8.22.03-3 and the plans.
  7. General: The barrier shall be kept in good condition at all times by the Contractor during all stages of construction. Any damaged material shall be replaced by the Contractor at his expense.

When the barrier is no longer required, it shall be removed from the work site and become the property of the Contractor.

### **Method of Measurement:**

Temporary Precast Concrete Barrier Curb (Structure) and Relocated Temporary Precast Concrete Barrier Curb (Structure) will be measured for payment along the centerline at the top of the barrier and will be the actual number of linear feet of temporary structure barrier furnished, installed, and accepted.

Relocation of concrete barrier for access to the work area or for the convenience of the contractor will not be measured for payment. Movement of stored barrier or maintenance of the storage area will not be measured for payment.

Delineators will be measured in accordance with Article 12.05.04.

**Basis of Payment:**

This work will be paid for at the contract unit price per linear foot for "Temporary Precast Concrete Barrier Curb (Structure)" and "Relocated Temporary Precast Concrete Barrier Curb (Structure)", complete in place, which price shall include all furnishing, transportation, initial installation, relocation, final removal, storage, materials, reinforcing steel, connection rods, and all equipment, tools, and labor incidental thereto. The cost of furnishing, installing, and cutting of anchor bolts shall also be included for payment under this item. Each Temporary Precast Concrete Barrier Curb (Structure) will be paid for once regardless of the number of times it is used on the project. Any barrier units that become lost, damaged or defaced shall be replaced by the Contractor at no cost to the State.

<u>Pay Item</u>	<u>Pay Unit</u>
Temporary Precast Concrete Barrier Curb (Structure)	l.f.
Relocated Temporary Precast Concrete Barrier Curb (Structure)	l.f.

**ITEM #0824052A – REMOVE EXISTING CONCRETE BARRIER CURB**

**Description:** Work under this item shall consist of the removal and disposal of concrete barrier curb from its existing location as indicated on the plans or as directed by the Engineer.

**Construction Methods:** Controlled material adhered to the concrete barrier curb shall be removed, handled, decontaminated, solidified, stored, loaded, transported and disposed of in accordance with their respective contract items.

All concrete barrier curb removed shall be disposed of by the Contractor.

**Method of Measurement:** This work will be measured for payment by the actual number of linear feet of precast concrete barrier removed measured along the face of the barrier.

**Basis of Payment:** This work will be paid for at the contract unit price per linear foot for “Remove Existing Concrete Barrier Curb”, which price shall include all equipment, tools, and labor incidental thereto and shall include the disposal of the concrete barrier curb.

The cost of removal, special handling, decontamination, material solidification, dewatering, storage, loading, transportation and disposal of controlled material will be paid in accordance with their respective contract items.

Pay Item	Pay Unit
Remove Existing Concrete Barrier Curb	If

## **ITEM #0913027A – REMOVE AND RELOCATE CHAIN LINK FENCE**

*Work under this item shall conform to the requirements of Section 9.13, supplemented and amended as follows:*

### **Article 9.13.01 Description:** – *Add the following:*

Work under this item shall also consist of removing existing fence, storing fencing during construction as needed, and reinstalling the fence after construction in the area is complete, where indicated on the plans or as ordered by the Engineer.

### **Article 9.13.02 Materials:** – *Add the following:*

If new fencing material is required, it shall be approved by the Engineer.

### **Article 9.13.03 Construction Methods:** – *Add the following:*

Fencing shall be removed in a workmanlike manner, stored during construction as needed, and reset at the original location or relocated to the location shown on the plans upon completion of the work in the affected area.

Existing post foundations shall be removed and new foundations of similar size poured at the locations of reset or relocated posts.

If the Engineer determines that the existing fence cannot be properly removed and set due to the existing condition of the fence and the impacts of removing and resetting, or if the fence is damaged or stolen when it is either being removed or stored, the Engineer may order the Contractor to install new fence.

### **Article 9.13.04 Method of Measurement:** – *Add the following:*

Removing and resetting or relocating fence will be measured for payment by the number of linear feet of fence removed, reset, or relocated, complete and accepted, measured from outside to outside of terminal posts.

### **Article 9.13.05 Basis of Payment:** – *Add the following:*

The work to remove and reset fence or to remove and relocate fence will be paid at the contract unit price per linear foot for "Remove and Relocate Chain Link Fence" complete in place, which price shall include removal, storage, resetting or relocating the fence including placement of new

concrete foundations, and all material, equipment, tools and labor incidental thereto.

No additional payment under any item shall be made under this item for new fence or gate if the Contractor is ordered by the Engineer to install new fence in the event that the existing fence or gate is damaged or stolen prior to being reset.

Pay Item	Pay Unit
Remove and Relocate Chain Link Fence	lf

## **ITEM #0917010A – REPAIR GUIDERAIL**

**Description:** Work under this item shall consist of the repair of newly installed guiderail. It shall be repaired in the locations originally installed and fabricated in conformity with the lines, designations, dimensions, and details shown on the plans or as ordered by the Engineer.

**Materials:** The material for guiderail shall meet the requirements as specified within the original applicable contract items.

When repairing guiderail, the Contractor shall reuse any undamaged existing guiderail elements, timber rail, wire rope, appropriate posts, delineators, lap bolts, and other hardware within the project limits as approved by the Engineer to repair the guiderail. The Contractor shall use new materials when any components of the existing railing are damaged or missing and cannot be obtained from other guiderail systems being removed or converted within the Project limits.

**Construction Methods:** The repair of guiderail shall be in accordance with contraction methods as specified within the original applicable contract items.

Guiderail, including end anchors, which has been installed in final condition and accepted by the Engineer, shall be eligible for reimbursement for repairs subject to the conditions described below. If multiple runs are to be installed in a single stage as indicated in the contract documents, determination for reimbursement shall be made when all runs within the stage are complete and accepted as previously described. On projects without designated stages, guiderail installations must be complete and serving the intended function as determined by the Engineer.

When newly installed guiderail is damaged by public traffic, the following conditions must be satisfied prior to reimbursement for payment;

1. The damage must have been caused solely by the traveling public.
2. The contractor shall provide satisfactory evidence that such damage was caused by public traffic. Such as accident reports obtained from the Connecticut Department of Public Safety, police agencies or insurance companies; statements by reliable, unbiased eyewitnesses; or identification of the vehicle involved in the accident.
3. The contractor shall attempt to collect the costs from the person or persons responsible for the damage and provide documentation of those efforts to the satisfaction of the Engineer.
4. If such evidence cannot be obtained, the Engineer may determine that the damage was not caused by the Contractor and reimbursement for payment is warranted.

This repair provision does not relieve the Contractor of the requirements of Section 1.07, any other contractual requirements for maintenance and protection of traffic and final acceptance and relief of responsibility for the project.

The contractor shall remain responsible for the safety and integrity of the guiderail system for the duration of the project. In the event the guiderail is damaged, the Contractor shall provide sufficient cones, drums and other traffic control devices to provide safe passage by the public. When ordered by the Engineer, the Contractor shall furnish replacement parts and immediately repair the guiderail, but in no case more than 24 hours after notification from the Engineer. In non-emergency situations, the guiderail shall be repaired within 72 hours. The repaired guiderail or anchorages, when completed, shall conform to these specifications for a new system. The Contractor shall be responsible for the removal and the proper disposal of all damaged material and debris.

**Method of Measurement:** Guiderail damaged solely by the traveling public will be measured for payment. Damage caused by the Contractor's equipment or operations will not be measured for payment.

The sum of money shown on the estimate and in the itemized proposal as "Estimated Cost" for repair of guiderail will be considered the price bid even though payment will be made only for actual work performed. The estimated cost figure is not to be altered in any manner by the bidder. Should the bidder alter the amount shown, the altered figures will be disregarded and the original price will be used to determine the total amount bid for the contract.

**Basis of Payment:** Repair of guiderail will be paid for in accordance with Article 1.09.04 as required to restore the rail to its full working condition in conformance with these specifications for a new system. There will be no payment for maintenance and protection of traffic for work associated with this item unless, in the opinion of the Engineer, the sole purpose of the maintenance and protection of traffic is for repair of the guiderail.

<u>Pay Item</u>	<u>Pay Unit</u>
Repair Guiderail	est. (est.)



## **ITEM #0945005A – WILDFLOWER ESTABLISHMENT**

**Description:** The work included in this item shall consist of providing an accepted uniform stand of established wildflowers by furnishing and placing seed and mulch on all areas to be treated as shown on the plans, permits or as directed by the Engineer.

The work will also include the installation of bio-degradable erosion control matting, as shown on plans, permits or as directed by the Engineer, consisting of mulch and netting woven together as a unit.

**Materials:** All wildflower seed mixture sources shall be locally obtained within the Northeast USA including New England, New York, Pennsylvania, New Jersey, Delaware, or Maryland in order to preserve and enhance the diversity of native wildflower species.

Mulch shall meet the requirements of Article M.13.05.

Bio-degradable erosion control matting, if required, shall be from the Department's Qualified Products List and shall meet the requirements of Article M.13.09.

All seed mixture sources, mulch and erosion control matting shall be approved by Engineer prior to application.

Three approved seed mixtures are detailed below.

1. **New England Wildflower Seed Mix: (NEWP) New England WetMix**, New England Wetland Plants, Inc. 800 Main Street Amherst, MA 01002, or equal. Rate shall be 1 pound PLS per 1900 sq.ft.
2. **XERCES Northeastern Pollinator Mix:** Ernst Conservation Seeds Inc. 8884 Mercer Pike, Meadville, PA, 16335, or equal. Rate shall be 8 pound PLS per 1 acre.
3. **Wildflower & Grass Mix**, Vermont Wetland Plant Supply, LLC, P.O. Box 153, Orwell, VT, 05760, or equal. Rate shall be 1 pound PLS per 1600 sq.ft.

All seed mixtures must be approved by the Environmental Scientist from the Office of Environmental Planning in advance of purchase. The materials certification for any proposed mixture shall be submitted a minimum of thirty (30) days prior to delivery on site by the Contractor. All seed material certifications must have seed mixtures that shall not include any invasive species pursuant to Connecticut General Statute Sec. 22a-381d or any State Threatened or State Endangered species known pursuant to Connecticut General Statute Sec. 26-303 which would be a violation of the Connecticut Endangered Species Act. The seed tags from the bags are to be removed by the Engineer upon delivery and attached to the Material Certification. A copy of the seed tag is to be provided to the Environmental Scientist. No seeding shall occur if the requirements are not met.

All approved seed mixtures shall be obtained in sufficient quantities to meet the pure live seed (PLS) application rates as determined by the seed analysis of the mixture.

**Construction Methods:** Construction methods shall be those established as agronomically acceptable and feasible and approved by the Engineer.

Preparation of Seedbed Areas:

- a. Level areas, median areas, interchanges and lawns: These areas shall be made friable and receptive for seeding by discing or by other approved methods to the satisfaction of the Engineer. The final prepared surface which has been seeded shall meet the lines and grades for such surface areas as shown on the plans, or as directed by the Engineer.
- b. Slope and embankment areas: These areas shall be made friable and receptive to seeding by approved methods which will not disrupt the line and grade of the slope surface. In no event, will seeding be permitted on hard or crusted soil surface.

All areas to be seeded shall be reasonably free from weeds taller than 3 inches. Removal of weed growth for the slope areas shall be those methods which do not rut or scar the slope surface or cause excessive disruption of the slope line or grade as approved by the Engineer. Seeding on level areas shall not be permitted until substantial weed growth is removed and approved by the Engineer.

Seeding Season: The calendar dates for seeding shall be:

Spring – March 1 to June 15

Fall – September 15 to November 15

Seeding Methods: The wildflower seed mixture shall be applied by an agronomically acceptable procedure approved by Environmental Scientist. The rate of application shall be as shown on the plans or directed by the Engineer.

$(\text{Germination Percentage} \times \text{Purity Percentage}) / 100 = \text{Percentage PLS}$

The Engineer shall verify that the seed is applied at a rate which will allow for 100 percent PLS.

**Method of Measurement:** The work will be measured for payment by the number of pounds of each size and kind of wildflower seed counted, planted and accepted.

**Basis of Payment:** This work will be paid at the contract unit price per pound for “Wildflower Establishment,” which price shall include all materials, maintenance, equipment tools, labor, transportation, operations, and all work incidental thereto. Partial payment of up to 50% may be

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made for work completed, but not accepted. Full payment shall not be made until the area has been accepted by the Engineer.

**Pay Item**

Wildflower Establishment

**Pay Unit**

lb.

**ITEM #0950019A – TURF ESTABLISHMENT - LAWN**

**Description:** The work included in this item shall consist of providing an accepted stand of grass by furnishing and placing seed as shown on the plans or as directed by the Engineer.

**Materials:** The materials for this work shall conform to the requirements of Section 9.50 of Standard Specification Form 817. The following mix shall be used for this item:

**Turf Seed Mix:**

In order to preserve and enhance the diversity, the source for seed mixtures shall be locally obtained within the Northeast USA including New England, New York, Pennsylvania, New Jersey, Delaware, or Maryland. One approved seed mixture is detailed below. Other proposed mixtures must be approved by the ConnDOT Landscape Design office.

<b><u>Proportion (Percent)</u></b>	<b><u>Species Common name</u></b>	<b><u>Scientific name</u></b>
20	Kentucky Bluegrass Improved varieties	Poa pratensis
45	Red Fescue Improved varieties	Festuca rubra
35	Perennial Ryegrass Improved varieties	Lolium perenne

**Construction Methods:** Construction Methods shall be those established as agronomically acceptable and feasible and that are approved by the Engineer. Rate of application shall be field determined in Pure Live Seed (PLS) based on the minimum purity and minimum germination of the seed obtained. Calculate the PLS for each seed species in the mix. Adjust the seeding rate for the above composite mix, based on 250 lbs. per acre. The seed shall be mulched in accordance with Article 9.50.03.

**Method of Measurement:** This work will be measured for payment by the number of square yards of surface area of accepted established grasses as specified or by the number of square yards of surface area of seeding actually covered and as specified.

**Basis of Payment:** This work will be paid for at the contract unit price per square yard for “Turf Establishment - Lawn” which price shall include all materials maintenance, equipment, tools, labor, and work incidental thereto. Partial payment of up to 60% may be made for work completed, but not accepted.

<b><u>Pay Item</u></b>	<b><u>Pay Unit</u></b>
Turf Establishment - Lawn	S.Y.

**ITEM #0969030A – PROJECT COORDINATOR (MINIMUM BID)**

*Article 1.05.08 – Schedules and Reports of the Standard Specifications is hereby amended by the following:*

*Add the following:*

**Description:** Under this item the Contractor shall furnish the services of an administrative employee, entitled the Project Coordinator, for this Project, to coordinate and expedite all phases of the work required for the Project and to ensure that the construction schedule is maintained.

The minimum lump sum bid for this item shall be equal to 0.5% of the Contractor's total bid. Failure of the Contractor to bid at least the minimum amount will result in the Department adjusting the Contractor's bid to include the minimum bid amount for this item.

The Project Coordinator's resume shall be submitted for approval by name, in writing, within seven (7) calendar days of the award of the Contract, and shall not be changed without prior written notice to the Department.

This resume must demonstrate the Project Coordinator is experienced and versatile in the preparation, interpretation and modification of Critical Path Method (CPM) construction schedules. This must include successful completion of at least three (3) construction projects of similar complexity, where they served in a lead scheduling capacity. If the Contractor does not have a person in their company that has these skills, then the Contractor shall engage the services of a Consultant, subject to the approval of the Engineer, for the scheduling work required. If a Consultant is engaged, they shall be present at the first meeting, along with the Project Coordinator, prepared to discuss, in detail, the methods and techniques they propose to use. Thereafter, the Project Coordinator or the Consultant responsible for updating the CPM Schedule shall attend all meetings between the Contractor, its Subcontractors, and any other meetings, which will affect the CPM schedule. The Contractor shall prepare CPM Schedules utilizing the latest version of Primavera Project Planner software.

When the Contract is administered under Section 1.20, the following requirement shall also apply:

The Project Coordinator shall have, in addition to the above noted requirements, a minimum of eight (8) years' experience related to commercial/industrial building construction as a Project Coordinator performing duties similar to those required herein. The Project Coordinator shall have knowledge of all trades involved in the construction, including civil/site work, environmental work, concrete work, masonry work, steel work, wood work, electrical work, and mechanical work. Other combinations of experience and education totaling ten (10) years in commercial building construction will be considered subject to the approval of the Engineer.

**Computer Software and Printer:** The Contractor shall provide the following equipment with all the required maintenance and repairs (to include labor and parts) throughout the Contract life. The Engineer reserves the right to expand or relax the specification to adapt to the software and hardware limitations and availability.

The Contractor shall provide the Engineer with a licensed copy registered in the Department's name of the latest versions of the software listed and maintain customer support services offered by the software producer for the duration of the project. The Contractor shall deliver to the Engineer all supporting documentation for the software and hardware including any instructions or manuals.

Software – Minimum Specification: The Contractor shall provide the Engineer with a licensed copy of the latest version of the Oracle Primavera Contractor – Deluxe Version scheduling software, registered in the Department's name, and maintain the Primavera customer support service contract over the duration of the project.

Printer: An addition printer shall be provided that meets the printer specifications noted under contract item for "Construction Field Office" and is compatible with the software.

The Contractor is responsible for service and repairs to all computer hardware. All repairs must be performed within 24 hours. If the repairs require more than a 24 hours then a replacement must be provided.

**Construction Methods:** The Project Coordinator shall attend all meetings between the Contractor and the Department, the Contractor and its Subcontractors, and any other meetings that affect the progress of the job. The Project Coordinator shall be knowledgeable of the status of all parts of the work throughout the length of the Contract.

*Please delete any reference to Bar Chart under 1.05.08 – Schedule and Reports and replace with the following:*

Critical Path Method (CPM)

*Please add the following:*

Proper relationship between all major activities shall be indicated. Node numbers shall be coded such that the major activities shown on the Critical Path Schedule shall be easily referenced to the Detailed Project Schedule when it is developed. Break down the work covered under each Special Provision, or Division and Section of Article 1.20 of the Standard Specifications, into individual activities required and logically group related activities together within the CPM.

All documents, which require approval by the Department, shall be clearly identified within the schedule. The Department and any outside agency shall be allocated a minimum number of calendar days in accordance with Article 1.20-1.05.02. If Article 1.20 does not apply, then the Department shall be allocated a minimum of thirty (30) calendar days (exclusive of weekends

and holidays) for review and approval of each submittal. Any submittals requiring approval by an outside Agency (ConnDEEP, Coast Guard, Army Corps of Engineers, etc.) shall be allocated a minimum of sixty (60) calendar days. The Department shall not be held responsible for any delay associated with the approval or rejection of any substitution or other revisions proposed by the Contractor.

The schedule shall indicate the logic of the work for the major elements and components of work under the Contract, such as the planned mobilization of plant and equipment, sequences of operations, procurement of materials and equipment, duration of activities, type of relationship, lag time (if any), and such other information as it is necessary to present a clear statement of the intended activities.

The schedules shall consist of a network technique of planning, scheduling and control, shall be a clear statement of the logical sequence of work to be done, and shall be prepared in such a manner that the Contractor's work sequence shall be optimized between early start and late start restraints. The Contractor shall use the same criteria in a consistent manner throughout the term of the project. If, at any time, the Contractor alters logic, original durations, and descriptions, adds activities or activity codes or in any way modifies the Baseline Schedule, they must notify the Engineer of the change, in writing, presenting in detail the reasons for the change. The Engineer reserves the right to approve or reject any such change.

The critical path of the project must be identified on the CPM schedule. The critical path is the longest-duration path through the network. The significance of the critical path is that the activities that lie on it cannot be delayed without delaying the project. Because of its impact on the entire project, critical path analysis is an important aspect of project planning.

The critical path can be identified by determining the following four parameters for each activity:

1. ES - Earliest Start Time: the earliest time at which the activity can start given that its precedent activities must be completed first.
2. EF - Earliest Finish Time: equal to the earliest start time for the activity plus the time required to complete the activity.
3. LF - Latest Finish Time: the latest time at which the activity can be completed without delaying the project.
4. LS - Latest Start Time: equal to the latest finish time minus the time required to complete the activity.

The *float time* for an activity is the time between its earliest and latest start time, or between its earliest and latest finish time. Float is the amount of time that an activity can be delayed past its earliest start or earliest finish without delaying the project. Delays to activities on the critical path through the project network in which no float exists, that is, where  $ES=LS$  and  $EF=LF$  will delay the project.

Float available in the schedule, at any time shall not be considered for the exclusive use of either the Department or the Contractor. During the course of Contract, any float generated due to the efficiencies of either party is not for the sole use of the party generating the float; rather it is a shared commodity to be reasonably used by either party. Project float will be a resource available to both the Department and the Contractor.

Each CPM Schedule submittal shall be in the form of an activity on node diagram (precedence diagramming method) and shall include at a minimum; an Early Start computer sort, a Total Float computer sort, an Activity Number computer sort, a Schedule Diagram in the Time Scaled Logic format and a backup data CD-ROM which includes all Primavera project files. The diagrams may be requested printed out by the Department and shall be on 22" x 34" sheets. Additional, more detailed diagrams for important aspects or phases of the work may be required on large or complex projects.

Activity I.D. numbers shall be keyed to the item numbers assigned on the detailed estimate sheet. The first three digits (four digits for highway illumination, signing, traffic signals and utility work) of the activity I.D. number shall be identical to the first three digits of the item number in the Contract. The remaining digits may be used to provide unique, orderly and sequential I.D. numbers for each activity.

Activity codes shall be added to the schedule dictionary at the direction of the Engineer. At a minimum, activity codes for responsibility (prime, subcontractor by name), location of work (bridge #, span #, sta. #, site, building, type of work, etc.) and stage or phase number should be included.

1. Recovery Schedules: If, in the opinion of the Engineer, the updated schedule indicates that the Project has fallen behind schedule, or that a revision in sequence of operations may be necessary for any other reason, absent a justifiable time extension, the Contractor shall immediately institute all necessary steps to improve the Project's progress and shall submit such revised network diagrams, tabulations and operational plans, as may be deemed necessary by the Engineer, to demonstrate the manner in which an acceptable rate of progress will be regained.

Should the Contractor not demonstrate an ability to regain an acceptable rate of progress, the Engineer shall require the schedule to be resource loaded with the next monthly update. No additional compensation will be allowed for resource loading the schedule.

2. As-Built Schedules: Within thirty (30) days of completion of the project, including all corrective work, the Contractor shall submit an "As-Built Schedule" showing the actual progress of work. The Contractor shall submit three prints of this final CPM Schedule and one project backup data CD-ROM which include all Primavera project files for the Engineer's exclusive use.

The following shall also apply to Contracts administered under Section 1.20:



3. Daily Construction Reports: The Project Coordinator shall assist the Engineer in the preparation of a daily construction report by ensuring that each of the Contractor's employees and subcontractors working on the Project Site on a given day signs the Engineer's sign-in sheet for that day; and by keeping and providing to the Engineer its own daily list of employees and subcontractors who worked on the Project Site on that day.

**Method of Measurement:** Within ten (10) calendar days of the award of the Contract, the Contractor shall submit to the Engineer for approval a breakdown of its lump sum bid price for this item detailing:

1. The development cost to prepare the Baseline Schedule in accordance with these specifications. Development costs shall not exceed 25% of the total cost of the item and shall include costs to furnish and install all specified hardware.
2. The cost to provide the services of the Project Coordinator, including costs to prepare and submit the Monthly Updates and Narrative; furnish and submit any Recovery Schedules; furnish and submit Two Week Look Ahead Schedules and maintenance of and supplies for the specified hardware noted above. A per month cost will be derived by taking this cost divided by the number of Contract months remaining from the date of acceptance of the Baseline Schedule.
3. The cost of submission and certification of the As-Built Schedule in accordance with these specifications. The submission and certification costs shall be no less than 2% of the total cost of the item.
4. Substantiation showing that the costs submitted are reasonable based on the Contractor's lump sum bid.

Upon approval of the payment schedule by the Engineer, payments for work performed will be made as follows:

1. Upon approval of the "Baseline" Schedule by the Engineer, the lump sum development cost will be certified for payment.
2. Upon receipt of each monthly narrative and update of the "Baseline" Schedule, the per month cost for the services of the Project Coordinator will be certified for payment.
3. Upon approval of the As-Built Schedule by the Engineer, the lump sum submission and certification cost will be certified for payment.

**Basis of Payment:** This service will be paid for at the Contract lump sum price for "Project Coordinator" complete, which price shall include the preparation and submission of all schedules, narratives, updates, reports and submittals. The lump sum price shall also include the

cost of providing a complete, licensed copy of the Primavera software which will remain the property of the Engineer, and all materials, equipment, labor and work incidental of this service.

The lump sum price will be certified for payment as described in "Method of Measurement" subject to the following conditions:

1. Any month where the monthly update of the "Baseline" CPM schedule is submitted late, without authorization from the Engineer, will result in the following actions:
  - a. The monthly payment for the Project Coordinator item will be deferred to the next monthly payment estimate. If any monthly submittal is more than thirty (30) calendar days late, there will be no monthly payment for the services of the Project Coordinator.
  - b. The greater of 5% of the monthly payment estimate or \$25,000 will be retained from the monthly payment estimate until such time as the Contractor submits all required reports.
  - c. If in the opinion of the Engineer, the Contractor is not in compliance with this specification, the Engineer may withhold all Contract payments.
2. In the event the Contract time extends beyond the original completion date by more than thirty (30) calendar days, and a time extension is granted to the Contractor, the Department may require additional CPM updates which will be paid for at the per month cost for the services of the Project Coordinator.
3. If the Contractor is not in compliance with this specification or has failed to submit a "Baseline" schedule, monthly update, or a Recovery Schedule for any portion of the work, the Engineer will withhold all Contract payments until the schedule is submitted to, and approved by, the Engineer.

<u>Pay Item</u>	<u>Pay Unit</u>
Project Coordinator	L.S.

## **ITEM #0969062A – CONSTRUCTION FIELD OFFICE, MEDIUM**

**Description:** Under the item included in the bid document, adequate weatherproof office quarters with related furnishings, materials, equipment and other services, shall be provided by the Contractor for the duration of the work, and if necessary, for a close-out period determined by the Engineer. The office, furnishings, materials, equipment, and services are for the exclusive use of CTDOT forces and others who may be engaged to augment CTDOT forces with relation to the Contract. The office quarters shall be located convenient to the work site and installed in accordance with Article 1.08.02. This office shall be separated from any office occupied by the Contractor. Ownership and liability of the office quarters shall remain with the Contractor.

**Furnishings/Materials/Supplies/Equipment:** All furnishings, materials, equipment and supplies shall be in like new condition for the purpose intended and require approval of the Engineer.

**Office Requirements:** The Contractor shall furnish the office quarters and equipment as described below:

Description \ Office Size	Med.
Minimum Sq. Ft. of floor space with a minimum ceiling height of 7 ft.	400
Minimum number of exterior entrances.	2
Minimum number of parking spaces.	7

**Office Layout:** The office shall have a minimum square footage as indicated in the table above, and shall be partitioned as shown on the building floor plan as provided by the Engineer.

**Tie-downs and Skirting:** Modular offices shall be tied-down and fully skirted to ground level.

**Lavatory Facilities:** For field offices sizes Small and Medium the Contractor shall furnish a toilet facility at a location convenient to the field office for use by CTDOT personnel and such assistants as they may engage; and for field offices sizes Large and Extra Large the Contractor shall furnish two (2) separate lavatories with toilet (men and women), in separately enclosed rooms that are properly ventilated and comply with applicable sanitary codes. Each lavatory shall have hot and cold running water and flush-type toilets. For all facilities the Contractor shall supply lavatory and sanitary supplies as required.

**Windows and Entrances:** The windows shall be of a type that will open and close conveniently, shall be sufficient in number and size to provide adequate light and ventilation, and shall be fitted with locking devices, blinds and screens. The entrances shall be secure, screened, and fitted with a lock for which four keys shall be furnished. All keys to the construction field office shall be furnished to the CTDOT and will be kept in their possession while State personnel are using the office. Any access to the entrance ways shall meet applicable building codes, with appropriate handrails. Stairways shall be ADA/ABA compliant and have non-skid tread surfaces. An ADA/ABA compliant ramp with non-skid surface shall be provided with the Extra-Large field office.

Lighting: The Contractor shall equip the office interior with electric lighting that provides a minimum illumination level of 100 foot-candles at desk level height, and electric outlets for each desk and drafting table. The Contractor shall also provide exterior lighting that provides a minimum illumination level of 2 foot-candles throughout the parking area and for a minimum distance of 10 ft. on each side of the field office.

Parking Facility: The Contractor shall provide a parking area, adjacent to the field office, of sufficient size to accommodate the number of vehicles indicated in the table above. If a paved parking area is not readily available, the Contractor shall construct a parking area and driveway consisting of a minimum of 6 inches of processed aggregate base graded to drain. The base material will be extended to the office entrance.

Field Office Security: Physical Barrier Devices - This shall consist of physical means to prevent entry, such as: 1) All windows shall be barred or security screens installed; 2) All field office doors shall be equipped with dead bolt locks and regular day operated door locks; and 3) Other devices as directed by the Engineer to suit existing conditions.

Electric Service: The field office shall be equipped with an electric service panel, wiring, outlets, etc., to serve the electrical requirements of the field office, including: lighting, general outlets, computer outlets, calculators etc., and meet the following minimum specifications:

- A. 120/240 volt, 1 phase, 3 wire
- B. Ampacity necessary to serve all equipment. Service shall be a minimum 100 amp dedicated to the construction field office.
- C. The electrical panel shall include a main circuit breaker and branch circuit breakers of the size and quantity required.
- D. Additional 120 volt, single phase, 20 amp, isolated ground dedicated power circuit with dual NEMA 5-20 receptacles will be installed at each desk and personal computer table (workstation) location.
- E. Additional 120 volt, single phase, 20 amp, isolated ground dedicated power circuit with dual NEMA 5-20 receptacles will be installed, for use by the Telephone Company.
- F. Additional 120-volt circuits and duplex outlets as required meeting National Electric Code requirements.
- G. One exterior (outside) wall mounted GFI receptacle, duplex, isolated ground, 120 volt, straight blade.
- H. After work is complete and prior to energizing, the State's CTDOT electrical inspector, must be contacted at 860-594-2240. (Do Not Call Local Town Officials)
- I. Prior to field office removal, the CTDOT Office of Information Systems (CTDOT OIS) must be notified to deactivate the communications equipment.

Heating, Ventilation and Air Conditioning (HVAC): The field office shall be equipped with sufficient heating, air conditioning and ventilation equipment to maintain a temperature range of 68°-80° Fahrenheit within the field office.

Telephone Service: The Contractor shall provide telephone service with unlimited nation-wide calling plan. For a Small, Medium and Large field office this shall consist of the installation of two (2) telephone lines: one (1) line for phone/voice service and one (1) line dedicated for the facsimile machine. For an Extra-Large field office this shall consist of four (4) telephone lines: three (3) lines for phone/voice service and one (1) line dedicated for facsimile machine. The Contractor shall pay all charges.

Data Communications Facility Wiring: Contractor shall install a Category 6 568B patch panel in a central wiring location and Cat 6 cable from the patch panel to each PC station, Smart Board location, Multifunction Laser Printer/Copier/Scanner/Fax, terminating in a (Category 6 568B) wall or surface mount data jack. The central wiring location shall also house either the data circuit with appropriate power requirements or a category 5 cable run to the location of the installed data circuit. The central wiring location will be determined by the CTDOT OIS staff in coordination with the designated field office personnel as soon as the facility is in place.

For Small, Medium and Large field offices the Contractor shall run a CAT 6 LAN cable a minimum length of 25 feet for each CTDOT networked device (including but not limited to: smartboards and Multi-Function Laser Printer/Copier/Scanner/Fax) to LAN switch area leaving an additional 10 feet of cable length on each side with terminated RJ45 connectors. For an Extra-Large field office the Contractor shall run CAT 6 LAN cables from workstations, install patch panel in data circuit demark area and terminate runs with RJ45 jacks at each device location. Terminate runs to patch panel in LAN switch area. Each run / jack shall be clearly labeled with an identifying Jack Number.

The Contractor shall supply cables to connect the Wi-Fi printer to the Contractor supplied internet router and to workstations/devices as needed. These cables shall be separate from the LAN cables and data Jacks detailed above for the CTDOT network.

The number of networked devices anticipated shall be at least equal to the number of personal computer tables, Multi-Function Laser Printer/Copier/Scanner/Fax, and smartboards listed below.

The installation of a data communication circuit between the field office and the CTDOT OIS in Newington will be coordinated between the CTDOT District staff, CTDOT OIS staff and the local utility company once the Contractor supplies the field office phone numbers and anticipated installation date. The Contractor shall provide the field office telephone number(s) to the CTDOT Project Engineer within 10 calendar days after the signing of the Contract as required by Article 1.08.02. This is required to facilitate data line and computer installations.

Additional Equipment, Facilities and Services: The Contractor shall provide at the field Office at least the following to the satisfaction of the Engineer:

Furnishing Description	Office Size
	Med.
	Quantity
Office desk (2.5 ft. x 5 ft.) with drawers, locks, and matching desk chair that have pneumatic seat height adjustment and dual wheel casters on the base.	3
Standard secretarial type desk and matching desk chair that has pneumatic seat height adjustment and dual wheel casters on the base.	-
Personal computer tables (4 ft. x 2.5 ft.).	3
Drafting type tables (3 ft. x 6 ft.) and supported by wall brackets and legs; and matching drafters stool that have pneumatic seat height adjustment, seat back and dual wheel casters on the base.	1
Conference table, 3 ft. x 12 ft.	-
Table – 3 ft. x 6 ft.	-
Office Chairs.	4
Mail slot bin – legal size.	-
Non-fire resistant cabinet.	-
Fire resistant cabinet (legal size/4 drawer), locking.	1
Storage racks to hold 3 ft. x 5 ft. display charts.	-
Vertical plan racks for 2 sets of 2 ft. x 3 ft. plans for each rack.	1
Double door supply cabinet with 4 shelves and a lock – 6 ft. x 4 ft.	-
Case of cardboard banker boxes (Min 10 boxes/case)	1
Open bookcase – 3 shelves – 3 ft. long.	-
White Dry-Erase Board, 36" x 48" min. with markers and eraser.	1
Interior partitions – 6 ft. x 6 ft., soundproof type, portable and freestanding.	-
Coat rack with 20 coat capacity.	-
Wastebaskets - 30 gal., including plastic waste bags.	1
Wastebaskets - 5 gal., including plastic waste bags.	3
Electric wall clock.	-
Telephone.	1
Full size stapler 20 (sheet capacity, with staples)	2
Desktop tape dispensers (with Tape)	2
8 Outlet Power Strip with Surge Protection	4
Rain Gauge	1
Business telephone system for three lines with ten handsets, intercom capability, and one speaker phone for conference table.	-
Mini refrigerator - 3.2 c.f. min.	1
Hot and cold water dispensing unit. Disposable cups and bottled water shall be supplied by the Contractor for the duration of the project.	1
Microwave, 1.2 c.f. , 1000W min.	1

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Fire extinguishers - provide and install type and *number to meet applicable State and local codes for size of office indicated, including a fire extinguisher suitable for use on a computer terminal fire.	*
Electric pencil sharpeners.	2
Electronic office type printing calculators capable of addition, subtraction, multiplication and division with memory and a supply of printing paper.	1
Small Multi-Function Laser Printer/Copier/Scanner/Fax combination unit, network capable, as specified below under <u>Computer Related Hardware and Software</u> .	1
Large Multi-Function Laser Printer/Copier/Scanner/Fax combination unit, network capable, as specified below under <u>Computer Related Hardware and Software</u> .	
Field Office Wi-Fi Connection as specified below under <u>Computer Related Hardware and Software</u>	1
Wi-Fi Printer as specified below under <u>Computer Related Hardware and Software</u> .	1
Digital Camera as specified below under <u>Computer Related Hardware and Software</u> .	1
Video Projector as specified below under <u>Computer Related Hardware and Software</u> .	-
Smart Board as specified below under <u>Computer Related Hardware and Software</u> .	-
Infrared Thermometer, including annual third party certified calibration, case, and cleaning wipes.	1
Concrete Curing Box as specified below under Concrete Testing Equipment.	1
Concrete Air Meter and accessories as specified below under Concrete Testing Equipment as specified below. Contractor shall provide third party calibration on a quarterly basis.	1
Concrete Slump Cone and accessories as specified below under Concrete Testing Equipment.	1
First Aid Kit	1
Flip Phones as specified under <u>Computer Related Hardware and Software</u> .	-
Smart Phones as specified under <u>Computer Related Hardware and Software</u> .	-

The furnishings and equipment required herein shall remain the property of the Contractor. Any supplies required to maintain or operate the above listed equipment or furnishings shall be provided by the Contractor for the duration of the project.

Computer Related Hardware and Software: The CTDOT will supply by its own means the actual Personal Computers for the CTDOT representatives. The Contractor shall supply the Field Office Wi-Fi Connection, Wi-Fi Printer, Digital Camera(s), Flip Phones, Smart Phones, Multifunction Laser Printer/Copier/Scanner/Fax, Video Projectors, and Smart Board(s) as well as associated hardware and software, must meet the requirements of this specification as well as the latest minimum specifications posted, as of the project advertising date, at CTDOT's web site <http://www.ct.gov/dot/cwp/view.asp?a=1410&q=563904>

Within 10 calendar days after the signing of the Contract but before ordering/purchasing the Wi-Fi Printer (separate from the Multifunction Laser Printer/Copier/Scanner/Fax), Field Office Wi-Fi, Digital Camera(s), Flip Phones, Smart Phones, Multifunction Laser Printer/Copier/Scanner/Fax, Video Projector(s) and Smart Board(s) as well as associated hardware, the Contractor must submit

a copy of their proposed order(s) with catalog cuts and specifications to the Administering CTDOT District for review and approval. The Wi-Fi Printer, Wi-Fi Router, Flip Phones, Smart Phones, digital cameras, Projector(s) and Smart Board(s) will be reviewed by CTDOT District personnel. The Multifunction Laser Printer/Copier/Scanner/Fax will be reviewed by the CTDOT OIS. The Contractor shall not purchase the hardware, software, or services until the Administering CTDOT District informs them that the proposed equipment, software, and services are approved. The Contractor will be solely responsible for the costs of any hardware, software, or services purchased without approval.

The Contractor and/or their internet service provider shall be responsible for the installation and setup of the field office Wi-Fi, Wi-Fi printer, and the configuration of the wireless router as directed by the CTDOT. Installation will be coordinated with CTDOT District and Project personnel.

After the approval of the hardware and software, the Contractor shall contact the designated representatives of the CTDOT administering District, a minimum of 2 working days in advance of the proposed delivery or installation of the Field Office Wi-Fi Connection, Wi-Fi Printer, Digital Camera(s), Flip Phones, Smart Phones, Multifunction Laser Printer/Copier/Scanner/Fax, Video Projectors and Smart Board(s), as well as associated hardware, software, supplies, and support documentation.

The Contractor shall provide all supplies, paper, maintenance, service and repairs (including labor and parts) for the Wi-Fi printers, copiers, field office Wi-Fi, fax machines and other equipment and facilities required by this specification for the duration of the Contract. All repairs must be performed with-in 48 hours. If the repairs require more than a 48 hours then an equal or better replacement must be provided.

Once the Contract has been completed, the hardware and software will remain the property of the Contractor.

First Aid Kit: The Contractor shall supply a first aid kit adequate for the number of personnel expected based on the size of the field office specified and shall keep the first aid kit stocked for the duration that the field office is in service.

Rain Gauge: The Contractor shall supply install and maintain a rain gauge for the duration of the project, meeting these minimum requirements. The rain gauge shall be installed on the top of a post such that the opening of the rain gauge is above the top of the post an adequate distance to avoid splashing of rain water from the top of the post into the rain gauge. The Location of the rain gauge and post shall be approved by the Engineer. The rain gauge shall be made of a durable material and have graduations of 0.1 inches or less with a minimum total column height of 5 inches. If the rain gauge is damaged the Contractor shall replace it prior to the next forecasted storm event at no additional cost.

Concrete Testing Equipment: If the Contract includes items that require compressive strength cylinders for concrete, in accordance with the Schedule of Minimum Testing Requirements for Sampling Materials for Test, the Contractor shall provide the following equipment.



- A) Concrete Cylinder Curing Box – meeting the requirements of Section 6.12 of the Standard Specifications.
- B) Air Meter – The air meter provided shall be in good working order and meet the requirements of AASHTO T 152.
- C) Slump Cone Mold – Slump cone, base plate, and tamping rod shall be provided in like-new condition and meet the requirements of AASHTO T119, Standard Test Method for Slump of Hydraulic-Cement Concrete.

All testing equipment will remain the property of the Contractor at the completion of the project.

**Insurance Policy:** The Contractor shall provide a separate insurance policy, with no deductible, in the minimum amount of five thousand dollars (\$5,000) in order to insure all State-owned data equipment and supplies used in the office against all losses. The Contractor shall be named insured on that policy, and the CTDOT shall be an additional named insured on the policy. These losses shall include, but not be limited to: theft, fire, and physical damage. The CTDOT will be responsible for all maintenance costs of CTDOT owned computer hardware. In the event of loss, the Contractor shall provide replacement equipment in accordance with current CTDOT equipment specifications, within seven days of notice of the loss. If the Contractor is unable to provide the required replacement equipment within seven days, the CTDOT may provide replacement equipment and deduct the cost of the equipment from monies due or which may become due the Contractor under the Contract or under any other contract. The Contractor's financial liability under this paragraph shall be limited to the amount of the insurance coverage required by this paragraph. If the cost of equipment replacement required by this paragraph should exceed the required amount of the insurance coverage, the CTDOT will reimburse the Contractor for replacement costs exceeding the amount of the required coverage.

**Maintenance:** During the occupancy by the CTDOT, the Contractor shall maintain all facilities and furnishings provided under the above requirements, and shall maintain and keep the office quarters clean through the use of weekly professional cleaning to include, but not limited to, washing & waxing floors, cleaning restrooms, removal of trash, etc. Exterior areas shall be mowed and clean of debris. A trash receptacle (dumpster) with weekly pickup (trash removal) shall be provided. Snow removal, sanding and salting of all parking, walkway, and entrance ways areas shall be accomplished during a storm if on a workday during work hours, immediately after a storm and prior to the start of a workday. If snow removal, salting and sanding are not completed by the specified time, the State will provide the service and all costs incurred will be deducted from the next payment estimate.

**Method of Measurement:** The furnishing and maintenance of the construction field office will be measured for payment by the number of calendar months that the office is in place and in operation, rounded up to the nearest month.

There will not be any price adjustment due to any change in the minimum computer related hardware and software requirements.

**Basis of Payment:** The furnishing and maintenance of the Construction Field Office will be paid for at the Contract unit price per month for “Construction Field Office, Medium,” which price shall include all material, equipment, labor, service contracts, licenses, software, repair or replacement of hardware and software, related supplies, utility services, parking area, external illumination, trash removal, snow and ice removal, and work incidental thereto, as well as any other costs to provide requirements of this specified this specification.

Pay Item

Construction Field Office, Medium

Pay Unit

Month

## **ITEM #0971001A – MAINTENANCE AND PROTECTION OF TRAFFIC**

### **Article 9.71.01 – Description is supplemented by the following:**

The Contractor shall maintain and protect traffic as described by the following and as limited in the Special Provision "Prosecution and Progress":

#### **Interstate 95**

The Contractor shall maintain and protect the minimum number of through lanes and shoulders as dictated in the Special Provision for Section 1.08 - Prosecution and Progress "Limitations of Operations - Minimum Number of Lanes to Remain Open" Chart, on a paved travel path not less than 12 feet in width per lane.

The Contractor shall be allowed to halt traffic for a period of time not to exceed 10 minutes for the purpose of lifting or demolition operations. If more than one 10-minute period is required, the Contractor shall allow all stored vehicles to proceed through the work area prior to the next stoppage.

#### **I-95 Ramps**

The Contractor shall maintain and protect existing traffic operations.

Excepted therefrom will be those periods, during the allowable periods, when the Contractor is actively working, at which time the Contractor shall be allowed to maintain and protect a minimum of one lane of traffic, on a paved travel path not less than 12 feet in width.

The Contractor will be allowed to close the Route I-95 Exit 55 northbound and southbound on/off ramps to through traffic and detour traffic as shown on the Detour Plan contained in the contract plans.

#### **U.S. Route 1**

The Contractor shall maintain and protect a minimum of one lane of traffic in each direction, each lane on a paved travel path not less than 11 feet in width.

Where turn lanes exist, the Contractor shall provide an additional 11 feet of paved travel path to be used for turning vehicles only. This additional 11 feet of travel path shall be a minimum length of 100 feet. It shall be implemented so that sufficient storage, taper length, and turning radius are provided.

Excepted therefrom will be those periods, during the allowable periods, when the Contractor is actively working, at which time the Contractor shall maintain and protect at least an alternating one-way traffic operation, on a paved travel path not less than 11 feet in width. The length of the alternating one-way traffic operation shall not exceed 300 feet and there shall be no more than one

alternating one-way traffic operation within the project limits without prior approval of the Engineer.

The Contractor shall be allowed to halt traffic on U.S. Route 1 for a period of time not to exceed 20 minutes for the purpose of structure demolition and the erection of prefabricated bridge units (PBUs). If more than one 20-minute period is required, the Contractor shall allow all stored vehicles to proceed through the work area prior to the next stoppage.

### **All Other Roadways**

The Contractor shall maintain and protect a minimum of one lane of traffic in each direction, each lane on a paved travel path not less than 11 feet in width.

Excepted therefrom will be those periods, during the allowable periods, when the Contractor is actively working, at which time the Contractor shall maintain and protect at least an alternating one-way traffic operation, on a paved travel path not less than 11 feet in width. The length of the alternating one-way traffic operation shall not exceed 300 feet and there shall be no more than one alternating one-way traffic operation within the project limits without prior approval of the Engineer.

### **Commercial and Residential Driveways**

The Contractor shall maintain access to and egress from all commercial and residential driveways throughout the project limits. The Contractor will be allowed to close said driveways to perform the required work during those periods when the businesses are closed, unless permission is granted from the business owner to close the driveway during business hours. If a temporary closure of a residential driveway is necessary, the Contractor shall coordinate with the owner to determine the time period of the closure.

### **Article 9.71.03 - Construction Method is supplemented as follows:**

#### **General**

The Contractor is required to delineate any raised structures within the travel lanes, so that the structures are visible day and night, unless there are specific contract plans and provisions to temporarily lower these structures prior to the completion of work.

The Contractor shall schedule operations so that pavement removal and roadway resurfacing shall be completed full width across a roadway section by the end of a workday (work night), or as directed by the Engineer.

When the installation of all intermediate courses of bituminous concrete pavement is completed for the entire roadway, the Contractor shall install the final course of bituminous concrete pavement.

If applicable, when an existing sign is removed, it shall be either relocated or replaced by a new sign during the same working day.

The Contractor shall not store any material on-site which would present a safety hazard to motorists or pedestrians (e.g. fixed object or obstruct sight lines).

The field installation of a signing pattern shall constitute interference with existing traffic operations and shall not be allowed, except during the allowable periods.

Construction vehicles entering travel lanes at speeds less than the posted speed are interfering with traffic, and shall not be allowed without a lane closure. The lane closure shall be of sufficient length to allow vehicles to enter or exit the work area at posted speeds, in order to merge with existing traffic.

### **Existing Signing**

The Contractor shall maintain all existing overhead and side-mounted signs throughout the project limits during the duration of the project. The Contractor shall temporarily relocate signs and sign supports as many times as deemed necessary, and install temporary sign supports if necessary and as directed by the Engineer.

### **Requirements for Winter**

The Contractor shall schedule a meeting with representatives from the Department including the offices of Maintenance and Traffic, and the Town of Branford to determine what interim traffic control measures the Contractor shall accomplish for the winter to provide safety to the motorists and permit adequate snow removal procedures. This meeting shall be held prior to October 31 of each year and will include, but not be limited to, discussion of the status and schedule of the following items: lane and shoulder widths, pavement restoration, traffic signal work, pavement markings, and signing.

### **Signing Patterns**

The Contractor shall erect and maintain all signing patterns in accordance with the traffic control plans contained herein. Proper distances between advance warning signs and proper taper lengths are mandatory.

### **Pavement Markings - Limited Access Highways, Turning Roadways and Ramps**

During construction, the Contractor shall maintain all pavement markings throughout the limits of the project.

### **Interim Pavement Markings**

The Contractor shall install painted pavement markings, which shall include lane lines (broken lines), edge lines, stop bars, lane-use arrows and gore markings, on each intermediate course of

bituminous concrete pavement and on any milled surface by the end of the work day/night. All painted pavement markings will be paid under the appropriate items.

If the Contractor does not install permanent Epoxy Resin Pavement Markings by the end of the work day/night on exit ramps where the final course of bituminous concrete pavement has been installed, the Contractor shall install temporary 12 inch wide white stop bars. The temporary stop bars shall consist of Temporary Plastic Pavement Marking Tape and shall be installed by the end of the work day/night. Stop bars may consist of two 6 inch wide white markings or three 4 inch wide white markings placed side by side. The Contractor shall remove and dispose of these markings when the permanent Epoxy Resin Pavement Markings are installed. The cost of furnishing, installing and removing the Temporary Plastic Pavement Marking Tape shall be at the Contractor's expense.

If an intermediate course of bituminous concrete pavement will be exposed throughout the winter, then Epoxy Resin Pavement Markings should be installed unless directed otherwise by the Engineer.

### **Final Pavement Markings**

The Contractor should install painted pavement markings on the final course of bituminous concrete pavement by the end of the work day/night. If the painted pavement markings are not installed by the end of the work day/night, then Temporary Plastic Pavement Marking Tape shall be installed as described above and the painted pavement markings shall be installed by the end of the work day/night on Friday of that week.

If Temporary Plastic Pavement Marking Tape is installed, the Contractor shall remove and dispose of these markings when the painted pavement markings are installed. The cost of furnishing, installing and removing the Temporary Plastic Pavement Marking Tape shall be at the Contractor's expense.

The Contractor shall install permanent Epoxy Resin Pavement Markings in accordance with Section 12.10 entitled "Epoxy Resin Pavement Markings" after such time as determined by the Engineer.

### **Pavement Markings -Non-Limited Access Multilane Roadways**

#### **Secondary and Local Roadways**

During construction, the Contractor shall maintain all pavement markings on paved surfaces on all roadways throughout the limits of the project.

### **Interim Pavement Markings**

The Contractor shall install painted pavement markings, which shall include centerlines, edge lines, lane lines (broken lines), lane-use arrows, and stop bars, on each intermediate course of bituminous concrete pavement and on any milled surface by the end of the work day/night. If the next course of bituminous concrete pavement will be placed within seven days, edge lines are not required. The painted pavement markings will be paid under the appropriate items.

If the Contractor will install another course of bituminous concrete pavement within 24 hours, the Contractor may install Temporary Plastic Pavement Marking Tape in place of the painted pavement markings by the end of the work day/night. These temporary pavement markings shall include centerlines, lane lines (broken lines) and stop bars; edge lines are not required. Centerlines shall consist of two 4 inch wide yellow markings, 2 feet in length, side by side, 4 to 6 inches apart, at 40-foot intervals. No passing zones should be posted with signs in those areas where the final centerlines have not been established on two-way roadways. Stop bars may consist of two 6 inch wide white markings or three 4 inch wide white markings placed side by side. The Contractor shall remove and dispose of the Temporary Plastic Pavement Marking Tape when another course of bituminous concrete pavement is installed. The cost of furnishing, installing and removing the Temporary Plastic Pavement Marking Tape shall be at the Contractor's expense.

If an intermediate course of bituminous concrete pavement will be exposed throughout the winter, then Epoxy Resin Pavement Markings should be installed unless directed otherwise by the Engineer.

### **Final Pavement Markings**

The Contractor should install painted pavement markings on the final course of bituminous concrete pavement by the end of the work day/night. If the painted pavement markings are not installed by the end of the work day/night, then Temporary Plastic Pavement Marking Tape shall be installed as described above and the painted pavement markings shall be installed by the end of the work day/night on Friday of that week.

If Temporary Plastic Pavement Marking Tape is installed, the Contractor shall remove and dispose of these markings when the painted pavement markings are installed. The cost of furnishing, installing and removing the Temporary Plastic Pavement Marking Tape shall be at the Contractor's expense.

The Contractor shall install permanent Epoxy Resin Pavement Markings in accordance with Section 12.10 entitled "Epoxy Resin Pavement Markings" after such time as determined by the Engineer.

## **TRAFFIC CONTROL DURING CONSTRUCTION OPERATIONS**

The following guidelines shall assist field personnel in determining when and what type of traffic control patterns to use for various situations. These guidelines shall provide for the safe and efficient movement of traffic through work zones and enhance the safety of work forces in the work area.

### **TRAFFIC CONTROL PATTERNS**

Traffic control patterns shall be used when a work operation requires that all or part of any vehicle or work area protrudes onto any part of a travel lane or shoulder. For each situation, the installation of traffic control devices shall be based on the following:

Speed and volume of traffic  
Duration of operation  
Exposure to hazards

Traffic control patterns shall be uniform, neat and orderly so as to command respect from the motorist.

In the case of a horizontal or vertical sight restriction in advance of the work area, the traffic control pattern shall be extended to provide adequate sight distance for approaching traffic.

If a lane reduction taper is required to shift traffic, the entire length of the taper should be installed on a tangent section of roadway so that the entire taper area can be seen by the motorist.

Any existing signs that are in conflict with the traffic control patterns shall be removed, covered, or turned so that they are not readable by oncoming traffic.

When installing a traffic control pattern, a Buffer Area should be provided and this area shall be free of equipment, workers, materials and parked vehicles.

Typical traffic control plans 19 through 25 may be used for moving operations such as line striping, pot hole patching, mowing, or sweeping when it is necessary for equipment to occupy a travel lane.

Traffic control patterns will not be required when vehicles are on an emergency patrol type activity or when a short duration stop is made and the equipment can be contained within the shoulder. Flashing lights and appropriate trafficperson shall be used when required.

Although each situation must be dealt with individually, conformity with the typical traffic control plans contained herein is required. In a situation not adequately covered by the typical traffic control plans, the Contractor must contact the Engineer for assistance prior to setting up a traffic control pattern.

### **PLACEMENT OF SIGNS**

Signs must be placed in such a position to allow motorists the opportunity to reduce their speed prior to the work area. Signs shall be installed on the same side of the roadway as the work area. On multi-lane divided highways, advance warning signs shall be installed on both sides of the highway. On directional roadways (on-ramps, off-ramps, one-way roads), where the sight distance to signs is restricted, these signs should be installed on both sides of the roadway.

### **ALLOWABLE ADJUSTMENT OF SIGNS AND DEVICES SHOWN ON THE TRAFFIC CONTROL PLANS**



The traffic control plans contained herein show the location and spacing of signs and devices under ideal conditions. Signs and devices should be installed as shown on these plans whenever possible.

The proper application of the traffic control plans and installation of traffic control devices depends on actual field conditions.

Adjustments to the traffic control plans shall be made only at the direction of the Engineer to improve the visibility of the signs and devices and to better control traffic operations. Adjustments to the traffic control plans shall be based on safety of work forces and motorists, abutting property requirements, driveways, side roads, and the vertical and horizontal curvature of the roadway.

The Engineer may require that the traffic control pattern be located significantly in advance of the work area to provide better sight line to the signing and safer traffic operations through the work zone.

Table I indicates the minimum taper length required for a lane closure based on the posted speed limit of the roadway. These taper lengths shall only be used when the recommended taper lengths shown on the traffic control plans cannot be achieved.

**TABLE I – MINIMUM TAPER LENGTHS**

POSTED SPEED LIMIT MILES PER HOUR	MINIMUM TAPER LENGTH IN FEET FOR A SINGLE LANE CLOSURE
30 OR LESS	180
35	250
40	320
45	540
50	600
55	660
65	780

## **SECTION 1. WORK ZONE SAFETY MEETINGS**

- 1.a) Prior to the commencement of work, a work zone safety meeting will be conducted with representatives of DOT Construction, Connecticut State Police (Local Barracks), Municipal Police, the Contractor (Project Superintendent) and the Traffic Control Subcontractor (if different than the prime Contractor) to review the traffic operations, lines of responsibility, and operating guidelines which will be used on the project. Other work zone safety meetings during the course of the project should be scheduled as needed.
- 1.b) A Work Zone Safety Meeting Agenda shall be developed and used at the meeting to outline the anticipated traffic control issues during the construction of this project. Any issues that can't be resolved at these meetings will be brought to the attention of the District Engineer and the Office of Construction. The agenda should include:
- Review Project scope of work and time
  - Review Section 1.08, Prosecution and Progress
  - Review Section 9.70, Trafficpersons
  - Review Section 9.71, Maintenance and Protection of Traffic
  - Review Contractor's schedule and method of operations.
  - Review areas of special concern: ramps, turning roadways, medians, lane drops, etc.
  - Open discussion of work zone questions and issues
  - Discussion of review and approval process for changes in contract requirements as they relate to work zone areas

## **SECTION 2. GENERAL**

- 2.a) If the required minimum number of signs and equipment (i.e. one High Mounted Internally Illuminated Flashing Arrow for each lane closed, two TMAs, Changeable Message Sign, etc.) are not available; the traffic control pattern shall not be installed.**
- 2.b) The Contractor shall have back-up equipment (TMAs, High Mounted Internally Illuminated Flashing Arrow, Changeable Message Sign, construction signs, cones/drums, etc.) available at all times in case of mechanical failures, etc. The only exception to this is in the case of sudden equipment breakdowns in which the pattern may be installed but the Contractor must provide replacement equipment within 24 hours.

- 2.c) Failure of the Contractor to have the required minimum number of signs, personnel and equipment, which results in the pattern not being installed, shall not be a reason for a time extension or claim for loss time.
- 2.d) In cases of legitimate differences of opinion between the Contractor and the Inspection staff, the Inspection staff shall err on the side of safety. The matter shall be brought to the District Office for resolution immediately or, in the case of work after regular business hours, on the next business day.

### **SECTION 3. INSTALLING AND REMOVING TRAFFIC CONTROL PATTERNS**

- 3.a) Lane Closures shall be installed beginning with the advance warning signs and proceeding forward toward the work area.
- 3.b) Lane Closures shall be removed in the reverse order, beginning at the work area, or end of the traffic control pattern, and proceeding back toward the advance warning signs.
- 3.c) Stopping traffic may be allowed:
  - As per the contract for such activities as blasting, steel erection, etc.
  - During paving, milling operations, etc. where, in the middle of the operation, it is necessary to flip the pattern to complete the operation on the other half of the roadway and traffic should not travel across the longitudinal joint or difference in roadway elevation.
  - To move slow moving equipment across live traffic lanes into the work area.
- 3.d) Temporary road closures using Rolling Road Blocks (RRB) may be allowed on limited access highways for operations associated with the installation and removal of temporary lane closures. RRB may be allowed for the installation and removal of lead signs and lane tapers only and shall meet the following requirements:
  - RRB may not start prior to the time allowed in the contract Limitations of Operation for sign pattern installation. Sign pattern removal must be complete prior to the time indicated in the Limitations of Operation for restoring the lanes to traffic.
  - On limited access highways with 4 lanes or more, a RRB may not start until the Limitations of Operation Chart allows a 2 lane closure. In areas with good sight lines and full shoulders, opposite side lead signs should be installed in a separate operation.
  - Truck-Mounted Impact Attenuators (TMAs) equipped with arrow boards shall be used to slow traffic to implement the RRB. State Police Officers in marked vehicles may be used to support the implementation of the RRB. The RRB shall start by having all vehicles, including Truck-Mounted Impact Attenuators TMAs and police vehicles leave the shoulder or on-ramp and accelerate to a normal roadway speeds in each lane, then the vehicles will position themselves side by side and decelerate to the RRB speed on the highway.

- An additional Truck-Mounted Impact Attenuator TMAs equipped with a Portable Changeable Message Sign shall be utilized to advise the motorists that sign pattern installation / removal is underway. The Pre-Warning Vehicle (PWV) should be initially positioned in the right shoulder ½ mile prior to the RRB operation. If a traffic queue reaches the PWV's initial location, the contractor shall slowly reverse the PWV along the shoulder to position itself prior to the new back of queue. A Pre-Warning Vehicle, as specified elsewhere in the contract, shall be utilized to advise the motorists that sign pattern installation / removal is underway.
  - The RRB duration shall not exceed 15 minutes from start of the traffic block until all lanes are opened as designated in the Limitation of Operation chart. If the RRB duration exceeds 15 minutes on 2 successive shifts, no further RRB will be allowed until the Contractor obtains approval for a revised installation procedure from the respective construction District.
  - RRB should not be utilized to expand a lane closure pattern to an additional lane during the shift. The workers and equipment required to implement the additional lane closure should be staged from within the closed lane. Attenuator trucks (and State Police if available) should be used to protect the workers installing the taper in the additional lane.
  - Exceptions to these work procedures may be submitted to the District Office for consideration. A minimum of 2 business days should be allowed for review and approval by the District.
  - The RRB procedures (including any approved exceptions) will be reviewed and discussed by the inspection team and the Contractor in advance of the work. The implementation of the agreed upon plan will be reviewed with the State Police during the Work Zone Safety meeting held before each shift involving temporary lane closures. If the State Police determine that alternative procedures should be implemented for traffic control during the work shift, the Department and Contractor will attempt to resolve any discrepancies with the duty sergeant at the Troop. If the discrepancies are unable to be resolved prior to the start of the shift, the work will proceed as recommended by the Department Trooper. Any unresolved issues will be addressed the following day.
- 3.e) The Contractor must adhere to using the proper signs, placing the signs correctly, and ensuring the proper spacing of signs.
- 3.f) Additional devices are required on entrance ramps, exit ramps, and intersecting roads to warn and/or move traffic into the proper travel path prior to merging/exiting with/from the main line traffic. This shall be completed before installing the mainline pattern past the ramp or intersecting roadway.
- 3.g) Prior to installing a pattern, any conflicting existing signs shall be covered with an opaque material. Once the pattern is removed, the existing signs shall be uncovered.

- 3.h) On limited access roadways, workers are prohibited from crossing the travel lanes to install and remove signs or other devices on the opposite side of the roadway. Any signs or devices on the opposite side of the roadway shall be installed and removed separately.

**SECTION 4. USE OF HIGH MOUNTED INTERNALLY ILLUMINATED FLASHING ARROW**

- 4.a) On limited access roadways, one Flashing Arrow shall be used for each lane that is closed. The Flashing Arrow shall be installed concurrently with the installation of the traffic control pattern and its placement shall be as shown on the traffic control plan. For multiple lane closures, one Flashing Arrow is required for each lane closed. If conditions warrant, additional Flashing Arrows should be employed (i.e.: curves, major ramps, etc.).
- 4.b) On non-limited access roadways, the use of a Flashing Arrow for lane closures is optional. The roadway geometry, sight line distance, and traffic volume should be considered in the decision to use the Flashing Arrow.
- 4.c) The Flashing Arrow shall not be used on two lane, two-way roadways for temporary alternating one-way traffic operations.
- 4.d) The Flashing Arrow board display shall be in the “arrow” mode for lane closure tapers and in the “caution” mode (four corners) for shoulder work, blocking the shoulder, or roadside work near the shoulder. The Flashing Arrow shall be in the “caution” mode when it is positioned in the closed lane.
- 4.e) The Flashing Arrow shall not be used on a multi-lane roadway to laterally shift all lanes of traffic, because unnecessary lane changing may result.

**SECTION 5. USE OF TRUCK MOUNTED OR TRAILER MOUNTED IMPACT ATTENUATOR VEHICLES (TMAs)**

- 5.a) For lane closures on limited access roadways, a minimum of two TMAs shall be used to install and remove traffic control patterns. If two TMAs are not available, the pattern shall not be installed.
- 5.b) On non-limited access roadways, the use of TMAs to install and remove patterns closing a lane(s) is optional. The roadway geometry, sight line distance, and traffic volume should be considered in the decision to utilize the TMAs.
- 5.c) Generally, to establish the advance and transition signing, one TMA shall be placed on the shoulder and the second TMA shall be approximately 1,000 feet ahead blocking the lane. The flashing arrow board mounted on the TMA should be in the “flashing arrow” mode when taking the lane. The sign truck and workers should be immediately ahead of

the second TMA. In no case shall the TMA be used as the sign truck or a work truck. Once the transition is in place, the TMAs shall travel in the closed lane until all Changeable Message Signs, signs, Flashing Arrows, and cones/drums are installed. The flashing arrow board mounted on the TMA should be in the “caution” mode when traveling in the closed lane.

- 5.d) A TMA shall be placed prior to the first work area in the pattern. If there are multiple work areas within the same pattern, then additional TMAs shall be positioned at each additional work area as needed. The flashing arrow board mounted on the TMA should be in the “caution” mode when in the closed lane.
- 5.e) TMAs shall be positioned a sufficient distance prior to the workers or equipment being protected to allow for appropriate vehicle roll-ahead in the event that the TMA is hit, but not so far that an errant vehicle could travel around the TMA and into the work area. For additional placement and use details, refer to the specification entitled “Truck-Mounted or Trailer-Mounted Impact Attenuator”. Some operations, such as paving and concrete repairs, do not allow for placement of the TMA(s) within the specified distances. In these situations, the TMA(s) should be placed at the beginning of the work area and shall be advanced as the paving or concrete operations proceed.
- 5.f) TMAs should be paid in accordance with how the unit is utilized. If it is used as a TMA and is in the proper location as specified, then it should be paid at the specified hourly rate for “Truck-Mounted or Trailer-Mounted Impact Attenuator”. When the TMA is used as a Flashing Arrow, it should be paid at the daily rate for “High Mounted Internally Illuminated Flashing Arrow”. If a TMA is used to install and remove a pattern and is also used as a Flashing Arrow in the same day, then the unit should be paid as a “Truck-Mounted or Trailer-Mounted Impact Attenuator” for the hours used to install and remove the pattern, typically 2 hours (1 hour to install and 1 hour to remove). If the TMA is also used as a Flashing Arrow during the same day, then the unit should be paid at the daily rate as a “High Mounted Internally Illuminated Flashing Arrow”.

## **SECTION 6. USE OF TRAFFIC DRUMS AND TRAFFIC CONES**

- 6.a) Traffic drums shall be used for taper channelization on limited-access roadways, ramps, and turning roadways and to delineate raised catch basins and other hazards.
- 6.b) Traffic drums shall be used in place of traffic cones in traffic control patterns that are in effect for more than a 36-hour duration.
- 6.c) Traffic Cones less than 42 inches in height shall not be used on limited-access roadways or on non-limited access roadways with a posted speed limit of 45 mph and above.

- 6.d) Typical spacing of traffic drums and/or cones shown on the Traffic Control Plans in the Contract are maximum spacings and may be reduced to meet actual field conditions as required.

## **SECTION 7. USE OF (REMOTE CONTROLLED) CHANGEABLE MESSAGE SIGNS (CMS)**

- 7.a) For lane closures on limited access roadways, one CMS shall be used in advance of the traffic control pattern. Prior to installing the pattern, the CMS shall be installed and in operation, displaying the appropriate lane closure information (i.e.: Left Lane Closed - Merge Right). The CMS shall be positioned ½ - 1 mile ahead of the lane closure taper. If the nearest Exit ramp is greater than the specified ½ - 1 mile distance, than an additional CMS shall be positioned a sufficient distance ahead of the Exit ramp to alert motorists to the work and therefore offer them an opportunity to take the exit.
- 7.b) CMS should not be installed within 1000 feet of an existing CMS.
- 7.c) On non-limited access roadways, the use of CMS for lane closures is optional. The roadway geometry, sight line distance, and traffic volume should be considered in the decision to use the CMS.
- 7.d) The advance CMS is typically placed off the right shoulder, 5 feet from the edge of pavement. In areas where the CMS cannot be placed beyond the edge of pavement, it may be placed on the paved shoulder with a minimum of five (5) traffic drums placed in a taper in front of it to delineate its position. The advance CMS shall be adequately protected if it is used for a continuous duration of 36 hours or more.
- 7.e) When the CMS are no longer required, they should be removed from the clear zone and have the display screen cleared and turned 90° away from the roadway.
- 7.f) The CMS generally should not be used for generic messages (ex: Road Work Ahead, Bump Ahead, Gravel Road, etc.).
- 7.g) The CMS should be used for specific situations that need to command the motorist's attention which cannot be conveyed with standard construction signs (Examples include: Exit 34 Closed Sat/Sun - Use Exit 35, All Lanes Closed - Use Shoulder, Workers on Road - Slow Down).
- 7.h) Messages that need to be displayed for long periods of time, such as during stage construction, should be displayed with construction signs. For special signs, please coordinate with the Office of Construction and the Division of Traffic Engineering for the proper layout/dimensions required.
- 7.i) The messages that are allowed on the CMS are as follows:

<u>Message No.</u>	<u>Frame 1</u>	<u>Frame 2</u>	<u>Message No.</u>	<u>Frame 1</u>	<u>Frame 2</u>
1	LEFT LANE CLOSED	MERGE RIGHT	9	LANES CLOSED AHEAD	REDUCE SPEED
2	2 LEFT LANES CLOSED	MERGE RIGHT	10	LANES CLOSED AHEAD	USE CAUTION
3	LEFT LANE CLOSED	REDUCE SPEED	11	WORKERS ON ROAD	REDUCE SPEED
4	2 LEFT LANES CLOSED	REDUCE SPEED	12	WORKERS ON ROAD	SLOW DOWN
5	RIGHT LANE CLOSED	MERGE LEFT	13	EXIT XX CLOSED	USE EXIT YY
6	2 RIGHT LANES CLOSED	MERGE LEFT	14	EXIT XX CLOSED USE YY	FOLLOW DETOUR
7	RIGHT LANE CLOSED	REDUCE SPEED	15	2 LANES SHIFT AHEAD	USE CAUTION
8	2 RIGHT LANES CLOSED	REDUCE SPEED	16	3 LANES SHIFT AHEAD	USE CAUTION

For any other message(s), approval must be received from the Office of Construction prior to their use. No more than two (2) displays shall be used within any message cycle.



## **SECTION 8. USE OF STATE POLICE OFFICERS**

- 8.a) State Police may be utilized only on limited access highways and secondary roadways under their primary jurisdiction. One Officer may be used per critical sign pattern. Shoulder closures and right lane closures can generally be implemented without the presence of a State Police Officer. Likewise in areas with moderate traffic and wide, unobstructed medians, left lane closures can be implemented without State Police presence. Under some situations it may be desirable to have State Police presence, when one is available. Examples of this include: nighttime lane closures; left lane closures with minimal width for setting up advance signs and staging; lane and shoulder closures on turning roadways/ramps or mainline where sight distance is minimal; and closures where extensive turning movements or traffic congestion regularly occur, however they are not required.
- 8.b) Once the pattern is in place, the State Police Officer should be positioned in a non-hazardous location in advance of the pattern. If traffic backs up beyond the beginning of the pattern, then the State Police Officer shall be repositioned prior to the backup to give warning to the oncoming motorists. The State Police Officer and TMA should not be in proximity to each other.
- 8.c) Other functions of the State Police Officer(s) may include:
- Assisting entering/exiting construction vehicles within the work area.
  - Enforcement of speed and other motor vehicle laws within the work area, if specifically requested by the project.
- 8.d) State Police Officers assigned to a work site are to only take direction from the Engineer.

## NOTES FOR TRAFFIC CONTROL PLANS

1. IF A TRAFFIC STOPPAGE OCCURS IN ADVANCE OF SIGN (A), THEN AN ADDITIONAL SIGN (A) SHALL BE INSTALLED IN ADVANCE OF THE STOPPAGE.
2. SIGNS (AA), (A), AND (D) SHOULD BE OMITTED WHEN THESE SIGNS HAVE ALREADY BEEN INSTALLED TO DESIGNATE A LARGER WORK ZONE THAN THE WORK ZONE THAT IS ENCOMPASSED ON THIS PLAN.
3. SEE TABLE 1 FOR ADJUSTMENT OF TAPERS IF NECESSARY.
4. IF THIS PLAN REMAINS IN CONTINUOUS OPERATION FOR MORE THAN 36 HOURS, THEN TRAFFIC DRUMS SHALL BE USED IN PLACE OF TRAFFIC CONES.
5. ANY LEGAL SPEED LIMIT SIGNS WITHIN THE LIMITS OF A ROADWAY / LANE CLOSURE AREA SHALL BE COVERED WITH AN OPAQUE MATERIAL WHILE THE CLOSURE IS IN EFFECT, AND UNCOVERED WHEN THE ROADWAY / LANE CLOSURE IS RE-OPENED TO ALL LANES OF TRAFFIC.
6. IF THIS PLAN REMAINS IN CONTINUOUS OPERATION FOR MORE THAN 36 HOURS, THEN ANY EXISTING CONFLICTING PAVEMENT MARKINGS SHALL BE ERADICATED OR COVERED, AND TEMPORARY PAVEMENT MARKINGS THAT DELINEATE THE PROPER TRAVELPATHS SHALL BE INSTALLED.
7. DISTANCES BETWEEN SIGNS IN THE ADVANCE WARNING AREA MAY BE REDUCED TO 100' ON LOW-SPEED URBAN ROADS (SPEED LIMIT < 40 MPH).
8. IF THIS PLAN IS TO REMAIN IN OPERATION DURING THE HOURS OF DARKNESS, INSTALL BARRICADE WARNING LIGHTS - HIGH INTENSITY ON ALL POST-MOUNTED DIAMOND SIGNS IN THE ADVANCE WARNING AREA.
9. A CHANGEABLE MESSAGE SIGN SHALL BE INSTALLED ONE HALF TO ONE MILE IN ADVANCE OF THE LANE CLOSURE TAPER.
10. SIGN (P) SHALL BE MOUNTED A MINIMUM OF 7 FEET FROM THE PAVEMENT SURFACE TO THE BOTTOM OF THE SIGN.

TABLE 1 - MINIMUM TAPER LENGTHS

POSTED SPEED LIMIT (MILES PER HOUR)	MINIMUM TAPER LENGTH FOR A SINGLE LANE CLOSURE
30 OR LESS	180' (55m)
35	250' (75m)
40	320' (100m)
45	540' (165m)
50	600' (180m)
55	660' (200m)
65	780' (240m)

METRIC CONVERSION CHART (1" = 25mm)

ENGLISH	METRIC	ENGLISH	METRIC	ENGLISH	METRIC
12"	300mm	42"	1050mm	72"	1800mm
18"	450mm	48"	1200mm	78"	1950mm
24"	600mm	54"	1350mm	84"	2100mm
30"	750mm	60"	1500mm	90"	2250mm
36"	900mm	66"	1650mm	96"	2400mm



SCALE: NONE

### CONSTRUCTION TRAFFIC CONTROL PLAN NOTES

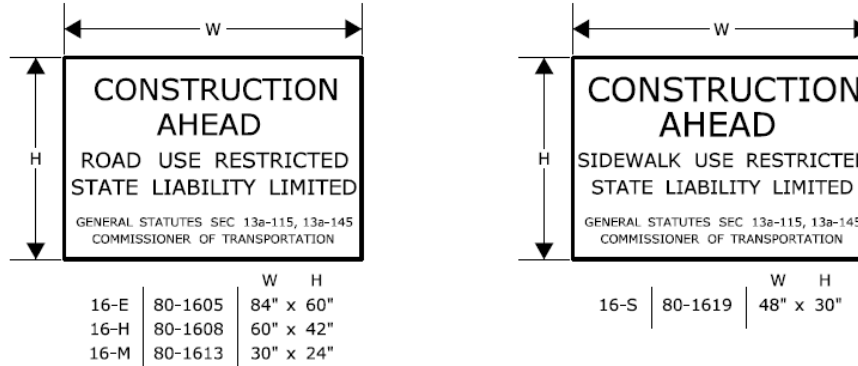
CONNECTICUT DEPARTMENT OF TRANSPORTATION  
BUREAU OF ENGINEERING & CONSTRUCTION

APPROVED

*Charles S. Harlow*  
PRINCIPAL ENGINEER

Charles S. Harlow  
2012.06.05 15:50:35-0400

### SERIES 16 SIGNS



THE 16-S SIGN SHALL BE USED ON ALL PROJECTS THAT REQUIRE SIDEWALK RECONSTRUCTION OR RESTRICT PEDESTRIAN TRAVEL ON AN EXISTING SIDEWALK.

SERIES 16 SIGNS SHALL BE INSTALLED IN ADVANCE OF THE TRAFFIC CONTROL PATTERNS TO ALLOW MOTORISTS THE OPPORTUNITY TO AVOID A WORK ZONE. SERIES 16 SIGNS SHALL BE INSTALLED ON ANY MAJOR INTERSECTING ROADWAYS THAT APPROACH THE WORK ZONE. ON LIMITED-ACCESS HIGHWAYS, THESE SIGNS SHALL BE LOCATED IN ADVANCE OF THE NEAREST UPSTREAM EXIT RAMP AND ON ANY ENTRANCE RAMPS PRIOR TO OR WITHIN THE WORK ZONE LIMITS.

THE LOCATION OF SERIES 16 SIGNS CAN BE FOUND ELSEWHERE IN THE PLANS OR INSTALLED AS DIRECTED BY THE ENGINEER.

SIGNS 16-E AND 16-H SHALL BE POST-MOUNTED.

SIGN 16-E SHALL BE USED ON ALL EXPRESSWAYS.

SIGN 16-H SHALL BE USED ON ALL RAMPS, OTHER STATE ROADWAYS, AND MAJOR TOWN/CITY ROADWAYS.

SIGN 16-M SHALL BE USED ON OTHER TOWN ROADWAYS.

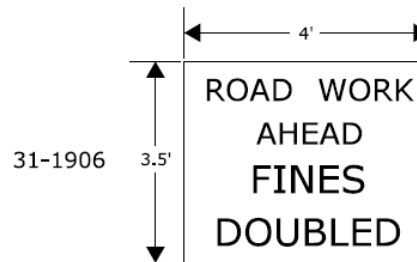
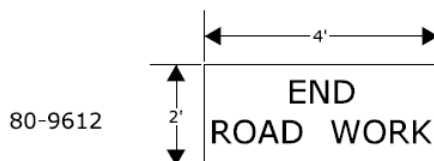
### REGULATORY SIGN "ROAD WORK AHEAD, FINES DOUBLED"

THE REGULATORY SIGN "ROAD WORK AHEAD FINES DOUBLED" SHALL BE INSTALLED FOR ALL WORK ZONES THAT OCCUR ON ANY STATE HIGHWAY IN CONNECTICUT WHERE THERE ARE WORKERS ON THE HIGHWAY OR WHEN THERE IS OTHER THAN EXISTING TRAFFIC OPERATIONS.

THE "ROAD WORK AHEAD FINES DOUBLED" REGULATORY SIGN SHALL BE PLACED AFTER THE SERIES 16 SIGN AND IN ADVANCE OF THE "ROAD WORK AHEAD" SIGN.

### "END ROAD WORK" SIGN

THE LAST SIGN IN THE PATTERN MUST BE THE "END ROAD WORK" SIGN.

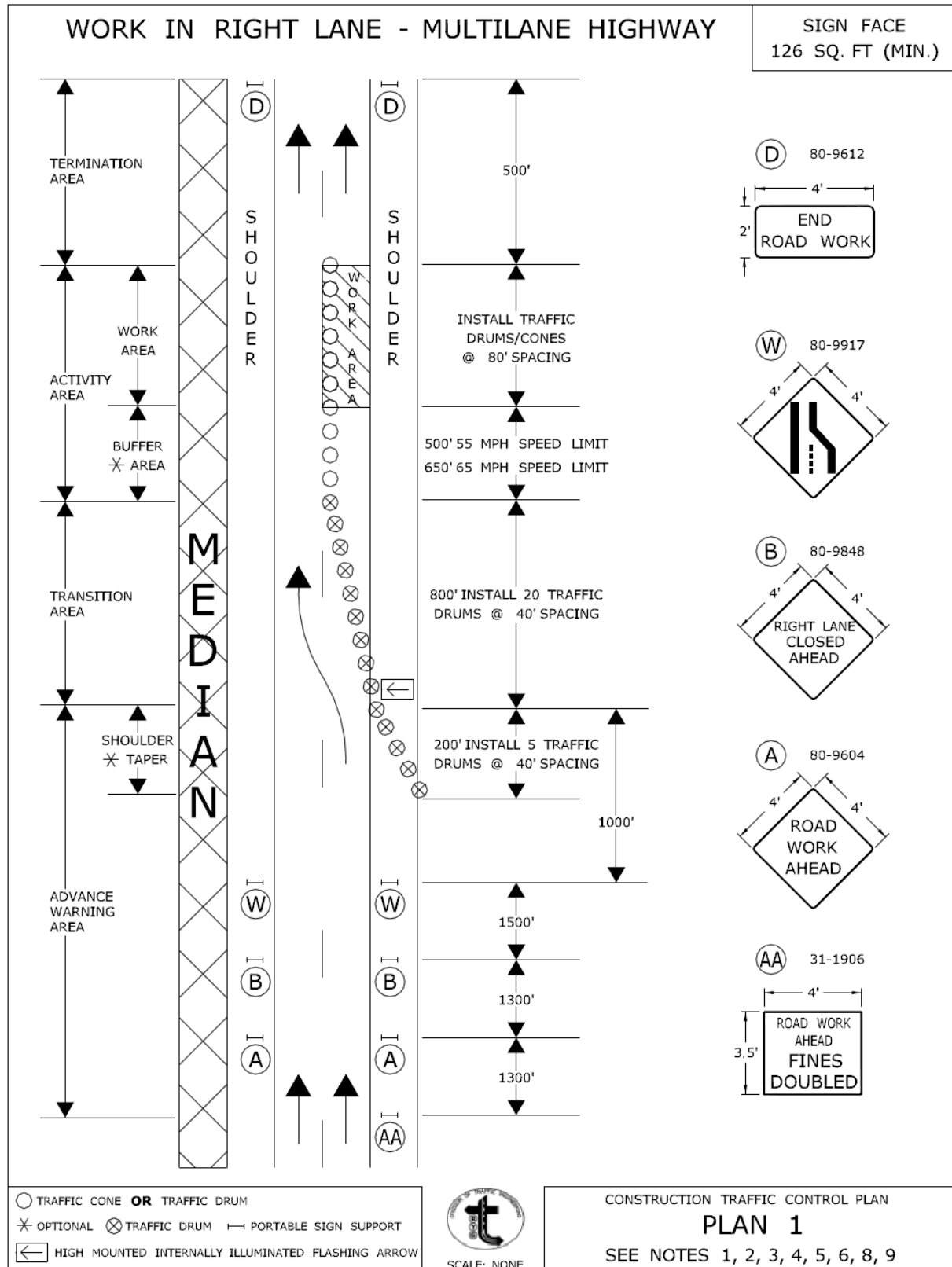


SCALE: NONE

CONSTRUCTION TRAFFIC CONTROL PLAN  
REQUIRED SIGNS

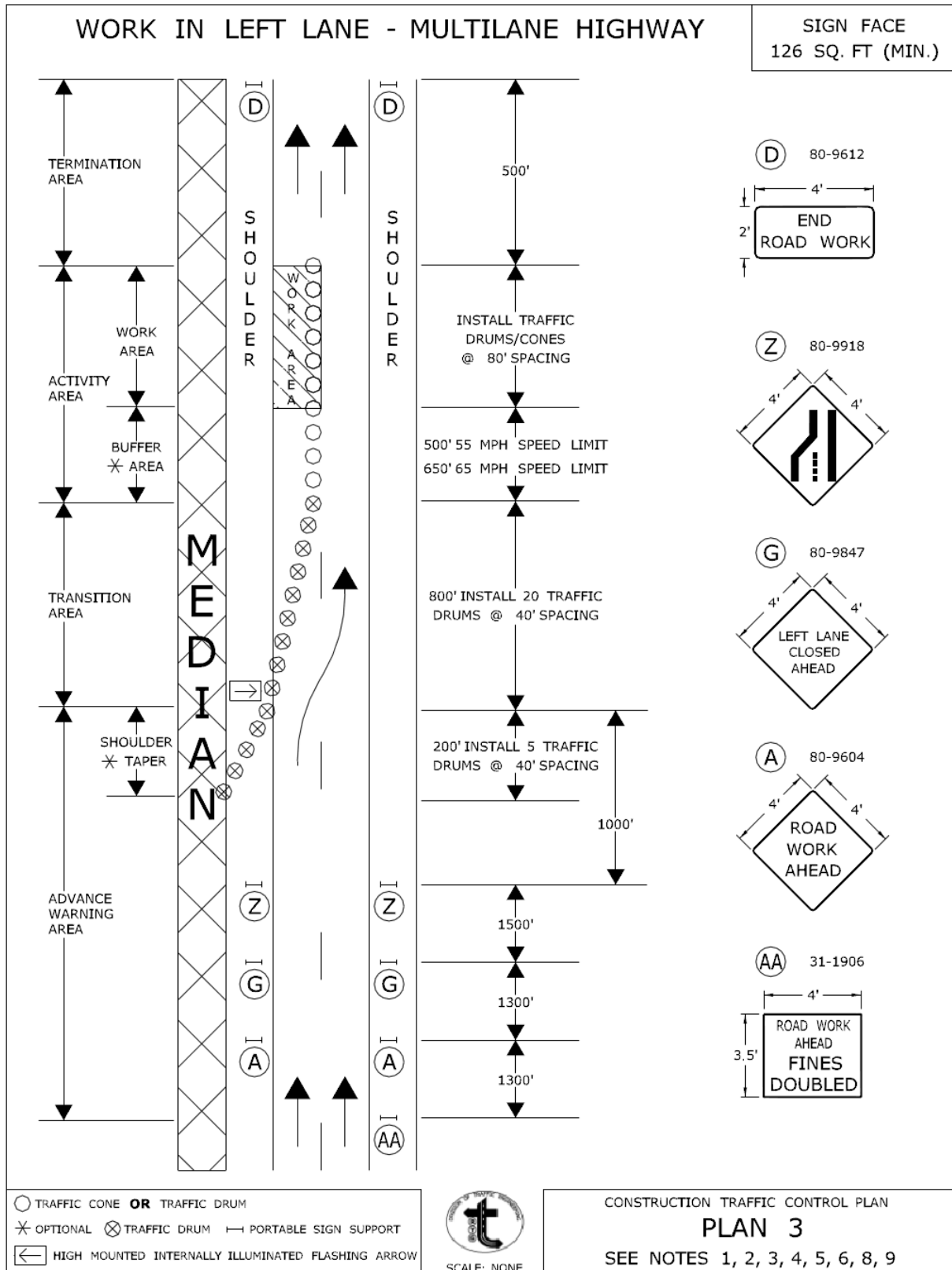
CONNECTICUT DEPARTMENT OF TRANSPORTATION  
BUREAU OF ENGINEERING & CONSTRUCTION

APPROVED *Charles S. Harlow*  
PRINCIPAL ENGINEER  
Charles S. Harlow  
2012.06.05 11:35:43-04'00'



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APPROVED *Charles S. Harlow*  
Charles S. Harlow  
2012.06.05 15:51:00-0400  
PRINCIPAL ENGINEER

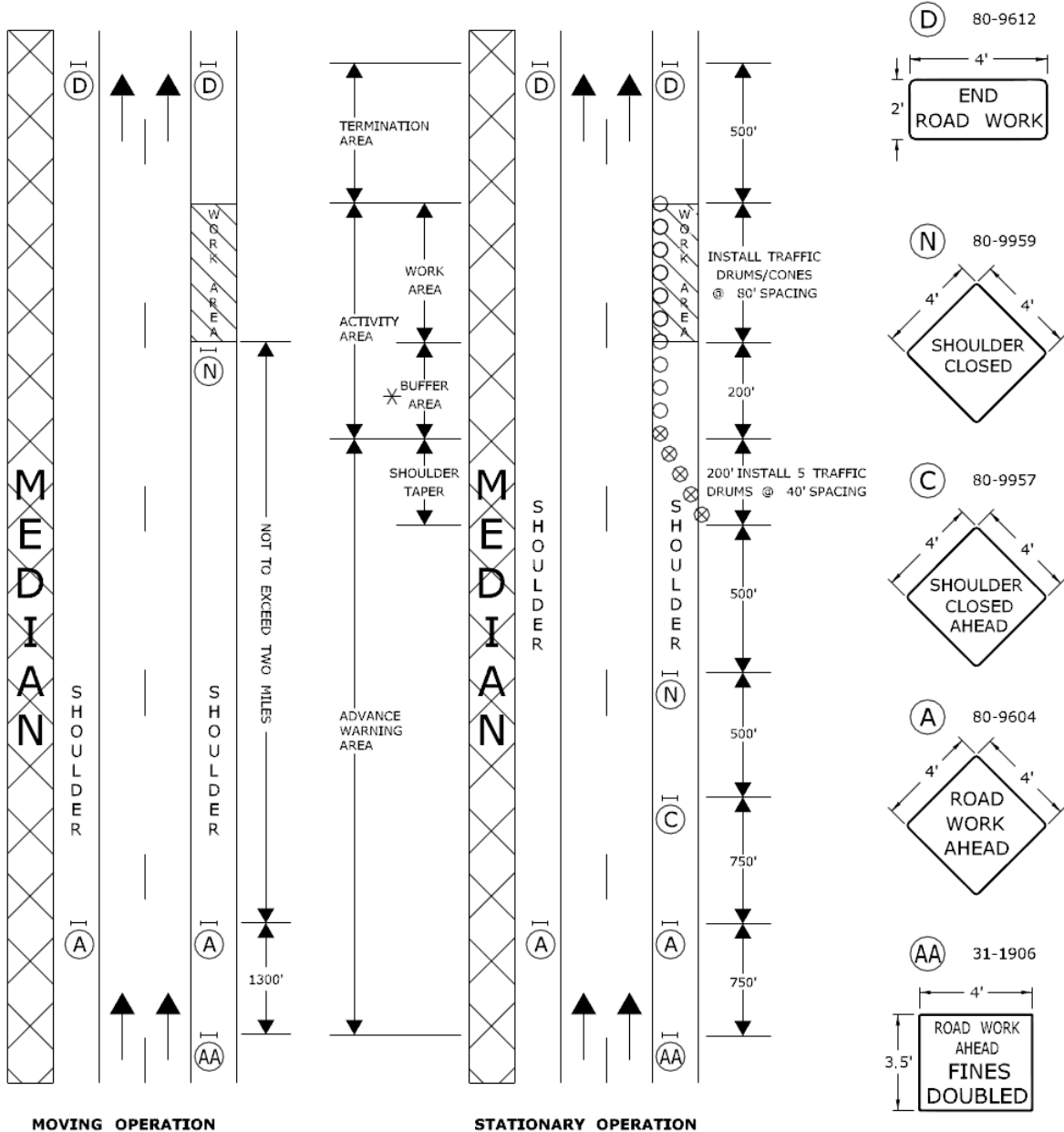


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PRINCIPAL ENGINEER  
Charles S. Harlow  
2012.06.05 15:51:46-0400

**WORK IN SHOULDER AREA - MULTILANE HIGHWAY**

SIGN FACE  
94 SQ. FT (MIN.)



- TRAFFIC CONE OR TRAFFIC DRUM
- \* OPTIONAL ⊗ TRAFFIC DRUM — PORTABLE SIGN SUPPORT
- ◀ HIGH MOUNTED INTERNALLY ILLUMINATED FLASHING ARROW



SCALE: NONE

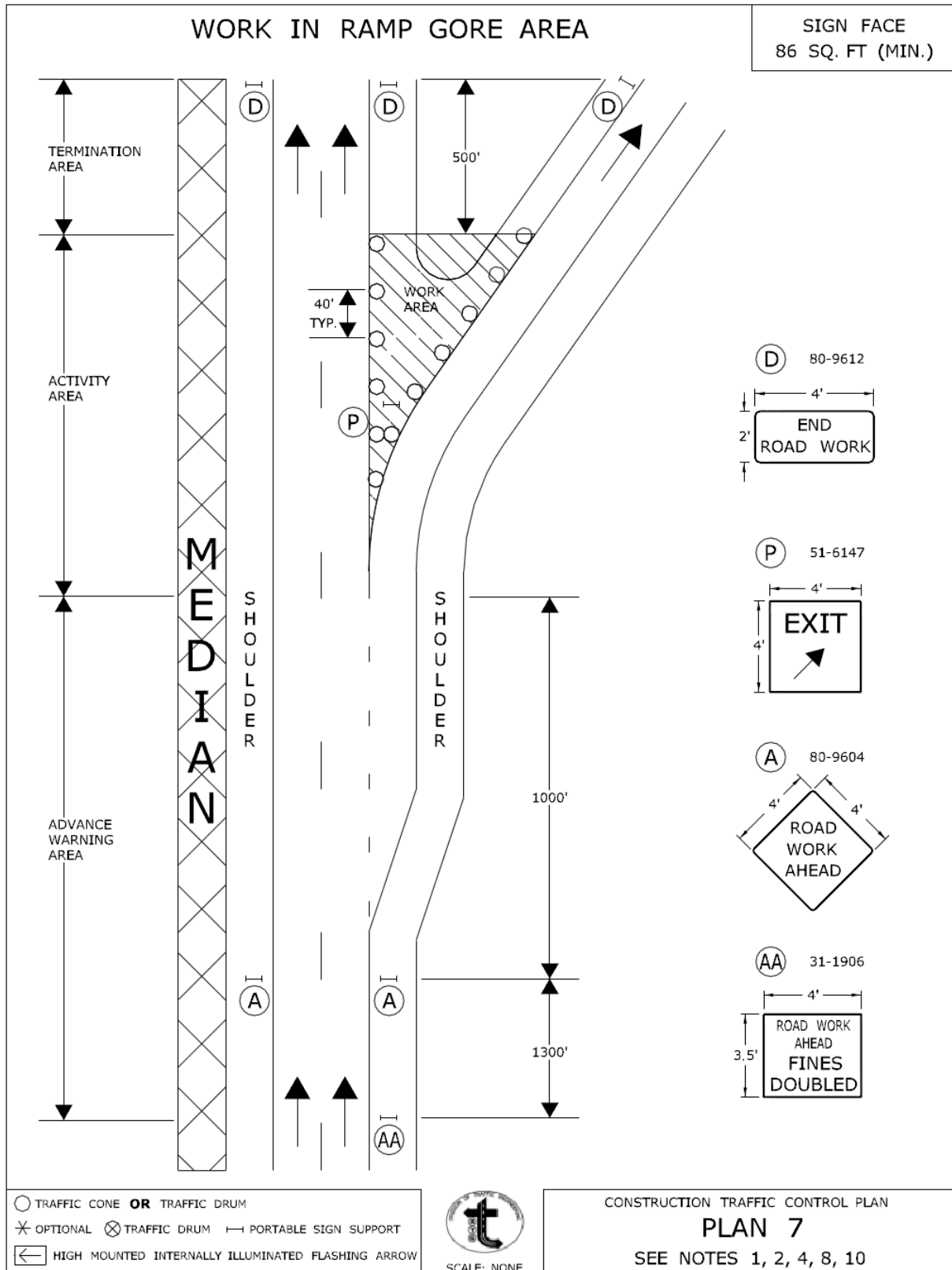
CONSTRUCTION TRAFFIC CONTROL PLAN

**PLAN 6**

SEE NOTES 1, 2, 4, 8

CONNECTICUT DEPARTMENT OF TRANSPORTATION  
BUREAU OF ENGINEERING & CONSTRUCTION

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PRINCIPAL ENGINEER  
2012.06.05 15:52:38-04'00"

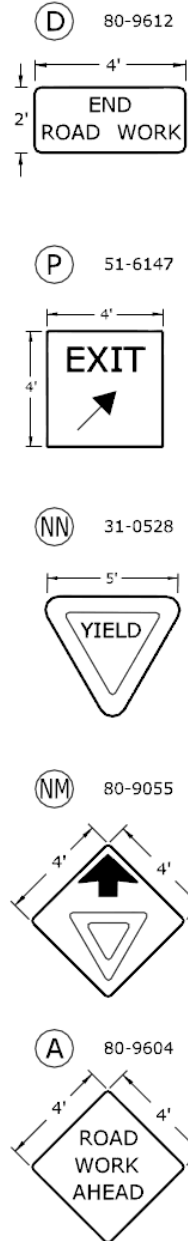
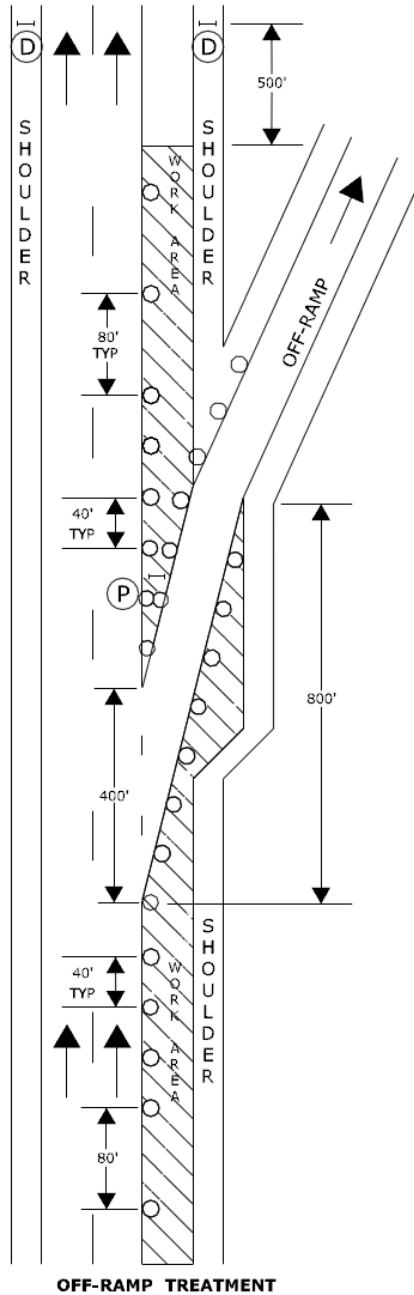
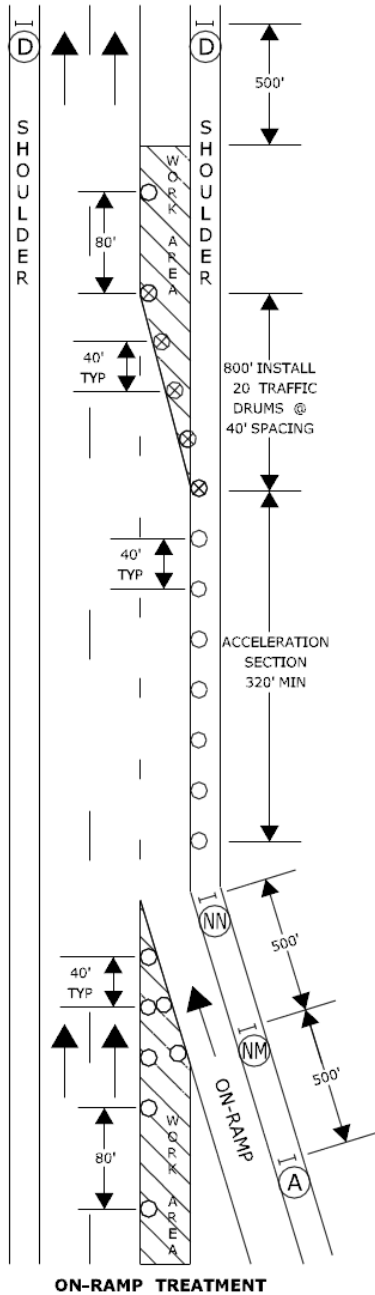


CONNECTICUT DEPARTMENT OF TRANSPORTATION  
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APPROVED *Charles S. Harlow* Charles S. Harlow  
2012.06.05 15:53:03-0400  
PRINCIPAL ENGINEER

## TYPICAL RAMP TREATMENTS FOR MAINLINE LANE CLOSURE - MULTILANE HIGHWAY

SIGN FACE  
SQ. FT VARIES



USE TRAFFIC CONTROL PLAN 1 TO CLOSE THE RIGHT LANE

- TRAFFIC CONE OR TRAFFIC DRUM
- ✱ OPTIONAL ⊗ TRAFFIC DRUM — PORTABLE SIGN SUPPORT
- ◀ HIGH MOUNTED INTERNALLY ILLUMINATED FLASHING ARROW



SCALE: NONE

CONSTRUCTION TRAFFIC CONTROL PLAN  
**PLAN 8**  
SEE NOTES 1, 2, 3, 4, 5, 6, 8, 9, 10

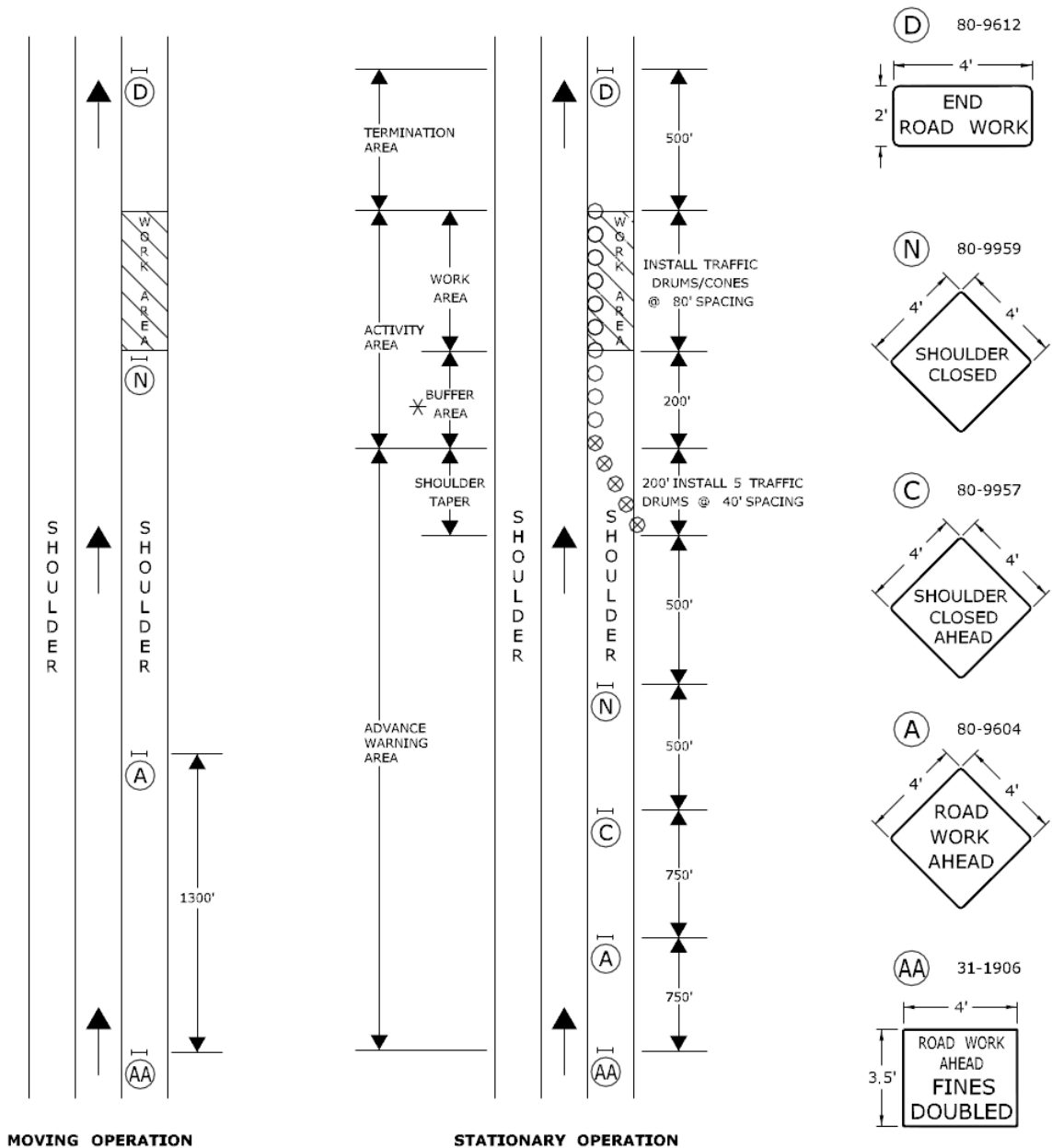
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BUREAU OF ENGINEERING & CONSTRUCTION

APPROVED *Charles S. Harlow*  
PRINCIPAL ENGINEER  
Charles S. Harlow  
2012.06.05 15:53:31-0400'



WORK IN SHOULDER AREA - TURNING ROADWAYS / RAMPS

SIGN FACE  
70 SQ. FT (MIN.)



- TRAFFIC CONE **OR** TRAFFIC DRUM
- \* OPTIONAL ⊗ TRAFFIC DRUM — PORTABLE SIGN SUPPORT
- ◀ HIGH MOUNTED INTERNALLY ILLUMINATED FLASHING ARROW



SCALE: NONE

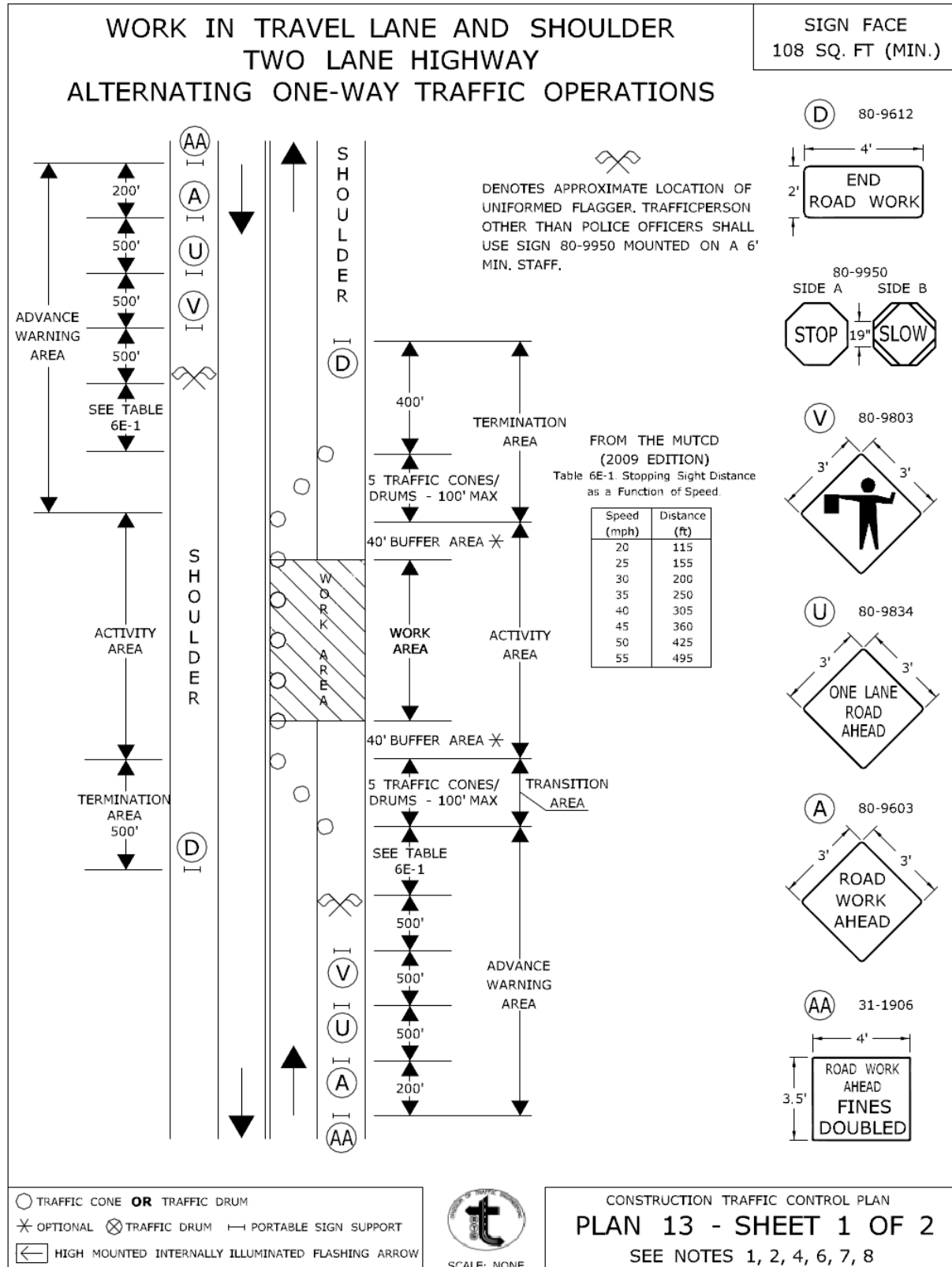
CONSTRUCTION TRAFFIC CONTROL PLAN

**PLAN 9**

SEE NOTES 1, 2, 4, 8

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APPROVED *Charles S. Harlow*  
PRINCIPAL ENGINEER  
Charles S. Harlow  
2012.06.05 15:53:0400'



- TRAFFIC CONE **OR** TRAFFIC DRUM
- ✱ OPTIONAL ✕ TRAFFIC DRUM — PORTABLE SIGN SUPPORT
- ◀ HIGH MOUNTED INTERNALLY ILLUMINATED FLASHING ARROW



SCALE: NONE

CONSTRUCTION TRAFFIC CONTROL PLAN  
**PLAN 13 - SHEET 1 OF 2**  
SEE NOTES 1, 2, 4, 6, 7, 8

CONNECTICUT DEPARTMENT OF TRANSPORTATION  
BUREAU OF ENGINEERING & CONSTRUCTION

APPROVED *Charles S. Harlow* Charles S. Harlow  
2012.06.05 15:55:23-04'00"  
PRINCIPAL ENGINEER

# WORK IN TRAVEL LANE AND SHOULDER TWO LANE HIGHWAY ALTERNATING ONE-WAY TRAFFIC OPERATIONS

SIGN FACE  
108 SQ. FT (MIN.)

## HAND SIGNAL METHODS TO BE USED BY UNIFORMED FLAGGERS

THE FOLLOWING METHODS FROM SECTION 6E.07, FLAGGER PROCEDURES, IN THE "MANUAL ON UNIFORM TRAFFIC CONTROL DEVICES," SHALL BE USED BY UNIFORMED FLAGGERS WHEN DIRECTING TRAFFIC THROUGH A WORK AREA. THE STOP/SLOW SIGN PADDLE (SIGN NO. 80-9950) SHOWN ON THE TRAFFIC STANDARD SHEET TR-1220 01 ENTITLED, "SIGNS FOR CONSTRUCTION AND PERMIT OPERATIONS" SHALL BE USED.

**A. TO STOP TRAFFIC**

TO STOP ROAD USERS, THE FLAGGER SHALL FACE ROAD USERS AND AIM THE STOP PADDLE FACE TOWARD ROAD USERS IN A STATIONARY POSITION WITH THE ARM EXTENDED HORIZONTALLY AWAY FROM THE BODY. THE FREE ARM SHALL BE HELD WITH THE PALM OF THE HAND ABOVE SHOULDER LEVEL TOWARD APPROACHING TRAFFIC.



**B. TO DIRECT TRAFFIC TO PROCEED**

TO DIRECT STOPPED ROAD USERS TO PROCEED, THE FLAGGER SHALL FACE ROAD USERS WITH THE SLOW PADDLE FACE AIMED TOWARD ROAD USERS IN A STATIONARY POSITION WITH THE ARM EXTENDED HORIZONTALLY AWAY FROM THE BODY. THE FLAGGER SHALL MOTION WITH THE FREE HAND FOR ROAD USERS TO PROCEED.



**C. TO ALERT OR SLOW TRAFFIC**

TO ALERT OR SLOW TRAFFIC, THE FLAGGER SHALL FACE ROAD USERS WITH THE SLOW PADDLE FACE AIMED TOWARD ROAD USERS IN A STATIONARY POSITION WITH THE ARM EXTENDED HORIZONTALLY AWAY FROM THE BODY. TO FURTHER ALERT OR SLOW TRAFFIC, THE FLAGGER HOLDING THE SLOW PADDLE FACE TOWARD ROAD USERS MAY MOTION UP AND DOWN WITH THE FREE HAND, PALM DOWN.



- TRAFFIC CONE **OR** TRAFFIC DRUM
- \* OPTIONAL ⊗ TRAFFIC DRUM — PORTABLE SIGN SUPPORT
- ◀ HIGH MOUNTED INTERNALLY ILLUMINATED FLASHING ARROW

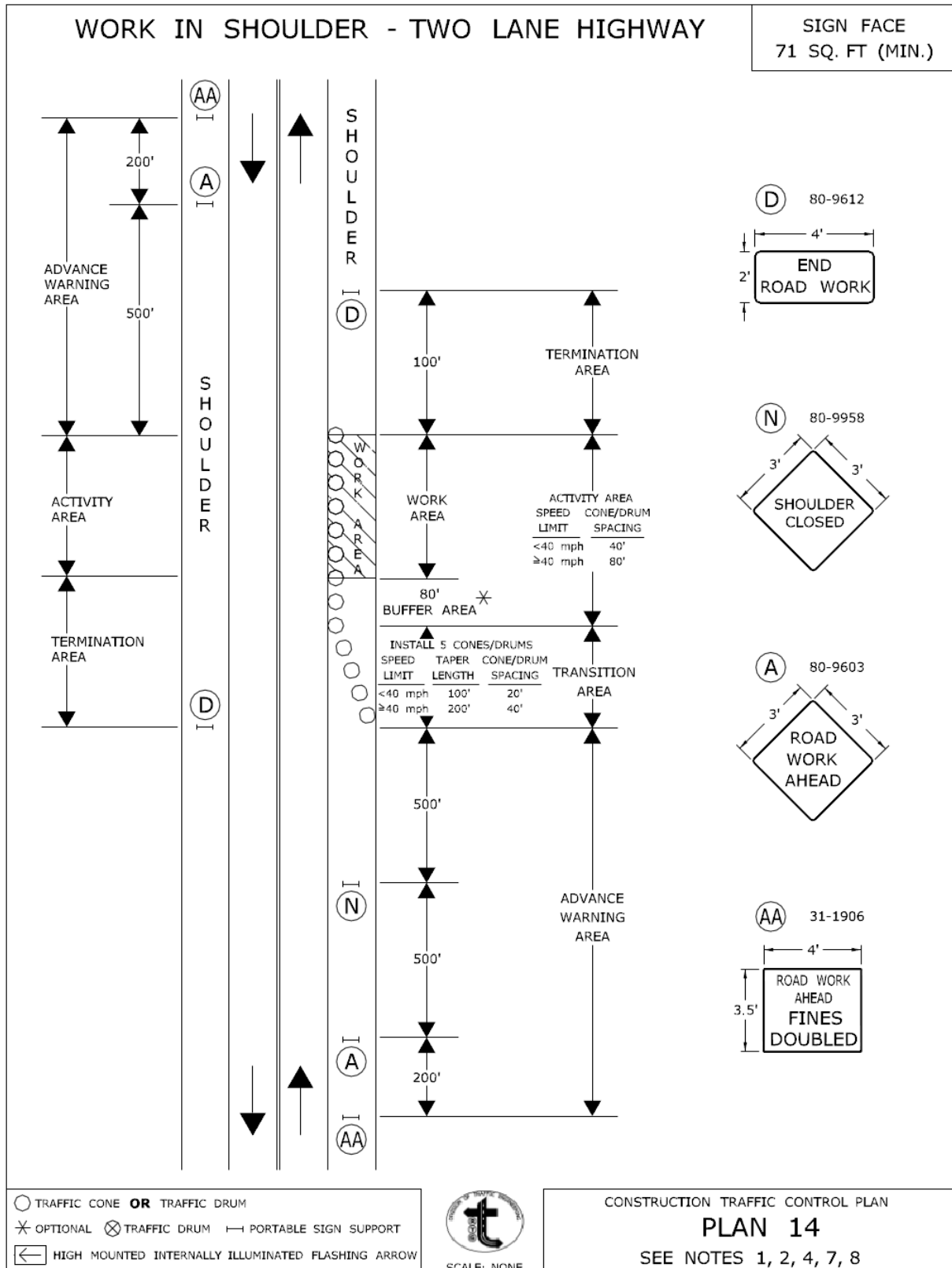


SCALE: NONE

CONSTRUCTION TRAFFIC CONTROL PLAN  
**PLAN 13 - SHEET 2 OF 2**  
SEE NOTES 1, 2, 4, 6, 7, 8

CONNECTICUT DEPARTMENT OF TRANSPORTATION  
BUREAU OF ENGINEERING & CONSTRUCTION

APPROVED Charles S. Harlow  
2012.06.05 15:55:45-04'00"  
PRINCIPAL ENGINEER



- TRAFFIC CONE **OR** TRAFFIC DRUM
- ✱ OPTIONAL ⊗ TRAFFIC DRUM — PORTABLE SIGN SUPPORT
- ◀ HIGH MOUNTED INTERNALLY ILLUMINATED FLASHING ARROW



SCALE: NONE

CONSTRUCTION TRAFFIC CONTROL PLAN

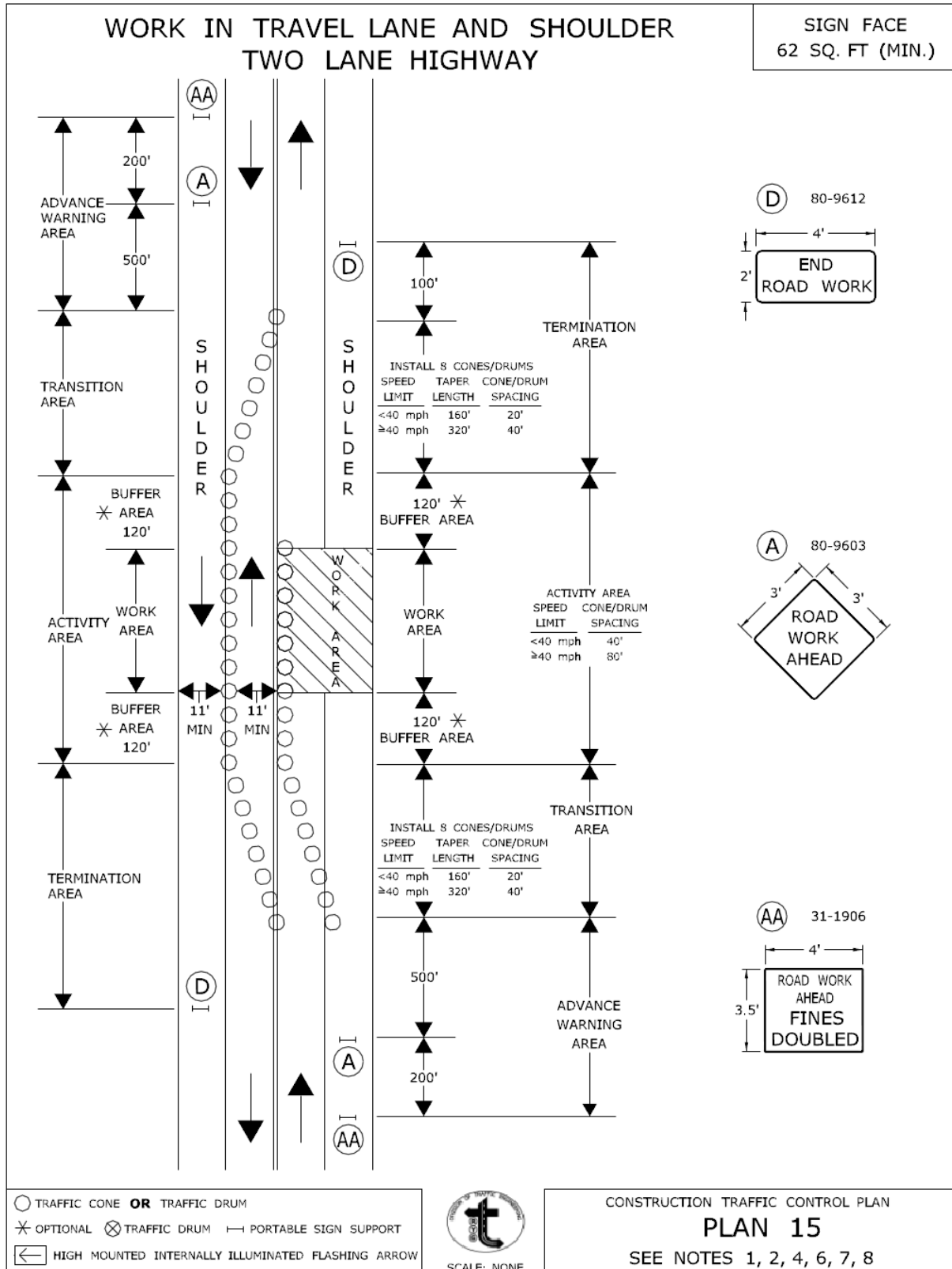
### PLAN 14

SEE NOTES 1, 2, 4, 7, 8

CONNECTICUT DEPARTMENT OF TRANSPORTATION  
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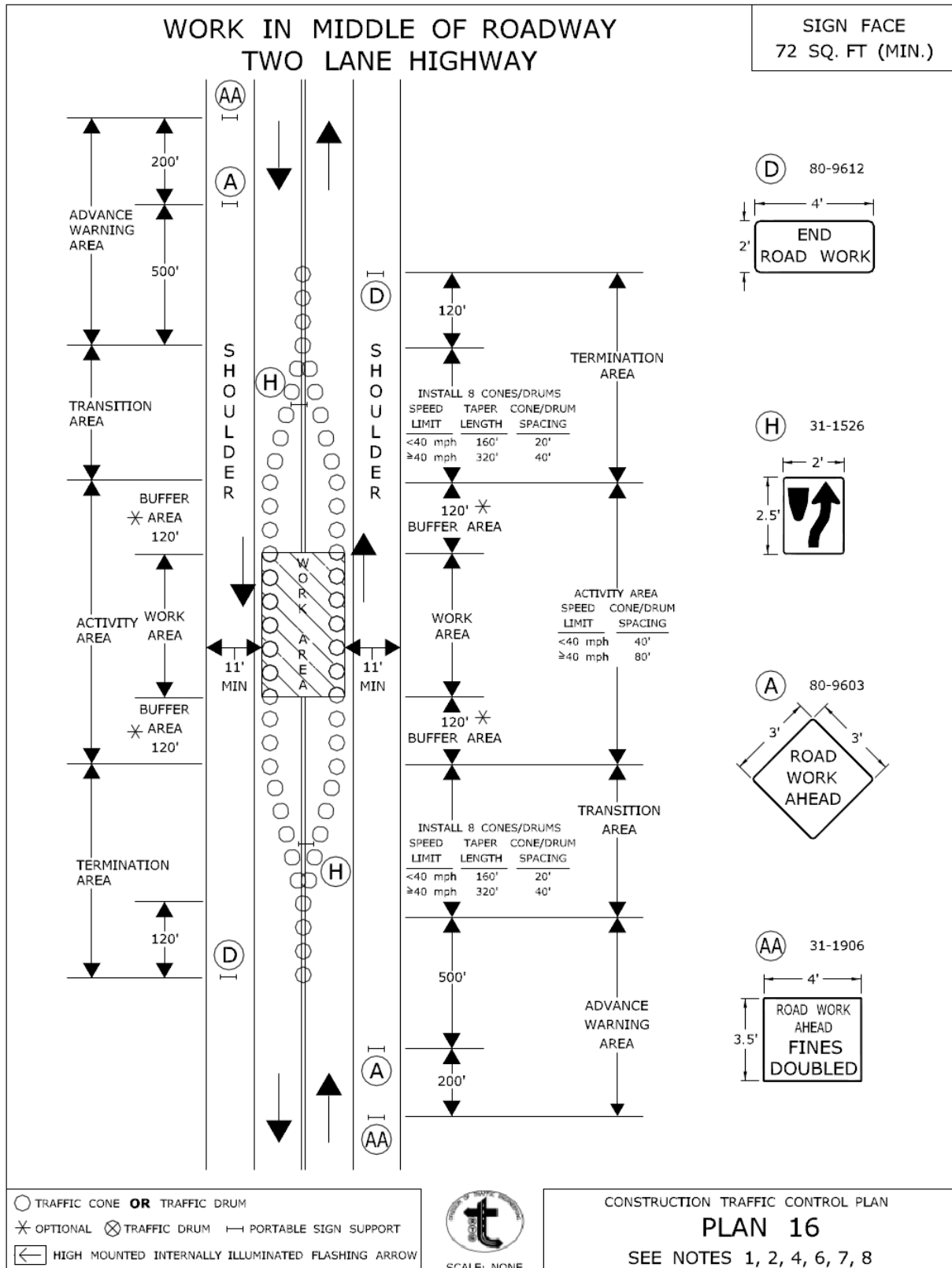
APPROVED

*Charles S. Harlow*  
Charles S. Harlow  
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PRINCIPAL ENGINEER

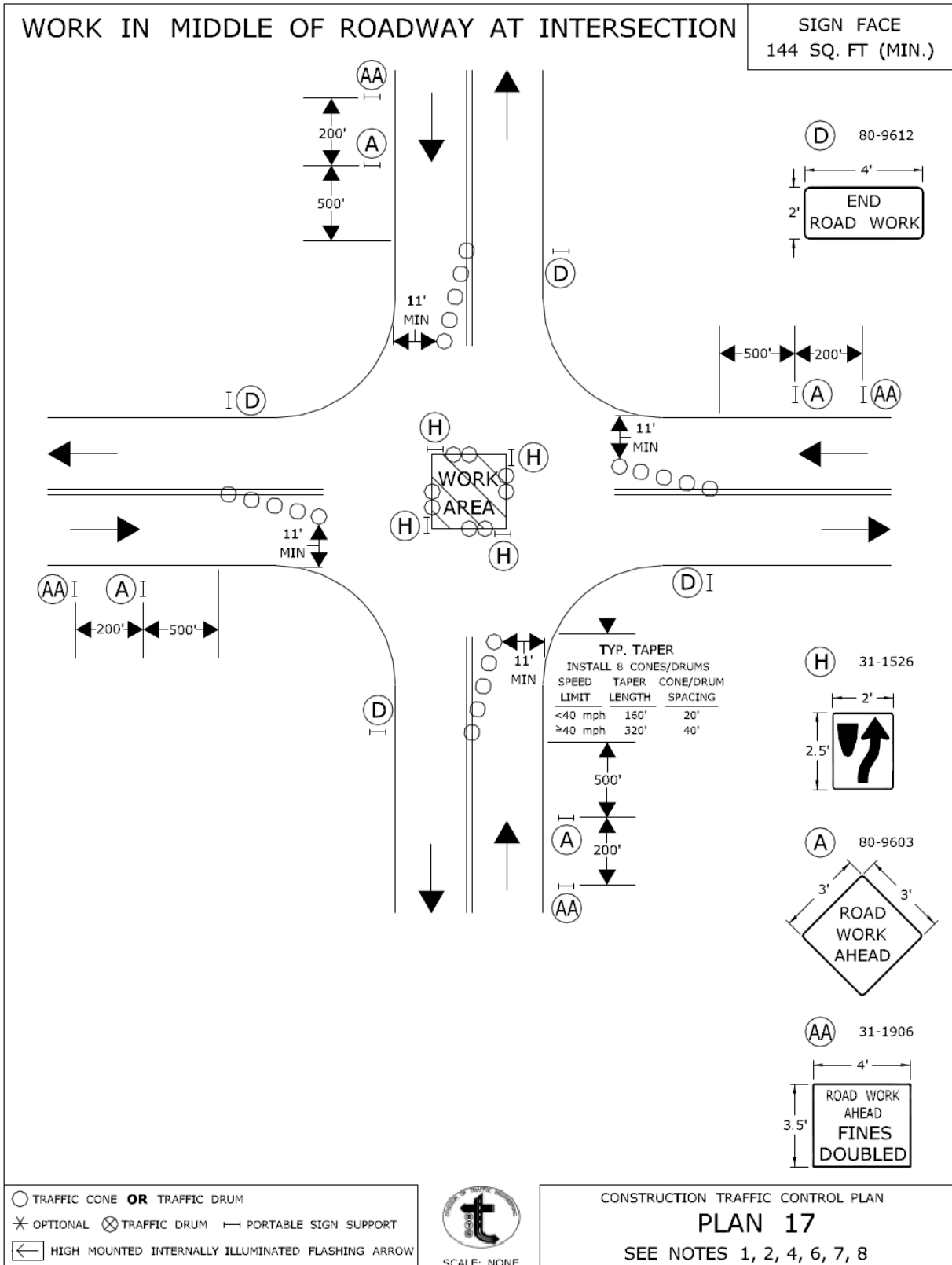


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2012.06.05 15:56:29-04'00"  
PRINCIPAL ENGINEER



APPROVED *Charles S. Harlow*  
 Charles S. Harlow  
 2012.08.05 15:56:51-04'00"  
 PRINCIPAL ENGINEER



○ TRAFFIC CONE **OR** TRAFFIC DRUM  
 ✱ OPTIONAL ⊗ TRAFFIC DRUM — PORTABLE SIGN SUPPORT  
 ← HIGH MOUNTED INTERNALLY ILLUMINATED FLASHING ARROW



CONSTRUCTION TRAFFIC CONTROL PLAN  
**PLAN 17**  
 SEE NOTES 1, 2, 4, 6, 7, 8

CONNECTICUT DEPARTMENT OF TRANSPORTATION  
 BUREAU OF ENGINEERING & CONSTRUCTION

APPROVED *Charles S. Harlow*  
 PRINCIPAL ENGINEER  
 2012.08.05 15:57:16-04'00"

**Article 9.71.05 – Basis of Payment is supplemented by the following:**

The temporary relocation of signs and supports, and the furnishing, installation and removal of any temporary supports shall be paid for under the item “Maintenance and Protection of Traffic”. Temporary overhead sign supports and foundations shall be paid for under the appropriate item(s).

The cost of furnishing, installing, and removing the material for the temporary I-95 cross-overs shall be paid for under the item “Maintenance and Protection of Traffic.”



## **ITEM #0973012A – CONSTRUCTION MONITORING-EXISTING BRIDGE**

**Description:** The work covered under this item is for Monitoring Structures, which includes, but is not limited to, preconstruction survey reports, surveying, furnishing, installing, protecting, reading, reporting and maintaining instrumentation as part of a Construction Monitoring Program required throughout the project.

- A. Purpose of Construction Monitoring: The Preconstruction Survey Reports are required to establish the condition of the existing structure prior to construction activities, and the monitoring is required for evaluation of ground and structure movements during various stages of construction. This item shall be completed separately and independent from other monitoring that may be required as part of the project.
- B. Scope of Work: Work associated with the Construction Monitoring shall include, but not necessarily be limited to providing:
  - 1. Preconstruction Survey Reports of existing structures documenting plumbness, levelness, etc. with photographs and/or video documentation of cracks, spalls, and other relevant defects, signed and sealed by a Professional Engineer licensed in the State of Connecticut.
  - 2. Layout and subsequent verification of all instrument locations and elevations.
  - 3. Access as necessary for the Engineer to inspect the instruments to obtain confirmation readings.
  - 4. Replacement of failed equipment.
  - 5. Taking immediate remedial action when the response limit is reached as detected by survey from the Deformation Monitoring Points; meeting with the Engineer to review current field conditions and further steps to be taken as necessary, before the recorded movement exceeds the limits value (see Table 1).
  - 6. Temporary monuments and benchmarks.
  - 7. Protection and security for all surface components of the construction monitoring system that are to be maintained.
  - 8. Removal and final disposal of all components of the construction monitoring system, as specified herein, or as directed by the Engineer.
  - 9. Construction Monitoring of individual Deformation Monitoring Points shall be continuous until such time as that particular monitoring point no longer requires monitoring, solely as determined by the Engineer.

**Materials:** Materials and products shall be in accordance with the following:

Deformation Monitoring Points (DMPs): These are to be used as targets in monitoring by conventional survey methods and shall have the following features:

1. The target shall be the head of a stainless or galvanized steel bolt welded to a steel angle of ½" minimum thickness fitted to the existing structure's abutments, wingwalls, and piers using expansion anchors. It shall also have an indent in the center of its head to receive a surveyor's plumb bob.
2. The target shall be clearly identified using fluorescent spray paint adjacent to the target on the steel angle, and labeled with a unique identification number using a paint stick or similar permanent marker for each DMP.

**Construction Methods:**

A. Instrumentation Layout: Note the following:

1. The DMPs required and their approximate locations are to be as directed by the Engineer.
2. The Engineer reserves the right to modify the DMP layout as is deemed necessary to monitor the impact of a Contractor proposed method of construction that has been approved. The DMPs shall be arranged so that monitoring can continue until completion without interruption. Adequate access for maintenance and reading of the DMPs shall be provided.

B. Preconstruction Submittals: These shall be made at least 30 calendar days prior to the commencement of any staged excavation, demolition of existing substructures, installation of temporary/permanent sheet pile and/or installation of any soil nail. The required submittals include, but are not limited to, the following:

1. Preconstruction Survey Reports as previously described.
2. Working Drawings of DMP location layout, and details showing all components of the construction monitoring system.

C. Submittals During and After Installations: These shall be made as follows:

1. Submit, within 24 hours of completion of DMP installation, initial readings and monitoring data taken immediately after installation to the Engineer.

D. General Installation Requirements: The construction monitoring program, prepared by the Contractor for review and approval by the Engineer, and the implementation of this program by the Contractor shall conform to the requirements, which include, but are not necessarily limited to the following:

1. All DMPS shall be installed in the presence of the Engineer.
2. All DMPs shall be securely fixed at the approved locations and position, so that the instruments are capable of resisting disturbance from vandalism.
3. Tolerances:
  - a. Establish the initial coordinates of each instrument installation to 1/8" or less.
  - b. Establish the initial elevation of DMPs to 1/8".
4. The performance and the extent of supplemental monitoring is at the discretion of the Engineer. The supplemental monitoring performed by the Engineer does not relieve the Contractor of the responsibility for the instrumentation and monitoring activities described in these Special Provisions.
5. The Contractor may install, monitor and interpret data from instrumentation that the Contractor deems necessary to ensure the safety of personnel and the work at no additional cost to the State. In the event the Contractor installs instrumentation in addition to that required herein, the Contractor shall:
  - a. Coordinate with the Engineer to ensure compatibility of collected data.
  - b. Implement recommendations developed from interpretations of monitoring program data.

E. Contractor's Responsibilities:

1. The Contractor shall furnish and install components of instrumentation that are to be used during construction. The Contractor shall protect and maintain installed instruments and replace or repair damaged instruments.
2. Disclosure of Instrumentation Data:
  - a. Do not disclose instrumentation monitoring data to third parties and do not publish instrument monitoring data without the prior approval of the Engineer.
3. Determine exact location of the DMPs to be installed in the field with approval of the Engineer.
4. Access to DMPs: Provide and facilitate access to each DMP for the Engineer at all times.

F. Monitoring Schedule:

1. All equipment and installation accessories required for operating the instrumentation system and recording of measurements shall be supplied by the Contractor and shall

be available at least 4 weeks in advance of construction of an area in which they are to be installed and shall be securely stored where they will not suffer physical damage or damage arising from excessive moisture, extremes of temperature or other adverse conditions.

2. Contractor shall provide and maintain adequate lighting, and provide a safe means of access to all DMPs to allow installation, repair, and reading of instruments at times selected by the Engineer.
3. All deformation monitoring points shall be installed and initial surveys completed a minimum of two weeks prior to any construction activity related to construction and groundwater control.
4. Deformation points shall be monitored in accordance to the following schedule of minimum intervals, or as directed by the Engineer:
  - a. Weekly when certain construction activities (e.g. substructure demolition, staged excavation or installing soil nails) are performed at a distance greater than 100 feet from a monitoring point.
  - b. Daily when certain construction activities (e.g. substructure demolition, staged excavation or installing soil nails) are performed at a distance less than 100 feet and greater than 30 feet from a monitoring point.
  - c. Before and after each soil nail is installed less than 30 feet from a monitoring point.
  - d. Immediately before and after each round of blasting (if applicable).
5. If, in the opinion of the Engineer, there appears to be excessive movement, the monitoring points shall be surveyed as often as deemed necessary by the Engineer.

G. Deformation Monitoring Points: The DMPs are to be installed and monitored by survey methods for detecting movements of selected fixed points. The work shall also meet the following requirements:

1. Install and monitor a minimum of 16 DMPs as follows:

At each abutment face (6 per abutment):

3 DMPs 6 inches below the bridge seat at each end and middle of the abutment.

3 DMPs 6 inches below top of pile cap directly below the upper DMP.

At each wingwall section (2 per wingwall):

1 DMP 6 inches below the top of the wingwall.

1 DMP 6 inches above finished grade directly below the upper DMP.

At each Soil Nail Wall (20 per wall)

10 DMPs along the soil nail wall alignment 6 inches below the top of wall and spaced at a maximum lateral interval of 20 feet on the initial shotcrete face and relocated to the final CIP face.

10 DMP along the soil nail wall alignment 6 inches above proposed sidewalk and spaced at a maximum lateral interval of 20 feet on the initial shotcrete face and relocated to the final CIP face.

2. Monitor the elevation to an accuracy of 1/8 inch (95% level of confidence) at each DMP designated to be monitored by the Contractor.

H. Instrument Reading and Records:

1. DMPs shall be surveyed as soon as possible after installation to establish datum readings which shall be established from a minimum of two independent reading operations giving consistent results.

I. Justify Response and Limiting Readings from Instrumentation: The Contractor shall respond to the monitored readings from instrumentation as follows:

1. Implement remedial action if instrumentation readings approach the Limiting Values shown in Table 1 (after these readings have exceeded the Response Values that were set to be 50 percent of the values shown on Table 1).
2. Take all necessary steps so that the limiting value is not exceeded. The Contractor may be directed to suspend activities in the affected areas with the exception of those actions necessary to avoid exceeding the limiting value.
3. If the Response Value is reached, the Contractor shall:
  - a. Meet with the Engineer to discuss response actions.
  - b. Implement the reviewed plan of action, which includes, but is not limited to, limiting the time a staged excavation cut is left unsupported prior to soil nail installation and/or using temporary stabilizing berms during soil nail installation while increasing the frequency of monitoring on adjacent structures.

J. Damage to Instrumentation:

1. The Contractor shall protect all DMPs and appurtenant fixtures and other components of instrumentation systems from damage due to construction operations, weather, traffic and vandalism.
2. If a DMP is damaged or unusable, the Contractors' instrumentation personnel shall replace the damaged DMP within 72 hours, at no additional cost to the State. The Engineer will be the sole judge of work stoppage in the vicinity of the damaged or unusable DMP until it is again operational, at no additional cost to the State.

**Method of Measurement:**

The work covered under this Item shall be on lump sum basis and will not be measured for payment.

**Basis of Payment:**

Payment for this work will be made at the lump sum price for “Construction Monitoring – Existing Bridge”, which price shall be compensation for preconstruction survey reports, furnishing, maintaining and installing equipment, materials; installation of instruments; surveying deformation monitoring points; monitoring; and survey data including all tools, labor, and incidentals thereto.

<b>TABLE 1 – LIMITING INSTRUMENTATION READINGS</b>	
<b>INSTRUMENT</b>	<b>LIMITING VALUE (*)</b>
Abutment and Wingwall DMPs	1/4”
Soil Nail Wall DMPs	1/3”

(\*) See also “I. Justify Response and Limiting Readings from Instrumentation”.

Pay Item	Pay Unit
Construction Monitoring – Existing Bridge	l.s.

**ITEM #0974001A – REMOVAL OF EXISTING MASONRY**

Work under this item shall conform to the requirements of Section 9.74 amended as follows:

**9.74.01-Description:** Delete the entire Article and replace with the following:

Work under this item shall include the removal and satisfactory disposal of portions of the existing concrete abutment backwalls, stemwalls and cheekwalls, existing piers and drainage outlet endwall to the limits shown on the plans or ordered by the Engineer.

**9.74.03 - Construction Methods:** Add the following:

The concrete shall be removed to the limits shown on the plans. The concrete shall be saw-cut to delineate the removal limits.

The Contractor shall take necessary precautions to prevent any damage to portions of the structure to remain and to prevent any collapse outside the limits of removal. Any damage shall be repaired by the Contractor, as directed by the Engineer, and at no cost to the State.

Pay Item	<u>Pay Unit</u>
Removal of Existing Masonry	C.Y

## **ITEM #1001001A – TRENCHING AND BACKFILLING**

The work under the item Trenching and Backfilling shall conform to Section 10.01 of the Standard Specifications amended as follows:

**Construction Methods:** Article 10.01.03 – Construction Methods, add the following:

All excavations shall be closed at the end of each day.

Where possible, communication conduit and electrical conduit shall be installed in the same trench and shall be paid for under this item as one. Payment shall not be made for separate trenching and backfilling where electrical and communication conduit may be installed in the same trench, but have been installed separately by the Contractor.

Unpaved areas disturbed during construction shall be restored with a minimum of 2 inches (50 mm) of topsoil and established turf.

Topsoil shall be provided in conformance to Section 9.44.03 of the standard specifications. Turf Establishment shall conform to Section 9.50.03 of the Standard Specifications.

**Method of Measurement:** Article 10.01.04 – Method of Measurement: Add the following:

There shall be no separate measurement for sawcutting, temporary pavement repair, concrete fill, joint sealing, permanent pavement repair, sidewalk repair, cutting reinforcement, reinforcement, topsoil and turf establishment.

### **Basis of Payment:**

Article 10.01.05 -- Basis of Payment: Replace the second paragraph with the following:

It shall also include all sand encasement, backfilling, grading, seeding, fertilizing, mulching, disposal of surplus material, sawcutting sidewalks and paved areas ,as well as furnishing and installing curbing, riprap, crushed stone, processed aggregate subbase, gravel borrow, concrete fill, topsoil, sidewalk, pavement or structure, as the case may be.



## **ITEM #1002201A – TRAFFIC CONTROL FOUNDATION – SPAN POLE**

**Description:** Work under this item shall consist of designing and constructing drilled shaft foundations for steel span poles, in accordance with the details shown on the plans and as ordered by the Engineer.

**Materials:** The reinforcing steel shall be uncoated, ASTM A615, Grade 60 reinforcement conforming to the requirements of Article M.06.01.

The concrete for the drilled shaft shall conform to Article M.03 for Class 'F' Concrete. The 28 day minimum compressive strength of the concrete in the constructed foundation shall be 4,400 psi. The concrete mix design, including admixtures, shall be submitted to the Engineer for approval.

The slurry shall be Contractor designed mineral slurry that meets the range of values listed herein. The slurry mix design, including admixtures, shall be submitted to the Engineer for approval.

Rigid metal conduit, ground rod sleeves and related hardware, and end caps shall be galvanized steel conduit, and shall conform to Article M.15.09.

Ground rods shall be 0.625 in. diameter by 10.0 ft. long copper clad steel. The copper cladding shall be a minimum thickness of 0.128 in. The ground clamp shall be a square-head bolt type, approved for direct burial.

Bare copper wire shall conform to Article M.15.13.

Topsoil shall conform to Article M.13.01.

Fertilizer shall conform to Article M.13.03.

Seed mixture shall conform to Article M.13.04.

Mulch shall conform to Article M.13.05.

Erosion control matting shall conform to Article M.13.09.

**Construction Methods:** For the purpose of bidding this item, the Contractor shall assume that the subsurface conditions for each drilled shaft foundation location consists of cohesionless, medium dense, granular soil (AASHTO A-1 or A-2) with cobbles present and a high groundwater table which requires the use of wet construction/concreting methods. During excavation and construction of each foundation, should the Contractor encounter subsurface conditions that differ materially from those assumed at the time of bid, the Contractor shall

notify the Engineer. All matters regarding increased cost relating to an agreed upon change in subsurface conditions will be handled per Section 1.04.04 – Differing Site Conditions.

The design of drilled shaft foundations shall conform to the requirements of AASHTO Standard Specifications for Structural Supports for Highway Signs, Luminaries and Traffic Signals – latest edition, including the latest interim specifications, available prior to the advertising date of the contract, amended as follows:

1. The foundation shall be designed for the soils and rock properties and parameters based on the subsurface conditions (character of the soil and rock, presence of ground water, etc.) in the location of, adjacent to and below the drilled shaft foundation excavation. The need and extent of all subsurface explorations and investigations shall be determined by the Contractor.
2. The specified compressive strength,  $f'_c$ , of the concrete used in the design shall be 4,000 psi.
3. The reinforcement shall be uncoated and conform to ASTM A615, Grade 60.
4. The foundation shall be designed for the span pole reactions of all group loads and load combinations. The reactions shall include axial, shear, flexural and torsional load effects. No reduction of the reactions or increase in the allowable stresses of the materials is permitted.
5. The diameter of the drilled shaft foundation shall be 3.0 ft., unless otherwise allowed by the Engineer.
6. The design of the drilled shaft foundation shall include embedment of the foundation in soil, the embedment of the foundation in rock or the embedment of the foundation partially in soil and partially in rock, as applicable.
7. The design of the drilled shaft embedment depth shall account for the slope of the finished grade.
8. The minimum embedment for a drilled shaft foundation, constructed entirely in soil, shall be no less than 12.0 ft. below the finished grade at the low side of a sloping grade. The minimum embedment for a drilled shaft foundation, constructed entirely in rock shall be no less than 8.0 ft. below the finished grade at the low side of a sloping grade.
9. The embedment depth for a drilled shaft foundation, determined by the Brom's design method, shall have a minimum factor of safety of 3.25 applied to the shear and moment load effects. The factor of safety applied to the torsional load effect shall be no less than 1.3.

10. The load factor method shall be used for the structural design of the drilled shaft foundation. The load factor applied to all loads, dead, wind and ice, and their effects, axial, shear, flexure and torsion, shall be no less than 1.6. The drilled shaft may be designed in accordance with the load factor method presented in the latest edition of the Building Code Requirements for Reinforced Concrete”, ACI 318.
11. The structural design of the drilled shaft shall be based on stress and strain compatibility in the circular drilled shaft cross section.
12. The drilled shaft foundation shall be reinforced with longitudinal and transverse reinforcement. The area of longitudinal reinforcement should be no less than the sum of the reinforcement required for flexure and the longitudinal reinforcement required for torsion. The area of transverse reinforcement should be no less than the sum of the reinforcement required for shear and the transverse reinforcement required for torsion.
13. The minimum number of longitudinal reinforcing bars shall be 16. The minimum size of longitudinal reinforcing bars shall be #8. The minimum area of longitudinal reinforcing bars shall be no less than 1% of the gross cross-sectional area of the shaft. The minimum clear distance between longitudinal reinforcing bars shall be no less than 5 times the maximum aggregate size or 5 in., whichever is greater. The reinforcement shall extend full length of the drilled shaft foundation, including the pedestal. Splicing of the longitudinal reinforcement is not permitted.
14. The drilled shaft foundation shall be transversely reinforced with spirals or circular, one piece, enclosed ties. The minimum size of the transverse reinforcement shall be #4. The maximum spacing/pitch of the transverse reinforcement shall be no more than 6 in. The minimum spacing/pitch of the transverse reinforcement shall be no more than 4 in. The spiral reinforcement shall be terminated at the top and the bottom with 1 ½ turns of the reinforcing and a 135° standard hook. Spirals may be spliced with lap splices or mechanical connectors. For spirals, the minimum lap splice length shall be 1.7 times the tension development length (including modification factors) of the bar or 48 bar diameters, whichever is greater. For spirals, the mechanical connectors shall develop both in tension and compression 125% of the specified yield strength of the bar and conform to the latest edition of the AASHTO LRFD Bridge Design Specifications, including the latest interim specifications. For ties, the minimum lap splice length shall be no less than 1.7 times the tension development length (including modification factors) of the bar. Tie lap splices shall be alternated.
15. The design of the foundation shall be coordinated with the traffic structure to avoid conflicts between the embedded support anchorage and the foundation reinforcement.

Prior to excavating for the foundation, the Contractor shall submit working drawings and design calculations, with all details and documents necessary for fabrication and construction, for each span pole foundation in a **span wire structure configuration** for review in accordance with the “Notice To Contractor – Special Provision 1.05” and the special provision “Section 1.05 – Control Of Work”.

The working drawings and design calculations for the span pole foundations shall conform to working drawing requirements for permanent construction. **A single set of working drawings with tabulated data for multiple span pole foundations in span wire structure configuration is allowed.** Each span pole foundation shall be referenced with an alpha-numeric identifier noted on the Contract documents. The working drawings and calculations shall be prepared in Customary U.S. units.

The span pole foundation working drawing and calculation submittal shall include the following:

1. title sheet
2. table of contents
3. contact information for designer – contact information shall include name and address of design firm, name of contact person with phone number and email address
4. copy of the certificate of insurance
5. foundation working drawings
6. foundation design calculations

The working drawings shall include complete details of all foundation components. The drawings shall include, but not be limited to the following:

1. the Project number, town and support identification number
2. reference to the design specifications, including interim specifications
3. material specifications for all components
4. embedment depths for foundation in soil, rock and a combination of soil and rock
5. anchor bolt details, including dimensions, embedment and projection

The design calculations shall include, but not be limited to the following:

1. the Project number, town and support identification number
2. references to design specifications, including interim specifications, and the applicable code section and articles
3. description/documentation for all computer programs used in the design
4. drawings/models of the foundation with dimensions, loads and references to the local and global coordinate systems used (as applicable), to facilitate review of the results
5. traffic structure reactions of all group loads and load combinations
6. soil and rock design parameters
7. computations demonstrating the geotechnical and structural capacity of the drilled shaft is adequate for all group load combinations

Prior to excavating for the foundation, the Contractor shall submit the following:

**Reinforcing Steel Shop Drawings:** Based on the reviewed foundation design, the Contractor shall prepare reinforcing steel shop drawings for each foundation. The drawings shall be reviewed and stamped by the foundation designer. Four copies of each reviewed drawing shall be submitted to the Engineer at the District Construction office. One copy of each reviewed and stamped drawing shall be submitted to the “Engineer of Record”.

**Concrete and Slurry Mix Designs:** The Contractor shall submit to the District Engineer the concrete mix design and the slurry mix design, including admixtures, for review.

**Foundation Construction Procedure:** The Contractor shall submit to the District Engineer a written foundation construction procedure outlining the equipment; drilling procedure for soil and rock, including removal of obstructions and removal of excavated spoils; temporary casing placement and removal; slurry placement; reinforcement, anchor bolt and conduit placement; and concrete placement required for the drilled shaft foundation construction for review. The procedure should include contingencies for the various soil, rock and subsurface water conditions that may be encountered during the foundation construction.

The Engineer will evaluate the foundation construction procedure for conformance with the contract documents and will then notify the Contractor of any additional information required and/or changes necessary to meet the contract requirements. All procedural approvals given by the Engineer shall be subject to

trial in the field and shall not relieve the Contractor of the responsibility to satisfactorily complete the work as detailed in the plans and specifications. The Contractor shall not commence construction of the drilled shafts until the Engineer has accepted the foundation construction procedure.

Excavations required for shafts shall be performed through whatever materials are encountered, to the dimensions and elevations in the working drawings or as ordered by the Engineer. The methods and equipment used shall be suitable for the intended purpose and materials encountered. Shaft excavation may be performed by combinations of augering, rotary drilling, down-the-hole hammer, reverse circulation drilling, clamming, scraping, or other means approved by the Engineer. Generally, either the dry method, wet method, or temporary casing method may be used, as necessary, to produce sound, durable concrete foundation shafts free of defects. The Contractor shall select and use the method that is needed to properly accomplish the work, as determined by site conditions and subject to the approval of the Engineer. The Contractor is responsible for maintaining the stability of the shaft excavation during all phases of construction.

The dry method consists of drilling the shaft excavation, removing accumulated water and loose material from the excavation, and placing the shaft concrete in a relatively dry excavation. The dry construction method shall be used only at sites where the groundwater table and site conditions are suitable to permit construction of the shaft in a relatively dry excavation, and where the sides and bottom of the shaft are stable and may be visually inspected prior to placing the concrete. The use of the dry construction method is permitted if less than one foot of water accumulates in the bottom of a hole without pumping over a one hour period, the excavation remains stable and any loose material and water can be removed prior to placement of concrete.

The wet construction method shall be used at sites where a dry excavation cannot be maintained for placement of the shaft concrete. Wet construction methods consist of using a mineral slurry to maintain stability of the hole perimeter while advancing the excavation to final depth, placing the reinforcing cage and shaft concrete. This procedure may require desanding and cleaning the slurry; final cleaning of the excavation by means of a bailing bucket, air lift, submersible pump or other devices; and placing the shaft concrete with a tremie. Unless it is demonstrated to the satisfaction of the Engineer that the surface casing is not required, temporary surface casings shall be provided to aid shaft alignment and position, and to prevent sloughing of the top of the shaft excavation. Surface casing is defined as the amount of casing required from the ground surface to a point in the shaft excavation where sloughing of the surrounding soil does not occur.

The temporary casing construction method shall be used at all sites where the dry or wet construction methods are inappropriate. Temporary casing construction method consists of advancing the excavation through caving material by the wet method. Temporary casing may be installed by driving or vibratory procedures in advance of excavation to the lower limits of the caving material. When a nearly impervious formation is reached, a casing is placed in the hole and sealed in the nearly impervious formation. After the drilling fluid is removed from the casing, drilling may proceed as with the dry method except that the casing is withdrawn when the shaft concrete is placed. If seepage conditions prevent use of the dry method, excavation is

completed using the wet method. Temporary casing may be installed by driving or vibratory procedures in advance of excavation to the lower limits of the caving material. Slurry may be omitted if the casing can be installed with only minor caving of the hole.

If the Engineer determines that the foundation material encountered during excavation is unsuitable or differs from that anticipated in the design of the shaft, or if rock is encountered at an unanticipated elevation, the Contractor's foundation designer shall determine if the foundation embedment should be revised from that shown on the working drawings. If rock is encountered, the Engineer shall be notified to inspect and determine the elevation of the top of competent rock. Any revisions to the foundation embedment during construction shall be reviewed by the Engineer.

Excavated materials which are removed from the shaft excavation and any drilled fluids used shall be disposed of by the Contractor as directed by the Engineer and in accordance with Section 1.10.

Casings shall be metal, smooth, clean, watertight, and of ample strength to withstand both handling and driving stresses and the pressure of both concrete and the surrounding earth materials. The outside diameter of casing shall not be less than the specified size of the shaft. Temporary casings shall be removed while the concrete remains workable (i.e., a slump of 4 in. or greater). Before the casing is withdrawn and while the casing is being withdrawn, a 5.0 ft. minimum head of fresh concrete in the casing shall be maintained so that all the fluid trapped behind the casing is displaced upward without contaminating the shaft concrete. The required minimum concrete head may have to be increased to counteract groundwater head outside the casing. Separation of the concrete by hammering or otherwise vibrating the casing, during withdrawal operations, shall be avoided. Casing extraction shall be at a slow, uniform rate with the pull in line with the shaft axis.

Slurry used in the drilling process shall be a mineral slurry. The slurry shall have both a mineral grain size that will remain in suspension and sufficient viscosity and gel characteristics to transport excavated material to a suitable screening system. The percentage and specific gravity of the material used to make the suspension shall be sufficient to maintain the stability of the excavation and to allow proper concrete placement. The level of the slurry shall be maintained at a height sufficient to prevent caving of the hole.

The mineral slurry shall be premixed thoroughly with clean fresh water at a temperature above 41° F and adequate time allotted for hydration prior to introduction into the shaft excavation. The elevation of the slurry within the shaft foundation shall be maintained within 24 in. of the top casing and at least 48 in. above the existing water level during drilling and until the concrete placement is essentially complete. The slurry properties shall be maintained at all times, including non-working periods and stoppages. The slurry shall be circulated and agitated, continuously if necessary, to maintain the slurry properties and to prevent it from setting up in the shaft.

The Contractor, in the presence of the Engineer, shall perform control tests on the slurry to ensure that the density, viscosity, and pH fall within the acceptable limits tabulated below. The Contractor shall provide all equipment required to perform the tests. If desanding is required, sand content shall not exceed 4% (by volume) at any point in the shaft excavation as determined by the American Petroleum Institute sand content test.

Range of Values (at 68°F)

<b>Property (Units)</b>	<b>Time of Slurry Introduction</b>	<b>Time of Concreting (in Hole)</b>	<b>Test Method</b>
Density (pcf)	64.3 to 69.1	64.3 to 75.0	Density Balance
Viscosity (seconds per quart)	28 to 45	28 to 45	Marsh Cone
pH	8 to 11	8 to 11	pH paper or meter

The control tests to determine unit weight (density), viscosity, and pH values of the slurry shall be done during the shaft excavation to establish a consistent working pattern.

Prior to placing shaft concrete, slurry samples shall be taken from the bottom and at intervals not exceeding 10.0 ft. for the full height of slurry. Any heavily contaminated slurry that has accumulated at the bottom of the shaft shall be eliminated. The mineral slurry shall be within specification requirements immediately before shaft concrete placement.

The hole shall be covered when left unattended.

After completing the shaft excavation, all loose material existing at the bottom of the hole shall be removed.

Prior to placing the reinforcement into the shaft, the Contractor, in the presence of the Engineer, shall determine the shaft dimensions, depth and alignment of the shaft. The concrete shaft shall not be out of plumb by more than 0.25 in. per foot of depth. The Contractor shall provide all equipment necessary for checking the shaft excavation. The Engineer shall inspect the shaft and verify that it has been properly cleaned.

The reinforcing steel shall be fabricated and assembled in accordance with Article 6.02.03. All reinforcement shall be assembled with wire ties. Welding to assemble the reinforcement is not permitted.

Immediately after the shaft excavation has been inspected and approved by the Engineer and prior to placement of the concrete, the assembled reinforcing steel cage, including cage stiffener bars, spacers, centralizers, and other necessary appurtenances, shall be carefully placed into the shaft excavation as a unit. Dropping or forcing cages into the shaft will not be allowed. The reinforcing steel in the shaft shall be tied and supported so that the reinforcing steel will remain



within allowable tolerances of its intended position until the concrete will support the reinforcing steel. When concrete is placed by tremie methods, temporary hold-down devices shall be used to prevent uplifting of the reinforcing steel cage during concrete placement. Concrete spacers or other approved noncorrosive spacing devices shall be used at sufficient intervals not exceeding 5.0 ft. along the shaft to insure concentric location of the cage within the shaft excavation. When the size of the longitudinal reinforcing steel is larger than a #8 bar, such spacing shall not exceed 10.0 ft. After placement of the reinforcing cage, the Engineer shall inspect the shaft to ensure that it has remained clean. If the inspection indicates that loose material has accumulated at the bottom of shaft excavation, the Contractor shall remove the reinforcing cage and reclean the shaft.

If directed by the Engineer, the top of the shaft shall be formed square with the length of the sides matching the diameter of the shaft.

Concrete construction shall conform to Subarticle 6.01.03-2,3,4,5 and 6 as amended herein.

Concrete shall be placed in the shaft excavation as soon as possible, but no more than 4 hours after completion of excavation and cleaning of the bottom of the excavation, and no more than 2 hours after placement of the reinforcing steel cage. Concrete shall be placed in a continuous operation to the top of the shaft. The concrete level shall be horizontal during the pouring operations. Concrete placement shall continue after the shaft is full and good quality concrete is evident at the top of the shaft. The elapsed time from the beginning of concrete placement in the shaft to the completion of placement shall not exceed 2 hours.

In dry construction, concrete shall be placed in a single continuous operation with the flow of concrete down the center of the shaft excavation so as to consolidate the concrete on impact. During placement operations, the concrete is not permitted to hit the reinforcing steel. A dropchute, consisting of a hopper and flexible hose, may be used to direct the concrete down the center of the foundation and prevent the concrete from hitting the reinforcing steel. Accumulated water shall be removed before placing the concrete. At the time of concrete placement, no more than 2 in. of water may exist at the bottom of the excavation and loose sediment no more than 0.5 in. over one-half the base is acceptable.

In wet (slurry) construction, concrete is to be placed by the tremie method, where the concrete displaces the slurry from bottom of the excavation to the top. The concrete shall be placed through a top metal hopper and into a rigid leak-proof elephant trunk tremie tube, sufficiently large enough to permit free flow of concrete. The tremie tube shall be positioned so that it can be removed without disturbing the reinforcing. Initially, the discharge end of the tremie tube shall be sealed closed (plugged) to prevent slurry from entering the tube after it is placed in the excavation and before the tube is filled with concrete. After concrete placement has started, the tremie tube shall be kept full of concrete to the bottom of the hopper to maintain a positive concrete head. The flow of concrete shall be induced by slightly raising the discharge end of the tube, always keeping the tube end in the deposited concrete. No horizontal movement of the tremie tube will be permitted.

The shaft concrete shall be vibrated or rodded to a depth of 5.0 ft. below the ground surface except where soft uncased soil or slurry remaining in the excavation will possibly mix with the concrete.

Exposed concrete shall be cured and finished in accordance with Subarticle 6.01.03-7, 9 and 10.

Anchor bolt assemblies shall be embedded in the concrete as shown on the working drawings. A template plate shall be used to hold the anchor bolt assemblies, conduits and ground rod sleeve in the correct position. The anchor bolts shall be installed plumb.

All conduit ends terminating below grade shall be capped with a malleable iron caps. All above-grade conduit ends shall be terminated with an insulated bonding bushing with tinned insert.

Ground rod and ground wire shall be installed as shown on the plans.

No construction operations that would cause soil movement adjacent to the shaft, other than mild vibration, shall be conducted for at least 48 hours after shaft concrete has been placed.

The top of the foundations shall be backfilled and the adjacent disturbed ground surfaces restored to match the surrounding area after the concrete has cured and the forms are removed. Placement of topsoil shall conform to Articles 9.44.01 and 9.44.03. Turf establishment shall conform to Article 9.50.03.

The span poles shall not be erected on the foundation until the concrete in the shaft has attained a 28 day compressive strength,  $f'_c$ , greater than or equal to 4,000 psi.

**Method of Measurement:** This work will be measured for payment by the number of foundation units, each completely installed and accepted.

The work to remove rock from the foundation excavation will be measured from the top of rock to the bottom of rock excavation.

**Basis of Payment:** The work will be paid for at the contract unit price each for "Traffic Control Foundation – Span Pole," completed and accepted in place, which price shall include all equipment, materials, tools and labor incidental to the subsurface exploration, design, fabrication, construction and disposal of drilling spoils, of the foundations at the locations specified on the plans.

Backfilling and restoration of adjacent ground surfaces (pavement, slope protection, topsoil and seed, etc.) in all areas disturbed by the work will not be paid for separately, but will be included as part of the work. The Engineer will determine the type, thickness and horizontal limits of the surfaces to be restored.

When rock is encountered within the limits of excavation, its removal will be paid for at the contract unit price per vertical foot for "Rock in Foundation Excavation," which price shall

include any additional excavation to remove the rock and any additional concrete required to fill the excavation beyond the designed foundation hole dimensions. Rock, in so far as it applies to "Rock in Foundation Excavation," shall be defined as rock in definite ledge formation, boulders, or portions of boulders, cement masonry structures, concrete structures or Portland cement concrete pavement which has a cross-sectional area that exceeds 50% of the cross-sectional area of the designed foundation hole.

**ITEM #1003912A – REMOVE CONCRETE LIGHT STANDARD BASE**

**DESCRIPTION:** Under this item the Contractor shall remove an existing concrete light standard base where shown on the plans or as directed. The removed concrete base shall remain the property of the contractor.

**CONSTRUCTION METHODS:** The Contractor shall remove a concrete light standard base where required. The removed base shall be properly disposed of by the Contractor. The hole shall be backfilled and graded to match surroundings, unless otherwise noted on the plans.

**METHOD OF MEASUREMENT:** This work will be measured for payment by the number of concrete light standard bases removed and disposed of, complete and accepted.

**BASIS OF PAYMENT:** This work will be paid for at the contract unit price each for "Remove Concrete Light Standard Base", which price shall include all materials, equipment and work incidental thereto including excavation, removal, backfill when necessary, hauling and disposing of the concrete base.

## **ITEM #1003916A – REMOVE AND RELOCATE LIGHT STANDARD**

**DESCRIPTION:** Under this item the Contractor shall remove, temporarily store as required, and install an existing light standard where shown on the plans, or as directed by the Engineer. The installation shall consist of erecting the light standard with bracket, ballast, luminaire and lamp on the new foundation (or existing foundation where indicated on the plans), and making all necessary electrical connections for proper operation.

**MATERIALS:** The Contractor shall be responsible for damage to all equipment and materials incurred during removal and hauling to the specified area. All repairs or replacements due to damage or loss by the Contractor shall be made at the Contractor's expense.

Breakaway fuse connectors and fuses shall conform to Section M.15.05.

No. 10 single conductor shall be #10 AWG, THHN, rated for 600 volts. No. 8 bare grounding conductor shall conform to M.15.13.

**CONSTRUCTION METHOD:** The Contractor shall remove a light standard, bracket, luminaire and ballast where required, or as directed by the Engineer. The removed light standard, transformer base, bracket, luminaire, attachment hardware, shims, and load side conductors shall be properly stored as a unit at a location not to pose a hazard to motorists or cause damage to the unit. Upon installation of the new concrete foundation (paid for under a separate bid item), the completely assembled light standard shall be re-installed plumb with the aid of aluminum shims, if necessary. Where indicated on the plans, the light standard shall be re-installed on the existing foundation. The bracket shall be securely attached to the light standard and the assembly shall be erected with the bracket placed perpendicular to the center line of the roadway. Where indicated on the plans, the transformer base shall remain mounted to the existing foundation to protect the branch circuit conductors/splices.

The existing No. 10 AWG conductors from the luminaire ballast shall be connected to the lighting circuit conductors in the pole base with new breakaway type fuse connectors. If the existing No. 10 conductors are of insufficient length, then new No. 10 conductors shall be installed between the luminaire and pole base. The light standard shall be connected to the grounding system and ground rod with a No. 8 bare copper grounding conductor.

The Contractor shall make all necessary arrangements with the District Electrical Maintenance Supervisor, for locking and unlocking of the circuits on which any work is to be done, through the Engineer.

All work shall be in strict conformance with the National Electric Code.

**METHOD OF MEASUREMENT:** This work will be measured for payment by the number of light standards removed and relocated, complete and accepted.

**BASIS OF PAYMENT:** This work will be paid for at the contract unit price each for "Remove and Relocate Light Standard" as specified, which price shall include removal, storage, delivery, and installation of the light standard with bracket and luminaire, breakaway fuse holders, fuses, conductors, connections, and all work, materials, tools and equipment incidental thereto.

**ITEM #1006001A – UNDERBRIDGE LUMINAIRE – LED (PENDANT MOUNTED)**

**DESCRIPTION:** This item shall consist of furnishing and installing a light emitting diode (LED) luminaire to be used for underbridge lighting as specified with necessary mountings, conduit, conductors, fuses, and fuseholders, completely wired and attached to the mounting pendant in accordance with the plans and details.

**MATERIALS:** The LED underbridge luminaire shall be one of the following:

Holophane, Parkpak LED, catalog number: **PPSQL2-P60-40K-48-GL-T5W-STM-GYSDP-SPD**, with the following characteristics: 66 watts, 7,194 lumens, 4000k CCT, 480 volt, and Type 5 wide light distribution.

Lithonia Lighting, D-Series LED Parking Garage fixture, catalog number: **DSXPG-LED-30C-700-40K-T5W-480-SPD-DNAXD** with the following characteristics: 67 watts, 8,019 lumens, 700mA, 4000k CCT, 480 volt, and Type 5 wide light distribution.

Philips Gardco, G3 LED Garage and Canopy fixture, catalog number: **G3-5-32L-600-NW-G2-480-MGY-NP**, with the following characteristics: 64 watts, 7,895 lumens, 800mA, 4000k CCT, 480 volt, and Type 5 symmetrical light distribution.

No alternate luminaires will be accepted. A catalog cut will be required.

The luminaire housing shall be powder coated grey or natural aluminum in color.

The luminaire housing shall not have a photocontrol receptacle.

The luminaire's onboard circuitry shall include a surge protection device (SPD) to withstand high repetition noise transients as a result of utility line switching, nearby lightning strikes, and other interference. The LED luminaire shall be provided with integral 10kV surge protection which shall conform and be labeled as UL 1449 compliant. The SPD protects the luminaire from damage and failure for common and differential mode transient peak currents up to 5kA (minimum). SPD performance shall have been tested per procedures in ANSI C136.2/IEEE C62.41-2:2002 category C high exposure. The SPD shall be field replaceable.

The LED luminaire shall carry a limited 5 year warranty on the LEDs and the Driver.

Conductors shall be #10 AWG in accordance with Article M.15.11 of the Standard Specifications. Insulation shall be THHN/THWN and rated for 600 volts. The equipment grounding conductor shall be No. 10 AWG, THHN/THWN, rated for 600 volts. The ground wire shall be green in color.

Flexible conduit shall be LFNC-B (Liquidtight Flexible Nonmetallic Conduit) with a trade size diameter as indicated on the plans. LFNC shall be listed for UL Standard UL1660 and marked for outdoor applications. LFNC shall be flame resistant and UV/sunlight resistant. LFNC and fittings shall be wet location rated.

The 3/4" fiberglass conduit shall be standard wall type with a minimum wall thickness of 0.070 inches. The conduit shall be reinforced thermosetting resin conduit using the single circuit filament winding process and shall be free from defects including non-circularity and foreign inclusions. The conduit shall be nominally uniform (as commercially practical) in color, density, and physical properties and shall be straight with the ends cut square to the inside diameter. Each section of conduit shall be supplied with an overall length of 20'. The conduit color shall be grey. The complete conduit system shall be UL listed and shall meet or exceed the requirements of UL 2515 Above Ground Standard. All conduit, elbows and fittings shall be durably and legibly marked in accordance with and Fittings and NEMA TC 14. All conduit joints shall feature tapered buttress threads which shall be permanently bonded using a joint adhesive supplied by the conduit manufacturer. The joint adhesive shall be applied to the conduit as specified by the manufacturer. The resin system shall be epoxy anhydride-cured with no fillers.

A complete line of fittings, adapters, expansion fittings and elbows shall be available and shall be manufactured from the same materials and manufacturing process as the conduit. Expansion fittings shall be supplied by the conduit manufacturer and shall provide a minimum of 8" of lateral movement at all bridge expansion joints and 4" of lateral movement at all non-expansion locations. The conduit shall have an operating range of -40F to +250F and shall contain an ultra-violet (UV) inhibitor to meet the appropriate UL, CSA or NEMA specification. Clamps for attaching the conduit to the steel bridge structure shall be single hole strap or beam-clamp type. Clamps for attaching the conduit to the concrete bridge structure shall be two hole strap type. All clamp materials shall be rated for outdoor wet environments and shall be either hot dip galvanized or stainless steel. Threaded rods, anchor bolts, nuts and washers shall be 316 stainless steel. When clamping the fiberglass conduit to the steel bridge structure, a slip collar shall be installed at the clamp location to allow the conduit to laterally expand within the clamp. When clamping the fiberglass conduit to the concrete bridge structure, the two hole strap shall be sized to allow the conduit to laterally expand within the strap.

**CONSTRUCTION METHOD:** The LED underbridge luminaire with associated conduit and conductors shall be installed in conformance with Section 10.06. The luminaire shall be installed at the end of the pendant mount bracket and shall be securely fastened, properly oriented, leveled, connected to the power supply conductors, cleaned, and ready for operation. A waterproof thread sealer shall be applied to the threaded joint between the pendant and the luminaire. The exact method of attaching the luminaire to the pendant will be luminaire specific and shall maintain the luminaire's IP66/U.L. wet location rating. The Contractor shall contact the luminaire manufacturer to determine the required mounting method to maintain the IP66/U.L. wet location rating of the fixture. Mounting methods may include:

- Direct mount to 1 1/4" pendant with a 3/4" NPT threaded reducer.
- Mount to 4"x4"x2" galvanized cast iron junction box with 3/4" threaded backwall conduit hub



threaded onto pendant with a 3/4" reducer.

It is the Contractor's responsibility to verify that the mounting method retains the IP66/U.L. wet location rating of the fixture and that all connections to the pendant are watertight and suitable for outdoor locations. The mounting method shall be submitted for approval as part of the shop drawing submittal process. A waterproof thread sealer shall be applied to all threaded pendant connections including the threaded joint between the pendant and the luminaire.

The luminaire shall be properly grounded with a No. 10 AWG equipment ground connected between the system ground wire in the adjacent junction box and the grounding lug in the luminaire.

Fuse holders and fuses shall be installed in the cast iron junction box surface mounted to the bridge abutment. The cast iron Junction box shall be furnished and installed under a separate bid item.

Surface conduit and conductors shall be installed in conformance with section 10.08.03-1. Fiberglass conduit shall be securely clamped to the structure with clamp spacing as recommended by the NEC for reinforced thermosetting resin conduit (RTRC). Support spacing shall not exceed 3'-0" as specified in N.E.C. 355.30 or as listed by the conduit manufacturer. Clamps for attaching the conduit to the steel bridge structure shall be single hole strap or beam-clamp type. Clamps for attaching the conduit to the concrete bridge structure shall be two hole strap type. When clamping the fiberglass conduit to the steel bridge structure, a slip collar shall be installed at the clamp location to allow the conduit to laterally expand within the clamp. When clamping the fiberglass conduit to the concrete bridge structure, the two hole strap shall be sized to allow the conduit to laterally expand within the strap. Expansion Joints and conduit shall be supplied by the same manufacturer. All expansion joints shall be installed using the manufacturers recommended guidelines. For conduit lengths under 50 feet no expansion joints will be required. For conduit lengths between 50 feet to 200 feet one expansion joint (4" movement) shall be installed at the mid-point of the conduit. For conduit lengths over 200 feet an expansion joint (4" movement) shall be installed every 200 feet. At bridge expansion joints, conduit expansion joints shall be "double" type with an overall lateral movement of 8". In areas where structural movement or expansion is anticipated and a standard conduit expansion coupling cannot be properly installed, the Contractor can install a sufficient length of LFNC to account for the anticipated movement. Surface mounted conduit shall be installed where indicated on the plans; using mounting brackets and/or clamps as approved by the Department. All joints shall be glued together using the Manufacturers recommended adhesive as well as the manufactures recommended procedure. The surface of the conduit shall be dry and clean, free of dust, moisture, oil, grease, or any other contaminant. Any field cuts shall be hand sanded to remove the resin glaze and to provide mechanical adhesion. The adhesive shall be applied only within the temperature range as specified by the manufacture. The Contractor shall ensure that no adhesive has formed on the interior wall of the conduit.

The Contractor shall ensure that once installed the LED luminaire functions properly.

**METHOD OF MEASUREMENT:** This work will be measured for payment by the number of LED luminaires installed, complete and accepted.

**BASIS OF PAYMENT:** This work will be paid for at the contract unit price each for "Underbridge Luminaire - LED (Pendant Mounted)" of the type and size specified, complete and accepted in place, which price shall include all materials including luminaire, LEDs, driver, surge suppressor (with spare), conductors, fuses, conduit, pendant bracket including conduit, conduit fittings, condulets and junction box, flexible conduit, fuse holders, anchors, hardware, connections, thread sealer, leveling, mounting, grounding, drilling, and all labor, tools, equipment and work incidental thereto.

**ITEM #1006151A - REMOVE UNDERBRIDGE LUMINAIRE**

**DESCRIPTION:** Work under this item shall consist of removal of an existing underbridge luminaire at the location shown on the plans or as directed. All removed underbridge luminaires, lamps, mountings, conduits, conductors, fuses and fuse holders shall be disposed of by the Contractor.

**CONSTRUCTION METHODS:** The Contractor shall remove an underbridge luminaire where required. All removed underbridge luminaires, lamps, mountings, conduits, conductors, fuses and fuse holders shall be disposed of by the Contractor.

H.I.D. lamps which are to be disposed of by the Contractor, must be handled as hazardous waste, and be subject to the provisions of the Resources Conservation and Recovery Act (RCRA) Subtitle C and chapter 446 of the Connecticut General Statutes. The removed lamps shall not be landfilled or incinerated, but must be handled and disposed of, or recycled, at an approved facility.

**METHOD OF MEASUREMENT:** This work will be measured for payment by the number of underbridge luminaires with associated equipment, removed and disposed of, complete and accepted.

**BASIS OF PAYMENT:** This work will be paid for at the contract unit price each for "Remove Underbridge Luminaire" complete, which price shall include removal of materials, disposing, delivering, hauling, including all materials, tools, equipment, labor and work incidental thereto.

**ITEM #1008115A – 2” RIGID METAL CONDUIT IN TRENCH**

**ITEM #1008117A – 3” RIGID METAL CONDUIT IN TRENCH**

Work under this item shall conform to the requirements of section 10.08 supplemented and amended as follows:

**Article 10.08.01 – Materials: shall be amended as follows:**

Underground utility marking tape shall have a minimum tensile strength of 350 N and a minimum elongation of 700 percent before breakage. The tape shall not delaminate nor smear when wet and shall be resistant to insects. The tape shall not degrade when exposed to alkalis, acids or other corrosive elements found in soil.

Pressure treated wood for Identification Posts shall conform to Article M.12.13 of the Standard Specifications. Signs on Identification Posts shall conform to Article M.18.13 of the Standard Specifications.

**Article 10.08.03 - Construction Methods:**

Only where conduit is used for Fiber Optic Cable:

The bending radius for the Rigid Metal Conduit shall not exceed the manufacturer's recommended safe pulling tension and minimum bending radius for Fiber Optic Cable during delivery and installation.

For Rigid Metal Conduit under Roadway, the Contractor shall be required to install the conduit **simultaneously** with the installation of the handholes.

The conduit shall be free from defects including non-circularity and foreign inclusions. It shall be nominally uniform (as commercially practical) in color, density, and physical properties. It shall be straight and the ends shall be cut square to the inside diameter.

Rigid Metal Conduit shall be galvanized steel also conforming to Section M.15.09 of the standard specifications.

Leave a pull rope in the conduit after installation of fiber optic cable.

Warning Tape shall be placed in trench over conduit as shown on the details. One (1) Identification Post shall be carefully placed adjacent to conduit in trench as shown on the traffic signal plans. This applies to conduit for fiber optic cable only.

Article 10.08.05 – Basis of Payment: shall be amended as follows:

In the second paragraph, after the words “bonding bushings”, add the words “bonding wire”.

This work shall be paid for at the contract unit price per linear foot for conduit of the size and type indicated, within the limits shown on the plans and in the details. This price shall include all materials required including expansion fittings, fixed and flexible sweep-bends, conduit fittings, pervious structure backfill, boxes, caps, pull tape, poly-line, inserts, warning tape, ground wire, identification posts with signs, structural supports, equipment, tools, labor and work incidental thereto.

**ITEM #1008643A – 2" FIBERGLASS CONDUIT – SURFACE**

**ITEM #1008664A – 2" FIBERGLASS CONDUIT IN TRENCH**

**DESCRIPTION:** This item shall consist of furnishing and installing conduit of the size and type specified with necessary fittings, where called for, at locations shown on the plans or as directed by the Engineer and in accordance with these specifications.

Work under the above items shall conform to Section 10.08.03-1 of the standard specifications, supplemented and amended as follows:

**MATERIALS:** The 2" fiberglass conduit shall be extra heavy wall type with a minimum wall thickness of 0.250 inches. The conduit shall be reinforced thermosetting resin conduit using the single circuit filament winding process and shall be free from defects including non-circularity and foreign inclusions. The conduit shall be nominally uniform (as commercially practical) in color, density, and physical properties and shall be straight with the ends cut square to the inside diameter. Each section of conduit shall be supplied with an overall length of 20'. The conduit color shall be grey.

The complete conduit system shall be UL listed. For surface mounted applications the conduit shall meet or exceed the requirements of UL 2515 Above Ground Standard. For conduit in trench or under roadway, the conduit shall meet or exceed the requirements of UL 2420 below ground standard and CSA-22.2 No. 211.3-96. All conduit, elbows and fittings shall be durably and legibly marked in accordance with NEMA TC 14-2002.

All conduit joints shall be straight socket type and shall be permanently bonded using a joint adhesive supplied by the conduit manufacturer. The joint adhesive shall be applied to the conduit as specified by the manufacturer. The resin system shall be epoxy anhydride-cured with no fillers.

A complete line of fittings, adapters, expansion fittings and elbows shall be available and shall be manufactured from the same materials and manufacturing process as the conduit. Expansion fittings shall be supplied by the conduit manufacturer and shall provide a minimum of 8" of lateral movement.

The conduit shall have an operating range of -40F to +250F and shall contain a ultra-violet (UV) inhibitor to meet the appropriate UL, CSA or NEMA specification.

Threaded rods, anchor bolts, nuts and washers shall conform to ASTM A449 and shall be stainless steel. Clamps shall be stainless steel and shall be supplied with stainless steel hardware.

The Contractor shall submit shop drawings to the Engineer for approval in accordance with Section 1.06.01.

**CONSTRUCTION METHODS:** Construction methods for surface mounted conduit shall conform to Section 10.08.03-1 of the Standard Specifications and to the manufacturer's instructions. Construction methods for conduit in trench or under roadway shall conform to Section 10.08.03-2 and 10.08.03-3 (respectively) of the Standard Specifications and to the manufacturer's instructions.

All conduit joints shall be glued together using the Manufacturer's recommended adhesive as well as the Manufacturer's recommended procedure. The surface of the conduit shall be dry and clean, free of dust, moisture, oil, grease, or any other contaminant. Any field cuts in the conduit shall be hand sanded to remove the resin glaze and to ensure proper mechanical adhesion. The adhesive shall be applied only within the temperature range as specified by the Manufacturer. The adhesive shall be applied in conformance with the Manufacturer's recommendations and in such a manner as to avoid "ponding" and voids which will result in weak joints. The Contractor shall ensure that no adhesive has formed on the interior wall of the conduit. Once the adhesive has set, the Contractor shall hand test the joint for proper connection. Any joints which are loose, cracked, or exhibit poor adhesion shall be cut out and re-made.

**For surface mounted conduit:** Surface mounted conduit shall be installed where indicated on the plans; using mounting brackets and/or clamps as approved by the Department. For 2" fiberglass conduit, support spacing shall not exceed 5'-0" as specified in N.E.C. 355.30. Conduit expansion joints and conduit shall be supplied by the same manufacturer and shall be installed in conformance with the manufacturers recommended guidelines. A conduit expansion joint shall be installed at all bridge joints subject to movement. Except as noted above, for conduit lengths under 50 feet no expansion joints will be required. For conduit lengths between 50 feet to 200 feet one expansion joint shall be installed at the mid-point of the conduit. For conduit lengths over 200 feet an expansion joint shall be installed every 200 feet. Clamps for attaching the conduit to the steel bridge structure shall be single hole type. Clamps for attaching the conduit to concrete bridge structure shall be two hole type. All clamp materials shall be rated for outdoor wet environments. Threaded rods, anchor bolts, nuts and washers shall be 316 stainless steel. When clamping the fiberglass conduit to the steel bridge structure, a slip collar shall be installed at the clamp location to allow the conduit to laterally expand within the clamp. When clamping the fiberglass conduit to the concrete bridge structure, the two hole strap shall be sized to allow the conduit to laterally expand within the strap.

Prior to beginning work and fabrication of any materials, the Contractor shall take all field measurements necessary to assure the proper fit of the finished structure mounted conduit. This shall include all supports, brackets and hangers, fixed and flexible sweep bends, expansion/contraction fittings, junction boxes, and other structure mounted appurtenances. The Contractor shall submit shop drawings to the Engineer for approval in accordance with Section 1.06.01.

**For conduit in trench:** Trenches shall be of the depth and cross section shown on the plans with a minimum covering of 24". Trenching and backfilling shall be paid for under a separate bid item (Item No. 1001001).

**METHOD OF MEASUREMENT:** The conduit shall be measured for payment by the actual number of linear feet of the type and size installed and accepted. Expansion fittings, fixed sweep-bends, conduit, brackets, clamps, and assorted fittings, will not be measured for payment but shall be included in the pay item for the conduit of the type and size specified. The measured length shall be from end to end along the centerline through all fittings.

The pull tape and conduit testing will not be measured for payment but shall be included in the pay item for the conduit of the type and size specified.

**BASIS OF PAYMENT:** This work shall be paid for at the contract unit price per foot for “2” Fiberglass Conduit – Surface” or “2” Fiberglass Conduit in Trench”, within the limits shown on the plans and in the details. This price shall include all materials required including conduit, couplings, threaded connectors, elbows, clamps/brackets, attachment hardware expansion fittings, fixed and flexible sweep-bends, conduit fittings, caps, pull-rope, inserts, structural supports, adhesive, equipment, tools, labor, drilling and all work incidental thereto.



## **ITEM #1008908A – CLEAN EXISTING CONDUIT**

### **Description:**

Clean existing conduit as required, as shown on the plans or as directed by the Engineer to remove dirt and debris to facilitate the installation of new cable.

### **Construction Methods:**

Where cable is to be installed in existing conduit the conduit may have to be cleared prior to the installation. Cleaning will only be necessary if the new cable cannot be easily installed in the existing conduit. By field inspection, and with the concurrence of the Engineer, determine the sections of conduit that require cleaning.

Remove all existing cable from conduit. Install temporary cable elsewhere, as necessary, to maintain normal signalization complete with vehicle & pedestrian detection, EVPS, and coordination. Clean the conduit by one of the following methods:

- 1) Rodding.
- 2) A high pressure jet spray, or air pressure.
- 3) By pulling a mandrel or ball through the conduit.

Submit in writing the anticipated method of cleaning the conduit to the Engineer for approval prior to cleaning any conduit.

If the conduit is found damaged to any extent that the cleaning process will not clear the obstruction, it will be the judgment of the Engineer whether to replace the entire conduit run or excavate and replace only the damaged section.

If the existing conduit is found to be missing hardware such as bonding bushings and bond wire, the missing material shall be provided and installed under this item prior to installation of the cable.

### **Method of Measurement:**

This work shall be measured from termination point to termination point. This work shall be measured for payment on actual number of linear feet (meters)..

### **Basis of Payment:**

The work under the Item “Clean Existing Conduit” shall be paid for at the contract unit price per linear foot (meters), which price shall include all material, tools, equipment, labor, and work incidental thereto. Work pertaining to temporary operation shall be paid for under Item 1108xxxA - Temporary Signalization (Site X). Replacement of any damaged conduit shall be paid for under the applicable conduit item.

Pay Item	Pay Unit
Clean Existing Conduit	l.f. (m)

## **ITEM #1010060A – CLEAN EXISTING CONCRETE HANDHOLE**

### **DESCRIPTION:**

Clean all debris from an existing concrete handhole where shown on the plans or as directed.

### **MATERIAL:**

Insulated Bonding Bushings:  
    Specification Grade  
    Threaded  
    Malleable Iron or Steel  
    Galvanized  
    UL listed  
Bonding Wire:  
    M.15.13  
Grout:  
    M.03.05

### **CONSTRUCTION METHODS:**

Remove to a level even with the bottom of the handhole all sand, silt and other debris. Remove any material that is accessible from the ends of conduit. Additional conduit cleaning will be paid for under Item 1008908A-Clean Existing Conduit. Place approximately 4" (100) of ¾" (19) crushed stone in bottom of handhole using care not to allow crushed stone to enter conduits. Grout around conduits to prevent future entrance of dirt and silt. Properly dispose all removed debris. Inspect bonding bushings. Tighten loose bushings. Secure loose bond connections. Install new bonding bushings on spare conduits and bond to other conduits.

### **METHOD OF MEASUREMENT:**

This work will be measured for payment by the number of concrete handholes cleaned, complete and accepted.

### **BASES OF PAYMENT:**

This work will be paid for at the contract unit price each for "Clean Existing Concrete Handhole", which price shall include the removal and disposal of debris from handhole and associated conduit, crushed stone, grout, bonding bushings, bonding wire, and all equipment and work incidental thereto.

<u>Pay Item</u>	<u>Pay Unit</u>
Clean Existing Concrete Handhole	Each (Ea)

## **ITEM #1014901A – REMOVE CABLE**

### **DESCRIPTION:**

The work under this item shall include the removal and legal disposal of Incident Management System (IMS) fiber optic cable where shown on the plans or as directed by the Engineer.

### **MATERIALS:**

The Contractor shall be responsible for damage to all equipment and materials incurred during removal, hauling and disposal. All repairs or replacements due to damage or loss by the Contractor shall be made at the Contractor's expense.

A 1/4" (6 mm) polyester rope (pull line) shall be installed in all abandoned conduits for future pulling purposes.

### **CONSTRUCTION METHOD:**

Removal of existing IMS fiber optic cable shall be performed in a manner and sequence not to damage portions of the cable that shall remain or other adjacent or nearby appurtenances. The Contractor shall install a 1/4-inch (6 mm) poly pull line for future use within any and all conduit where the IMS fiber optic cable has been removed. The pull line shall have sufficient length at each end and be neatly tied off within the nearest manhole, handhole, or pullbox.

### **METHOD OF MEASUREMENT:**

This work will be measured for payment by the actual number of linear feet (meters) of IMS cables and electrical service cable/conductors removed.

### **BASIS OF PAYMENT:**

This work will be paid for at the contract unit price per linear foot (meter) for "Remove Cable" as specified, which price shall include removal, storage, disposal, installation of polyester pull line, and all work, materials, tools and equipment incidental thereto.

**Pay Item**  
Remove Cable

**Pay Unit**  
ft (m)

## **ITEM #1017050A – SERVICE RELOCATION**

**Description:** Under this item the Contractor shall remove and relocate the existing pedestal mounted lighting control cabinet used to power the commuter parking lot lights, to the location shown on the plans. The relocation shall consist of relocating the existing pedestal cabinet and equipment onto a new concrete foundation and installing new feeders as shown on the plans. The existing foundation shall be removed and disposed of by the Contractor.

**Materials:** The foundation shall conform to Article M.15.15-05 and as detailed on the plans. The foundation anchor bolts shall be sized and located to fit the existing pedestal base.

Ground rod shall conform to the requirements of M.15.15.7.

No. 8 bare copper ground wire shall conform to Article M.15.13.

**Construction Method:** The Contractor shall relocate the existing pedestal service cabinet with associated equipment to the location as indicated on the plans. The Contractor shall first install the new pedestal foundation with new PVC conduit connections to the existing concrete handhole and service lateral conduit to the serving utility pole. The Contractor shall carry out all coordination with the Utility Company necessary to de-energize the existing cabinet and re-energize the relocated cabinet. The Contractor shall relocate the pedestal cabinet to the new foundation, bond the cabinet to the ground rod with a No. 8 bare copper grounding conductor, and carry out all circuit connections to restore the parking lot lighting to proper nighttime operation. The Contractor shall complete the cabinet relocation during daylight hours so that there is no disruption in the proper nighttime operation of the commuter parking lot lights.

The Contractor shall give Mr. Thomas Woronik of Eversource, (860) 267-3891, 30 days advance notice to coordinate the utility work for this relocation.

All work shall be in accordance with the National Electric Code.

The existing concrete foundation shall be removed and disposed of and the excavation shall be properly backfilled, graded, and seeded.

**Method of Measurement:** This work shall be measured for payment by the number of service relocations with associated equipment, complete and accepted in place.

**Basis of Payment:** This work will be paid for at the contract unit price each for "Service Relocation" which price shall include removal, relocation, conduit sweeps, foundation, ground rod, connections, excavation, removal and disposal of existing foundation, backfill, grading, grass seed, utility construction costs, and all work, tools, equipment, and labor incidental thereto.

**ITEM #1103023A – 32' STEEL SPAN POLE****ITEM #1114102A – SPAN WIRE**

**Description:** Work under this item shall consist of designing, fabricating and installing a steel span pole to carry traffic appurtenances (such as traffic signals or signs), of the type specified, on a prepared foundation, in accordance with the details shown on the plans and as ordered by the Engineer. Work under this item shall also include designing and installing a steel span wire, at the locations indicated, in accordance with the details shown on the plans and as ordered by the Engineer.

**Materials:** The tubular components, such as the pole and luminaire arm shall be made of steel with a minimum yield stress of 35,000 psi.

The structural plate components, such as the baseplates and handhole frames shall be made of steel that conforms to the requirements of ASTM A572, Grade 50.

Anchorage plates shall conform to the requirements of ASTM A572, Grade 50.

The steel for pole members and structural plate components, such as the baseplates and handhole frames, shall meet Charpy V-notch impact testing requirements for non-fracture critical members in Zone 2 and the following:

<b>Yield Strength</b>	<b>Thickness in.</b>	<b>Minimum Average Energy, ft.-lbf</b>
$F_y \leq 36$ ksi	$\leq 4$	15 at 40°F
$36$ ksi $< F_y \leq 50$ ksi	$\leq 2$	15 at 40°F
$36$ ksi $< F_y \leq 50$ ksi	$2 < t \leq 4$	20 at 40°F
$50$ ksi $< F_y \leq 70$ ksi	$\leq 4$	15 at -20°F
Charpy V-notch sampling and testing shall be in accordance with AASHTO T243, "H" piece frequency.		

The non-structural components, such as hand hole covers, caps and anchor bolt covers, shall be made of steel with minimum yield stress of 36,000 psi.

The filler metal shall have a matching strength relationship with the base metal.

All high strength bolts shall conform to ASTM A325, Type 1. Nuts shall conform to ASTM A563, Grade DH. Circular, flat, hardened steel washers shall conform to ASTM F436. The bolts, nuts and washers shall be galvanized in accordance with ASTM A153 or ASTM B695, Grade 50. The nuts shall be overtapped to the minimum amount required for the bolt assembly and all surfaces of the nuts shall be lubricated with a lubricant containing a visible dye of any color that contrasts with the color of the galvanizing. The high strength bolts shall conform to the requirements of Subarticle M.06.02-3.

The anchor bolts shall conform to ASTM F1554, Grade 105. The nuts shall conform to ASTM A563, Grade DH. The washers shall conform to ASTM F436. The bolts, nuts and washers shall be galvanized in accordance with ASTM A153. The nuts shall be overtapped to the minimum amount required for the bolt assembly and all surfaces of the nuts shall be lubricated with a lubricant containing a visible dye of any color that contrasts with the color of the galvanizing. Prior to shipping the anchor bolts, the nuts and washers shall be installed by hand on the anchor bolts to ensure that the nuts can be run on the threads. Only anchor bolts on which the nuts are free running shall be shipped. The anchor bolts shall be shipped with the nuts and washers on the threads.

All steel components, including anchor bolts, shall be completely hot-dip galvanized, after fabrication, in accordance with ASTM A123 or ASTM A153, as applicable. Repairs to damaged areas of the hot-dip galvanized coatings shall conform to the requirements of ASTM A780 amended as follows:

Paints containing zinc dust, if used for repairs, shall contain either between 65% to 69% metallic zinc by weight or greater than 92% metallic zinc by weight in dry film.

The silicone sealant shall be a 1-component, 100% silicone sealant recommended for use with galvanized steel.

Neoprene gasket material for the access openings shall conform to ASTM D1056, Grade 2A2 or 2A3. Other grades of neoprene approved by the Engineer may be used.

Closed cell elastomer for sealing the space between the foundation and base plate shall conform to ASTM D1056, Grade 2A2 or 2A3 and shall have a pressure-sensitive adhesive backing on one side for adhesion to steel. Closed cell elastomer contained within the anchor bolt pattern shall not interfere with the anchor bolt leveling nuts and shall not block the opening in the base plate.

Bare copper grounding conductor shall be #8 AWG stranded bare copper wire conforming to M.15.13. The grounding bolt shall be stainless steel with a hex head.

Steel span wire shall conform to Article M.16.15.

All materials used in the finished structure shall be new. The use of materials that have been previously used in a structure or salvaged from a structure is not permitted.

The Contractor shall submit Certified Test Reports and Materials Certificates in conformance with Article 1.06.07 for the steel used for span pole members and structural plate components, high-strength bolts (including nuts and washers) and anchor bolts (including nuts and washers). The Certified Test Reports shall include the following:

- a. Mill test reports that indicate the place where the material was melted and manufactured.
- b. High-strength bolt test results for proof load tests, wedge tests, and rotational-capacity tests that indicate where the tests were performed, date of tests, location where the components were manufactured and lot numbers.
- c. Galvanized material test results that indicate the thickness of the galvanizing.

Prior to incorporation into the work, the Contractor shall submit samples in conformance with Article 1.06.02 for the steel used for span pole members and components, high-strength bolts (including nuts and washers) and anchor bolts (including nuts and washers).

**Construction Methods:** The design and fabrication of the span pole, including its anchorage (into the foundation), and the design of the span wire shall conform to the requirements of the latest edition of the AASHTO Standard Specifications for Structural Supports for Highway Signs, Luminaires and Traffic Signals, including the latest interim specifications, available prior to the advertising date of the Contract, amended as follows:

1. The design wind speed shall be 120 mph. The calculation of wind pressures in accordance with Appendix C is not permitted.
2. The minimum design life shall be 50 years.
3. The wind importance factor,  $I_r$ , for wind pressure shall be 1.00.
4. The span pole and span wire shall be designed to support free swinging traffic signals and signs. The wind drag coefficient for traffic signals and luminaires shall be no less than 1.2.
5. The maximum stress ratio (the ratio of the computed stress to the allowable stress) or combined stress ratio (CSR) in any span pole component or in any span wire due to each group load shall not exceed 0.85. The purpose for limiting the stress ratio is to allow for future additional appurtenance configurations.
6. The span pole shall be designed to support a span wire with a sag no greater than 5% of the span. For definitions of sag and span, refer to Appendix A in the AASHTO Standard Specifications for Structural Supports for Highway Signs, Luminaires and Traffic Signals.
7. The span wire properties shall conform to Article M.16.15. All span wires in a span pole configuration shall be the same diameter
8. The maximum luminaire arm length shall be 20.0 ft.

9. The maximum diameter of the pole at the base shall be 18 in.
10. The minimum wall thickness of the pole shall be 0.3125 in. The wall thickness of the pole shall be uniform throughout its length. Joining 2 tubular members together with a circumferential weld to fabricate a pole is not permitted. The use of shop-fabricated stepped members is not permitted. The use of multiple plies (laminations) to obtain the required pole thickness is not permitted.
11. The span pole shall be a tubular member with either a round or multisided cross-section. Multisided tubular members with other than 8, 12 or 16 sides are not permitted. Multisided tubular members with fluted sides are not permitted. The pole shall be fabricated with a taper (change in diameter).
12. Multisided tubular members with diameters less than or equal to 13 in. shall have a minimum of 8 sides. Multisided tubular members with diameters greater than 13 in. and less than or equal to 18 in. shall have no less than 12 sides.
13. Multisided tubular members shall have a minimum internal bend radius of 5 times the tubular member thickness or 1 in., whichever is greater.
14. Slip-type field splices are not permitted in the pole.
15. The pole shall be fabricated with no more than 2 longitudinal seam welds.
16. The longitudinal seam welds within 6 in. of the member ends shall be complete joint penetration groove welds.
17. Non-destructively test 100% of partial joint penetration longitudinal seam welds in accordance with the magnetic particle method. Non-destructively test 100 % of complete joint penetration seam welds in accordance with the ultrasonic method.
18. All tubular member to transverse plate connections shall be made with a complete joint penetration groove weld with a backing ring attached to the plate with a continuous fillet weld. Non-destructively test 100% of the complete joint penetration groove welds by the ultrasonic method after fabrication and prior to galvanizing. Non-destructively test 100% of the complete joint penetration groove welds by the ultrasonic method for toe cracks after galvanizing. Non-destructively test 100% of backing ring fillet welds by the magnetic particle method after fabrication prior to galvanizing. After galvanizing, the joint between the backing ring and tubular member shall be sealed with silicone sealant to prevent the ingress of moisture.
19. The strength of a connection made with a complete joint penetration groove weld shall be no greater than the strength of the base metal. In connections joining



base metal with different yield strengths, the base metal with the lower yield strength shall govern the design.

20. The use of seal and tack welds is not permitted. No welding shall be performed after galvanizing.
21. The use of stiffeners at tubular member to transverse plate connections is not permitted.
22. The minimum base plate thickness shall be no less than 2.5 in. or at least as thick as the anchor bolt diameter, whichever is greater. The determination of the plate thickness in the tubular member to transverse plate connections shall consider the potential for the plate to warp due to the heat from welding. Consideration should be given to the use of thicker plates to allow for subsequent machining of warped plates to a flat surface so that removal of material will not compromise the required strength of the plate.
23. The opening in the base plate shall be sized to allow for proper galvanizing and allow conduits projecting from the foundation to pass through it. The size of the opening shall be kept to a minimum to reduce the flexibility of the baseplate.
24. The pole base plate anchor bolt circle diameter shall be 24 in.
25. The anchor bolt to base plate connection shall be designed as a double-nut connection with shear holes. The minimum distance from the center of the anchor bolt hole to the edge of the base plate shall be no less than 2 times the diameter of the anchor bolt. The anchor bolts shall use an embedded anchorage plate, 0.5 in. minimum thickness, to transmit loads from the pole base to the concrete foundation. The use of hooked anchor bolts is not permitted. The minimum number of anchor bolts shall be 8. The minimum anchor bolt diameter shall be 2 in. The minimum anchor bolt embedment, the distance from the top of the foundation to the top of the embedded anchorage plate, shall be 3.5 ft. or the tension development length of the vertical foundation reinforcement plus the end concrete cover, whichever is greater. Each anchor bolt shall be supplied with 4 nuts and 4 washers. Washers shall be placed on the top and bottom surfaces of the pole base plate and anchorage plate. Welding to the anchor bolts is not permitted. The use of lock washers with the anchor bolt assembly is not permitted.
26. The span wire pole clamp shall be designed to support a minimum tensile force of 12,000 pounds or 3 times the maximum calculated tensile force in the span wire, whichever is greater.

The span pole shall be designed for the load effects due to the span wire(s) attached to the poles and all the traffic appurtenances (signals, signs, luminaires, cameras, etc.) attached to the span

wire and the pole. The load effect due to the span wire, resulting from the attached traffic appurtenances, will not be provided and shall be determined by the Contractor. The span pole and span wire shall also be designed for load effects from future traffic appurtenances arranged, positioned and located as shown on the plans. The span pole and span wire shall also be designed for load effects during all stages of construction that may exist during the Project under which the span pole is installed. The span pole and span wire shall be designed to support traffic appurtenances with properties no less than those tabulated on the plans.

The locations and dimensions of the span poles are shown on the traffic plans. The luminaire arm and pole lengths and the attachment heights shall be verified by the Contractor based on the finished grade at the site, top of foundation elevation, the locations of overhead utility cables and the traffic appurtenance mounting heights. If either the wire or pole length is inadequate, the Contractor shall notify the Engineer.

The minimum vertical clearance from the top of the finished road to the bottom of the traffic signals shall be 16.0 ft. The maximum vertical clearance from the top of the finished road to the bottom of the traffic signals shall be 18.0 ft. The traffic signals shall be installed so that the bottom of all the signals for each approach is at the same elevation.

Vent and drain holes shall be provided for galvanizing. The number, size and location of vent and drain holes shall be coordinated with the galvanizer prior to the submission of the working drawings and design calculations. The area of vent and drain holes at each end of a member shall be at least 30% of the inside area of the member for members with diameters 3 in. and greater and 45% of the inside area of the member for members with diameters less than 3 in. The vent and drain holes shall be strategically located for reducing stress and for proper galvanizing. The holes shall be made by drilling. Flame cut holes are not permitted. The edges of all holes shall be rounded by grinding. After galvanizing, exposed holes placed in the sign support components for galvanizing shall be sealed with neoprene plugs.

A J-hook shall be welded to the inside of the pole at the top for wire handling and support.

The span pole shall have a handhole, reinforced with a frame, located at the base of the pole. The handhole shall be located with a normal direction that is 90° to the plane formed by the pole and span wire. The minimum clear distance from the top of the baseplate to the outside face of the bottom of the handhole frame shall be no less than the diameter of the tubular member or 1.25 ft., whichever is greater. The handhole frame shall have a minimum 4 in. wide by minimum 6 in. high clear opening. The maximum width of the handhole opening, the clear opening plus twice the frame thickness, shall not be greater than 40% of the tubular member diameter at that section. The inside corners of the handhole frame shall be rounded to a radius of 30% to 50% of the width of the clear opening. The minimum thickness of the handhole frame shall be no less than the thickness of the pole or 0.3125 in., whichever is greater. The handhole frame shall be connected to the pole with a partial joint penetration groove weld reinforced with a fillet weld. The handhole weld shall start and end at the point that is coincident with the longitudinal axis of symmetry of the tubular member and the longitudinal axis of symmetry of the handhole frame. Non-destructively test 100% of each handhole weld in accordance with the magnetic particle

method. The handhole shall be provided with a cover connected to the frame with no less than 2 stainless steel screws. The cover shall be installed with a neoprene gasket matching the dimensions of the cover. The cover and the gasket and the gasket and the handhole frame shall be in firm and continuous contact after tightening the fasteners. The cover shall also be attached to the frame with a 1.5 ft. long stainless steel chain. The inside bottom of the frame shall have a hole tapped for the stainless steel grounding bolt.

The span pole shall include wire entrance fittings. The number and size of the wire entrance fittings shall be as shown on the plans. The fittings shall be welded, all-around, to the pole at a 45-degree angle to the pole.

The span pole shall be supplied with a pole cap plate and anchor bolt covers. The cap plates shall be attached with fasteners. The joint between the tubular member and plate shall be sealed with a neoprene gasket matching the dimensions of the plate.

The luminaire arms shall be fabricated of pipe with a minimum thickness equal to schedule 40. Single arm luminaires shall be used for luminaires with arm lengths less than or equal to 8.0 ft. Truss type luminaires shall be used for luminaires with arm lengths greater than 8.0 ft. The truss type luminaires shall consist of upper and lower members joined with vertical members at the tip and midspan. To accommodate the luminaire fixture, the size of the pipe in the luminaire arm at the tip shall be 2 in. diameter, schedule 40. If necessary, a reducing tenon shall be installed at the tip of the arm to accommodate the luminaire fixture.

The luminaire arm(s) shall be connected to the pole with clamp connections. Each clamp connection shall use 4 high-strength bolts. The installed nuts shall be prevented from loosening while in service. The use of lock washers to meet this requirement is not permitted. The arms shall be fillet welded, all-around, to the clamp(s). The size of the weld shall be no less than 0.25 in. A hole shall be provided in the clamp, (upper arm clamp for truss type arms) and pole to allow for wires to pass from the pole to the luminaire arm. The sides of all holes in the connection shall be ground smooth and edges rounded by grinding to prevent the wires from chafing.

Prior to fabrication, the Contractor shall submit working drawings and design calculations, with all details and documents necessary for fabrication and erection of the structure and its components, for each **span wire structure configuration** for review in accordance with the "Notice To Contractor – Special Provision 1.05" and the special provision "Section 1.05 – Control Of Work".

The working drawings and design calculations for span poles and the calculations for the span wire shall conform to working drawing requirements for permanent construction. **A single set of working drawings with tabulated data for multiple span poles in span wire structure configuration is allowed.** Each span pole shall be referenced with an alpha-numeric identifier noted on the Contract documents. The working drawings and calculations shall be prepared in Customary U.S. units.

The span pole working drawing and calculation submittal shall include the following:

1. title sheet
2. table of contents
3. contact information for designer, fabricator and galvanizer – contact information shall include name and address of each firm and the name of contact person with phone number and email address
4. copy of the certificate of insurance
5. copy of fabricator's AISC certification
6. copy of the traffic signal control plan detailing the span wire structure configuration
7. span pole working drawings
8. span pole design calculations
9. span wire calculations
10. welding procedures
11. span pole installation procedure, including the method to plumb the pole

The working drawings shall include complete details of all span pole components. The drawings shall include, but not be limited to the following:

1. the Project number, town and span pole identification number
2. reference to the design specifications, including interim specifications
3. reference to the design specifications design criteria, such as design wind speed, minimum design life, vehicle speed, etc.
4. material specifications for all components
5. material designations for the pole, with an explanation of the alpha numeric characters (equivalent thickness, in inches, shall be provided for gage numbers)
6. non-destructive weld testing requirements
7. details of the location of the longitudinal seam weld(s) in the pole

8. vent and drain holes for galvanizing
9. a plan view of the anchor bolt layout relative to the orientation of the wire
10. anchor bolt dimensions, including embedment and projection
11. span pole installation procedure, including the method to plumb the pole, if procedure differs from that described in this specification

The design calculations shall include, but not be limited to the following:

1. the Project number, town and alpha-numeric span pole identifier
2. references to design specifications, including interim specifications, and the applicable code section and articles
3. description/documentation for all computer programs used in the design
4. drawings/models of the structure, components and connections, with dimensions, loads and references to the local and global coordinate systems used (as applicable), to facilitate review of the results
5. a tabulation of the section properties of the tubular members at each analyzed section. The tabulated values shall include:
  - a. the diameter,  $D$  (if round member)
  - b. effective width,  $b$  (if multisided member, AASHTO 5.5.2)
  - c. equivalent diameter (if multisided member, AASHTO 5.6)
  - d. wall thickness,  $t$
  - e. inside bend radius,  $r_b$  (if multisided member, AASHTO 5.5.2)
  - f. cross-sectional area,  $A$
  - g. moment of inertia,  $I$
  - h. section modulus,  $S$
  - i. radius of gyration,  $r$

AASHTO Table B-1 may be used to determine the section properties. If Table B-1 is used, the radius measured to the mid-thickness of the wall shall also be provided.

6. coefficients and factors used in the design
7. results of all group loads and load combinations
8. stress ratios and combined stress ratios for all group loads and load combinations

9. horizontal due to Group Load Combinations I, II and III for dead, wind and ice loads

The span poles shall be fabricated in accordance with the latest edition of the AASHTO LRFD Bridge Construction Specifications, including the latest interim specifications, amended herein.

The steel fabricator shall be AISC certified for the fabrication to the Standard for Bridge and Highway Metal Component Manufacturers (CPT).

Fabrication of the span pole may begin only after the working drawings and design calculations have been reviewed. The Contractor shall submit to the Engineer, no less than 2 weeks prior to the start of fabrication, the name and location of the fabrication shop where the work will be done so that arrangements can be made for an audit of the facility and the assignment of the Department Quality Assurance (QA) inspector. No fabrication will be accepted unless the QA inspector is present during fabrication. No changes may be made during fabrication without prior written approval by the Department.

The Contractor shall furnish facilities for the inspection of material and workmanship in the shop by the Engineer. The Engineer and Department QA representative shall be allowed free access to the necessary parts of the premises.

The Engineer will provide QA inspection at the fabrication shop to assure that all applicable Quality Control plans and inspections are adequately adhered to and maintained by the Contractor during all phases of the fabrication. A thorough inspection of a random selection of elements at the fabrication shop may serve as the basis of this assurance.

Prior to shipment to the Project, each individual piece of steel shall be marked in a clear and permanent fashion by a representative of the fabricators' Quality Control (QC) Department to indicate complete final inspection by the fabricator and conformance to the Contract for that piece. The mark must be dated. A Materials Certificate in accordance with Article 1.06.07 may be used in lieu of individual stamps or markings, for all material in a single shipment. The Materials Certificate must list each piece within the shipment and accompany the shipment to the Project site.

Following the final inspection by the fabricator's QC personnel, the Engineer may select pieces of steel for re-inspection by the Department's QA inspector. Should non-conforming pieces be identified, all similar pieces must be re-inspected by the fabricator and repair procedure(s) submitted to the Engineer for approval. Repairs shall be made at the Contractor's expense.

The pieces selected for re-inspection and found to be in conformance, or adequately repaired pieces, may be marked by the QA inspector. Such markings indicate the Engineer takes no exception to the pieces being sent to the Project site. Such marking does not indicate acceptance or approval of the material by the Engineer.

All welding details, procedures and nondestructive testing shall conform to the requirements of AWS D1.1 Structural Welding Code - Steel.

Personnel performing the nondestructive testing shall be certified as a NDT Level II technician in accordance with the American Society for Non Destructive Testing (ASNT), Recommended Practice SNT-TC-1A and approved by the Engineer.

All nondestructive testing shall be witnessed by Engineer. Certified reports of all tests shall be submitted to the Engineer for examination. Each certified report shall identify the structure, member, and location of weld or welds tested. Each report shall also list the length and location of any defective welds and include information on the corrective action taken and results of all retests of repaired welds.

The Department reserves the right to perform additional testing as determined by the Engineer. Should the Engineer require nondestructive testing on welds not designated in the Contract, the cost of such inspection shall be borne by the Contractor if the testing indicates that any weld(s) are defective. If the testing indicates the weld(s) to be satisfactory, the actual cost of such inspection will be paid by the Department.

All members and components shall be hot-dip galvanized in a single dip. Double-dipping of members and components is not permitted. All exterior and interior surfaces of the span pole members and components, shall be completely galvanized.

Galvanized members and components shall be free from uncoated areas, blisters, flux deposits, and gross inclusions. Lumps, projections, globules, or heavy deposits of zinc which will interfere with the intended use of the material will not be permitted.

After galvanizing the joint between the backing ring and the tubular member shall be sealed with silicone sealant to prevent the ingress of moisture.

All damaged areas of the hot-dip galvanized surfaces shall be repaired in accordance with the requirements of ASTM A780. If paint containing zinc dust is used for repairs, the dry coating thickness shall be at least 50% greater than the thickness of the adjacent hot-dip galvanized coating, but no greater than 4.0 mils. The paint shall be brush applied. The use of aerosol spray cans is not permitted. The color of the finished repair area shall match the color of the adjacent hot-dip galvanized surface at the time of the repair to the satisfaction of the Engineer.

Prior to shipping, all exterior and interior galvanized surfaces of the members and components shall be inspected, in the presence of the Engineer, to determine the acceptability of the galvanized coating. Galvanized coatings may be found acceptable by the Engineer if all surfaces of the members and components meet the galvanizing requirements herein. Only span pole members and components with acceptable galvanized coatings shall be shipped. If the galvanized coating on any member or component is found to be unacceptable, the Contractor shall submit a repair procedure to the Engineer for review.

After fabrication and prior to shipping, aluminum identification tags shall be attached to the span poles with self-tapping tamper resistant screws.

The finished members and components shall be protected with sufficient dunnage and padding to protect them from damage and distortion during transportation. Damage to any material during transportation, improper storage, faulty erection, or undocumented fabrication errors may be cause for rejection of said material at the Project Site. All costs associated with any corrective action will be borne by the Contractor.

Following delivery to the Project Site, the Engineer will perform a visual inspection of all material to verify shipping documents, fabricator markings, and that there was no damage to the material or coatings during transportation and handling.

The Engineer is not responsible for approving or accepting any fabricated materials prior to final erection and assembly at the Project Site.

High-strength bolts, nuts and washers shall be stored in accordance with Subarticle 6.03.03-4(f).

The span pole shall be erected, assembled and installed in accordance with these specifications and the procedures and methods submitted with the working drawings. The Contractor and the span pole designer are responsible to ensure that the erection and assembly procedures and methods in this specification are acceptable for use with the span pole. Changes to these method and procedures shall be submitted with the working drawings and calculations.

Prior to installation of the span pole, the exposed threads of all the embedded anchor bolts shall be cleaned of accumulated dirt and concrete and shall be lubricated. The threads and bearing surfaces of all the anchor bolt nuts shall be cleaned and lubricated. The anchor bolts and nuts are properly lubricated if the nuts can be turned by hand on the anchor bolt threads. The lubricant shall contain a visible dye of any color that contrasts with the color of the galvanizing. Re-lubricate the threads of the anchor bolts and nuts if more than 24 hours has elapsed since earlier lubrication, or if the anchor bolts and nuts have become wet since they were first lubricated.

Install (turn) the leveling nuts onto the anchor bolts and align the nuts to the same elevation or plane. The distance from the bottom of the leveling nuts to the top of the foundation shall not exceed 1 in. Place a structural hardened washer on top of each leveling nut, 1 washer on each anchor bolt.

Prior to erecting the pole, place the closed cell elastomer ring within the anchor bolt pattern. The closed cell elastomer ring shall not interfere with the anchor bolt leveling nuts and shall not block the opening in the base plate.

The pole shall be erected so that the centerline of the pole will be plumb after the application of all the dead loads. The pole may be initially installed raked in the opposite direction of the overhead member to obtain the plumb condition. Raking the pole may be accomplished by installing the leveling nuts in a plane other than level.



Install the pole base plate atop the washers resting on the leveling nuts, place a structural hardened washer on each anchor bolt resting it on the top of the base plate, and install (turn) a top nut on each anchor bolt until the nut contacts the washer. The leveling nuts and washers shall be inspected, and if necessary the nuts turned, so that the washers are in full contact with the bottom surface of the base plate.

Tighten the top nuts to a snug tight condition in a star pattern. Snug tight is defined as the maximum rotation resulting from the full effort of one person using a 12 in. long wrench or equivalent. A star tightening pattern is one in which the nuts on opposite or near-opposite sides of the bolt circle are successively tightened in a pattern resembling a star (e.g., For an 8-bolt circle with bolt sequentially numbered 1 to 8, tighten nuts in the following bolt order: 1, 5, 7, 3, 8, 4, 6, 2.).

Tighten leveling nuts to a snug tight condition in a star pattern.

Before final tightening of the top nuts, mark the reference position of each top nut in a snug-tight condition with a suitable marking on 1 flat with a corresponding reference mark on the base plate at each bolt. Then incrementally turn the top nuts using a star pattern one-sixth of a turn beyond snug tight. Turn the nuts in at least two full tightening cycles (passes). After tightening, verify the top nut rotation. The top nuts shall have full thread engagement. The distance from the bottom of the leveling nuts to the top of the foundation shall not exceed 1 in.

After erecting the span pole, the span pole shall be electrically grounded by attaching the bare copper grounding conductor to the inside of the handhole frame with a stainless steel bolt and to the ground rod with a ground clamp. The rigid metal conduit shall be electrically grounded by attaching the bare copper grounding conductor to the insulated bonding bushing and to the ground rod with a ground clamp.

The installation of the span wire shall conform to Article 11.14.03. A span wire pole clamp shall be provided for each span wire connected to the pole. The traffic appurtenances shall be located and mounted on the wire as shown on the cross-sections.

After installation of the traffic appurtenances, the anchor bolt nuts (leveling and top anchor nut) and washers shall be in full contact with the top and bottom surfaces of the pole base plate and the centerline of the pole shall be plumb.

After installation of the traffic appurtenances, a survey shall be performed by the Contractor to confirm that the sag is no less than 5% of the span and to confirm that the minimum vertical clearances from the top of the finished road to the bottom of the traffic appurtenances have been met.

The last character of the span pole identification number shall be stenciled with black paint, unless otherwise specified, on the pole of each span pole. The character shall be 3 in. high and placed approximately 12 in. above the top of the base plate facing the centerline of the roadway.

**Method of Measurement:** The work for span poles will be measured for payment by the number of span poles, of the type specified, completed and accepted in place. The work for span wires will be measured for payment by the actual number of linear feet of steel span wire installed and accepted in place.

**Basis of Payment:** The work for the span poles will be paid for at the Contract unit price each for "XX Steel Span Pole" or "Steel Combination Span Pole", of the type specified, complete in place, which price shall include all equipment, materials, tools and labor incidental to the design, fabrication and installation, of the span pole at the locations specified on the plans. The work for the span wire will be paid for at the Contract unit price per linear foot for "Span Wire", complete in place, which price shall include pole clamps, thimble eyebolts, nuts, washers, cable rings, and all equipment, materials, tools and labor incidental to the design and installation, at the locations shown on the plans.

<u>Pay Item</u>	<u>Pay Unit</u>
XX Steel Span Pole	ea.
Span Wire	l.f.

**ITEM #1105001A – 1 WAY, 1 SECTION SPAN WIRE TRAFFIC SIGNAL**

**ITEM #1105003A – 1 WAY, 3 SECTION SPAN WIRE TRAFFIC SIGNAL**

**Article 11.05.03 – Construction Methods:**

In the second paragraph, delete the last sentence (“A balance adjuster shall...”).

Add the following paragraphs:

Circular indications that have an identification mark (such as an arrow) on the top of the lens shall be installed with that mark at the 12 o'clock position.

**Article 11.05.05 – Basis of Payment:**

In the first sentence of the first paragraph, delete “balance adjuster,”.

**Article M.16.06 - Traffic Signals**

**Sub Article 3 - Housing:**

In the last sentence, between the words “housing” and “shall” add “and all internal hardware”.

Add the following after the last paragraph.

Each section of the housing shall be provided with a removable visor. The visor shall be the cap type, unless otherwise noted on the plan. The visor shall be a minimum .05 inch (.13 mm) thick. The visor shall be the twist on type and secured to the signal by four equidistant flat tabs screwed to the signal head.

**Sub Article 4 - Brackets:**

Add the following at the end of the last paragraph:

Backplates shall be 5” wide and louvered.

Install a 2” wide yellow retroreflective strip (Type IX sheeting) along the perimeter of the face of the backplate.

Replace the last paragraph with the following (Sheet Thickness...)

**Delete Sub Article 5 - Optical Unit and Sub Article 6 – Lamp Socket** and replace with the following:

Optical Unit, Light Emitting Diode:

**(a) General:**

Only Optical Units that meet the requirements contained herein supplied by the below manufacturers that have been tested by the Department's Signal Lab will be accepted. Final approval for model numbers will be done at the time of the catalog cut submittals.

Duralight  
Trastar, Inc.  
860 N. Dorothy Dr., Suite 600  
Richardson, TX 75081

GE Lighting Solutions  
Corporate Headquarters  
1975 Noble Road Building 338E  
East Cleveland, OH 44112-6300

Dialight  
1501 Foute 34 South  
Farmingdale, NJ 07727

Leotek  
726 South Hillview Drive  
Milpitas, CA 95035

The materials for Light Emitting Diode (LED), Optical Unit, circular and arrow, shall conform to the following:

- The ITE Performance Specification for Vehicle Traffic Control Signal Heads – Light Emitting Diode (LED) Circular Signal Supplement for circular indications dated June 27, 2005.
- The ITE Performance Specification for Vehicle Traffic Control Signal Heads – Light Emitting Diode (LED) Vehicle Arrow Traffic Signal Supplement for arrow indications dated July 1, 2007.

Section 4, Adjustable Traffic Signals and General Housing sections of the **Department of Transportation Functional Specifications for Traffic Control Equipment, current edition governs**. Where the Department of Transportation Functional Specifications conflict with this Special Provision or the 2005/2007 ITE Performance Specifications, this Special Provision and the 2005/2007 ITE Performance Specifications shall govern.

The Optical Unit shall have an Incandescent look and be made up of a smooth surfaced outer shell, multiple LED light sources, a filtered power supply and a back cover, assembled into a sealed unit. The Optical Unit shall be certified as meeting the 2005/2007 ITE Specifications by Intertek Testing Services, Inc. (ITSNA, formerly ETL) or another organization currently recognized by

the Occupational Safety and Health Administration (OSHA) as a Nationally Recognized Testing Laboratory (NRTL.) The Optical Unit shall perform to the requirements of the ITE Specification for a minimum of 60 months.

A “Swing Test” will be performed by the Department to ensure no significant dimming or blanking occurs, until the lamp is obscured by the visor. All L.E.D Lamps will be subjected to further field testing for reliable operation.

The Arrow Optical Unit shall be “Omni-Directional” so that it may be oriented in a right, left or straight configuration without degradation of performance.

**(b) Electrical Requirement:**

**Operating voltage:**

80 to 135 Volts AC with cutoff voltage (no visible indication) below 35Volts AC.

**Power requirements:**

Circular Indications: 12”, (300 mm) – no more than 16 Watts

Circular Indications: 8”, (200mm) - no more than 16 Watts

Arrows Indications: 12”, (300mm) - no more than 16 Watts

**Power Supply:**

Fused and filtered to provide excess current protection and over voltage protection from electrical surges and transient voltages.

**(c) Photometric Requirement:**

**Beam Color:**

Meet 2005/2007 ITE Specifications

**(d) Mechanical Requirements:**

**Diameter:**

The Circular Optical Unit shall fit into standard 12” (300mm) or 8” (200mm) housing.

The Arrow Optical Unit shall fit 12” (300mm) housings only.

**Enclosure:**

UV (Ultraviolet) stabilized polycarbonate back cover.

Clear lens cover for all Red, Yellow and Green Circular Optical Units.

For Arrow Optical Units the arrow indication segment of the lens shall be clear.

Enclosure sealed and waterproofed to eliminate dirt contamination and be suitable for installation in all weather conditions.

Clearly mark on the housing the following information:

- Manufacturer & model number
- Date of manufacture (must be within one year of installation)

The model number shall end with the number of LEDs used to comprise the unit as the last digits of the model number. Example, if the unit comprised of 3 LEDs and the model is x12y, then the new model number shall read x12y3.

**Operating temperature:**

Meet 2005/2007 ITE Specification

**Wiring:** L.E.D. lamps shall have **color coded 16 AWG wires** for identification of heads as follows:

RED L.E.D. Lamps	RED with WHITE neutral
YELLOW L.E.D. Lamps	YELLOW with WHITE neutral
GREEN L.E.D. Lamps	GREEN or Brown with WHITE neutral
RED L.E.D. ARROWS	RED/WHITE with WHITE neutral
YELLOW L.E.D. ARROWS	YELLOW/WHITE with WHITE neutral
GREEN L.E.D. ARROWS	GREEN/WHITE or BROWN/WHITE with WHITE neutral
GREEN/YELLOW L.E.D. ARROWS	GREEN/WHITE or BROWN/WHITE, YELLOW/WHITE, with WHITE neutral

Wires shall be terminated with a Block Spade, 6-8 stud/ 16-14 wire size.

All Circular Optical Units shall be supplied with a minimum 40" pigtail and all Arrow Optical Units Supplied with a minimum 60" pigtail.

**Sub Article 9 - Painting:**

**Third coat:**

Replace with the following:

The housing and all brackets and hardware shall be painted black by the manufacturer. The color shall be No. 17038, Federal Standard No. 595.

At intersections at Merritt Parkway interchanges, the housing and all brackets and hardware shall be painted dark green by the manufacturer. The color shall be No. 14056, Federal Standard No. 595.

The inside of the visors shall be flat black and shall meet Federal Specification TT-E-527.

The housing door and the outside of the visor shall be flat Black No. 37038, Federal Standard No. 595.

**ITEM#1106001A – 1 WAY PEDESTRIAN SIGNAL POLE MOUNTED**

**ITEM#1106003A – 1 WAY PEDESTRIAN SIGNAL PEDESTAL MOUNTED**

**ITEM#1106004A – 2 WAY PEDESTRIAN SIGNAL PEDESTAL MOUNTED**

**Section 11.06.02 Pedestrian Signal, Materials**

Section M.16.07 C. Optical Unit

Delete 2. LED: and replace with the following:

General

- Meet requirements of current MUTCD Section 4E.
- Meet current ITE specifications for Pedestrian Traffic Control Signal Indications - (PTCSI) Part 2: Light Emitting Diode (LED).
- Meet CT DOT, 2008 - 2010 Functional Specifications for Traffic Control Equipment; Section 5D, LED Pedestrian Signal with Countdown Timer.
- Meet EPA Energy Star® requirements for LED Pedestrian Signal Modules.

Operational

- Countdown display only during the flashing Pedestrian Clearance (Ped Clr) Interval. Timer goes blank at end of flashing ped clr even if countdown has not reached zero.

Physical

- Sealed optical module to prevent entrance of moisture and dust.
- Self-contained optical module, including necessary power supplies.
- Designed to securely fit into standard housing without the use of special tools or modifications to the housing.
- Identification information on module: manufacturer's name, model number, serial number, and date code.

Optical

- Multiple LED sources; capable of partial loss of LED's without loss of symbol or countdown message.
- Two complete self contained optical systems. One to display the walking person symbol (walk) and the hand symbol (don't walk). One to display the countdown timer digits.
- Visual Image similar to incandescent display; smooth, non-pixelated.
- Symbol and countdown digit size as shown on the plan.
- Solid hand/person symbol; outline display not allowed.
- Overlaid hand/person symbols and countdown digits arranged side by side.
- Countdown digit display color: Portland Orange in accordance with ITE requirements.
- Countdown digits comprised of two seven segments, each in a figure 8 pattern.
- Photometric Requirements: Luminance, Uniformity, and Distribution in accordance with ITE requirements.

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- Color Uniformity in accordance with ITE requirements.
- Blank-Out design; symbols and digits illegible even in direct sunlight when not illuminated.

#### Electrical

- Operating voltage: 89 VAC to 135 VAC.
- Low Voltage Turn-Off: 35 VAC.
- Turn-On and Turn-Off times in accordance with ITE specifications.
- Combined Hand – Countdown Digits wattage:  $\geq 20$  Watts.
- Input impedance at 60 Hertz sufficient to satisfy Malfunction Management Unit (MMU) requirements.
- Two separate power supplies. One to power the walking person symbol. One to power the hand symbol and the countdown digits.
- Meet Federal Communication Commission (FCC) regulations concerning electronic noise.
- Filtered and protected against electrical transients and surges.

#### Warranty

- Five years from date ownership is accepted.

#### Section M.16.07 F. Painting:

Remove the 2<sup>nd</sup> and 3<sup>rd</sup> sentences referring to the color.

**Third coat:** Replace with the following:

The housing and all brackets and hardware shall be painted black by the manufacturer. The color shall be No. 17038, Federal Standard No. 595.

At intersections at Merritt Parkway interchanges, the housing and all brackets and hardware shall be painted dark green by the manufacturer. The color shall be No. 14056, Federal Standard No. 595.

The inside and outside of the visors shall be flat black No. 37038, Federal Standard No. 595.



## **ITEM #1107011A – ACCESSIBLE PEDESTRIAN SIGNAL AND DETECTOR (TYPE A)**

### **Description:**

Furnish and install an Accessible Pedestrian Signal and Detector (APS&D). The APS&D provides audio and tactile information to augment the visual pedestrian signal.

Type A provides a low frequency percussive tone during the walk interval and is used where there is an exclusive pedestrian phase or  $\geq 10$  foot separation between APS&Ds.

### **Material:**

#### **A. General:**

- Conform to applicable sections of the current MUTCD Chapter 4E, Pedestrian Control Features as specified herein.
- All features fully operational when the traffic signal is in colors mode.
- All features non-operational when the traffic signal is in flash mode.
- Interchangeable with a non-accessible type pedestrian pushbutton with no modifications to the Controller Assembly (CA) or Controller Unit.
- Audible transducer integral with the APS&D housing, adjacent to the pushbutton.
- Operation programming method: Either or combination of:
  - Mechanically by dip switches or circuit board jumpers
  - Infrared remote-control hand-held device

#### **B. Electrical:**

- Metallic components either grounded or insulated to preclude an electrical hazard to pedestrians under all weather conditions.
- All features powered by the 110VAC Walk signal and the 110VAC Don't Walk signal so that additional conductors from the CA are not needed.

#### **C. Audible Pushbutton Locator Tone**

- Frequency: repeating tone at one (1) second intervals
- Tone duration:  $\leq 0.15$  seconds
- Volume:
  - Minimum setting of zero
  - Manually adjustable initial setting
  - Automatically adjusted after initial setting. Volume increased in response to a temporary increase in ambient noise and subsequently decreased with a decrease in ambient noise.
  - Maximum volume: 100 dBA which is the approximate sound pressure of a gasoline powered lawn mower nearby.
  - Automatic volume adjustment independent of other APS&Ds at the intersection.
  - May be disabled without affecting operation of other features.
- Silent only during walk interval. Active all other times.

#### **D. Vibrotactile Arrow Pushbutton**

- Pushbutton contained in a circular assembly which fits inside the housing and is attached to the housing with 4 screws.
- Actuation of pushbutton initiates speech message "Wait".
- ADA compliant: Size:  $\geq 2.0$ " (50) diameter, Actuation force:  $\leq 5$  ft-lb (22.2 N)

- Shape: Circular, raised slightly above housing so that it may be actuated with the back of a hand
- Tamper-proof, vandal-proof, weatherproof, freeze-proof, impact-resistant design and construction.
- Operation: Vibrates only during the walk interval (when the walk indication is displayed).
- Tactile Arrow:
  - Attached to surface of the button assembly by a tamperproof method.
  - Raised slightly above surface of pushbutton, minimum 0.125" (0.3)
  - Size: Length  $\geq$  1.5" (38), Height  $\geq$  1.0" (25)
  - Color: Sharp contrast to background color of pushbutton and housing

#### E. Audible Walk Interval

##### 1. General:

- Operation independent of other APS&Ds at intersection.
- Active only during the walk interval (when the walk indication is displayed).
- Volume:
  - Minimum setting of zero
  - Manually adjustable initial setting
  - Automatically adjusted after initial setting. Volume increased in response to a temporary increase in ambient noise and subsequently decreased with a decrease in ambient noise.
  - Automatic volume adjustment independent of other APS&Ds at the intersection.
  - Maximum volume: 100 dBA which is the approximate sound pressure of a gasoline powered lawn mower nearby.
- Duration:
  - Default method: Automatically set by the duration of the visual walk signal display.
  - When selected: Manually set when rest-in-walk is used for a concurrent pedestrian movement.
- Audible sounds that mimic any bird call are not allowed.

##### 2. Type A, Percussive Tone:

- Repeating tone at eight (8) to ten (10) ticks per second.
- Tone frequency: Multiple frequencies with a dominant component at 880 Hz which creates a "tick - tick - tick..." sound.

#### F. Pushbutton Housing/Sign Frame/Sign

- One piece die cast aluminum meeting requirements of ASTM B85.
- Sign frame designed to accept 9" x 15" (230 x 380) four-hole advisory sign.
- Flat back to facilitate surface mount.
- Available brackets to either pedestal top-mount or pole side-mount on pole diameter range of 3½" (89) to 15" (380).
- Available brackets to allow mounting two (2) APS&Ds to the same 3½" (89) pole, facing  $\geq$  60 degrees apart, at the same height.
- Available extension bracket of a size indicated on the plan – 18" maximum.
- Wire entrance through the rear.
- Stainless steel mounting hardware.
- Color: The color shall be black No. 17038, Federal Standard No. 595. At intersections at Merritt Parkway interchanges, all brackets and hardware shall be painted dark green by the manufacturer. The color shall be No. 14056, Federal Standard No. 595.
- Finish: Housing/Frame and all mounting brackets either:
  1. Painted with 3 coats of infrared oven-baked paint before assembly.

- Primer: Baked iron oxide which meets or exceeds FS TT-P-636.
- Second coat: Exterior-baking enamel, light gray, which meets or exceeds FS TT-E-527.
- Third coat: Exterior-baking enamel, which meets or exceeds FS TT-E-489.
- 2. Electrostatic powder coated after chemically cleaned.
- Sign: CT DOT Sign No. 31-0845

**Construction Methods:**

Install the APS&D according to the manufacturer’s instructions. Position the ASP&D so the plane of the sign face is parallel to the crossing (sign is facing perpendicular) and the arrow is pointing in the same direction as the crossing, not necessarily at the ramp. Notify the Engineer if there is any discrepancy or ambiguity between the plans and field conditions that prevent placement of the ASP&D as shown on the plan. Set the minimum sound levels of the locator tone and the audible walk indication when there is little or no ambient noise as in night time operation. Set the volume of audible walk indications and pushbutton locator tones to a maximum of 5dBA louder than ambient sound. The locator tone should be audible 6’ to 12’ (1.8 m to 3.6 m) from the pushbutton or to the building line, whichever is less. Confirm the volume of both audible walk indication and the locator tone increases with an increase in ambient sound and subsequently decreases when the ambient noise decreases.

If programming method is remote, by an infrared hand-held device, provide one device and operation manual for each intersection where APS&D is installed.

**Method of Measurement:**

This work is measured by the number of APS&Ds of the type specified, installed, tested, fully operational, and accepted.

**Basis of Payment:**

Payment for this work is based on the installation, inspection, successful completion of the 30 day test period, and final acceptance of the Accessible Pedestrian Signal and Detector of the type specified. Payment includes the sign, mounting brackets for adjacent buttons on the same structure, extension brackets, all necessary cable, all incidental materials, labor, tools, and equipment necessary to complete the installation. Payment also includes the warrantee, installation manual, and operation manual.

If programming method is remote by an infrared hand-held device, the total bid price of all APS&Ds includes one remote programming device and accompanying operation manual for each intersection where APS&D is installed.

Pay Item	Pay Unit
Accessible Pedestrian Signal and Detector (Type A)	Each

## **ITEM #1108163A – MODIFY EXISTING CONTROLLER**

This item shall consist of modifying the existing traffic controller assembly to provide the revised operation as shown on the plans or as directed by the Engineer. The modification shall include, but not be limited to, revisions to the timing and sequence, cabinet wiring, coordination, pre-emption, field wiring and cabinet wiring diagrams.

### **MATERIAL**

The material for this work shall conform to the requirements of the current edition of the Connecticut Department of Transportation Functional Specifications for Traffic Control Equipment. The material shall be compatible with the existing equipment. Any material in question shall be approved prior to installation by the Engineer or the Department of Transportation Signal Lab, 280 West Street, Rocky Hill. Contact Mr. Don Assard at (860) 258-0346 or Mr. Mark Zampini at (860) 258-0349 for approval.

### **CONSTRUCTION METHODS**

All revisions to the cabinet wiring shall be neat and orderly. All additional wiring shall be from terminal to terminal. Splices will not be allowed. All changes, additions and deletions shall be documented, dated and drawn on the reproducible original or a reproducible copy of the original cabinet wiring diagram. Four paper copies shall be furnished to the Engineer upon completion of the revision.

### **METHOD OF MEASUREMENT**

This item will be measured for payment as an "Each" item.

### **BASIS OF PAYMENT**

This item will be paid for at the contract price each, for "Modify Existing Controller" which price shall include all necessary load switches, relays, components, hardware, tools, equipment, engineering and labor required to modify the existing controller as shown on the plan. This price shall also include four updated cabinet wiring diagrams.

<u>Pay Item</u>	<u>Pay Unit</u>
Modify Existing Controller	Ea.

## **ITEM #1108207A – INSTALL STATE FURNISHED TRAFFIC CONTROLLER AND CABINET**

### **Description:**

This item shall consist of installing a traffic controller cabinet, and related equipment, furnished by the State, Department of Transportation, on an existing, modified, or new foundation as indicated on the plans or as directed by the Engineer.

### **Material:**

All material for this work shall be furnished by the State except for miscellaneous electrical hardware, such as spade connectors, electrical tape, and cable ties required to complete the installation.

### **Construction Methods:**

The Contractor shall arrange a schedule to pick up the traffic controller, cabinet, and related material from the Department of Transportation, Signal Lab, located at 280 West Street in Rocky Hill. Contact Mr. Don Assard at (860) 258-0346 or Mr. Mark Zampini at (860) 258-0349, 45 days in advance to schedule pick up of the material. In addition, the Contractor shall telephone 24 hours prior to the scheduled date to confirm the location and time of pick up.

The Contractor shall sign a receipt, listing all material furnished by the State, for each location. All material provided by the State shall be transported, and stored if necessary, with care appropriate for microprocessor electronic equipment. It shall be the Contractor's responsibility from the time of pick up until the new controller is in operation according to plan, to repair or replace any material damaged during delivery or during installation.

The Contractor shall develop a schedule of the dates of the installation of each State furnished controller. The Contractor shall keep the Engineer advised of the schedule and any subsequent changes. The Engineer shall notify the D.O.T., District Electrical Maintenance Office and the D.O.T. Signal Lab of the schedule and all changes to the schedule.

It shall be the responsibility of the Contractor to determine the function of existing traffic signal, pedestrian signal and detector cables, which will be reused, so that correct connection to the new controller may be completed.

The cabinet shall be installed on the foundation in accordance with the plans or as directed by the Engineer. Prior to connection of the field wires to the new controller cabinet, the Contractor shall perform the following tests:

1. Flash out all traffic and pedestrian signal field wires. This shall consist of momentarily connecting each to a 110 VAC fused source. This will ensure the signals are connected to the correct wires and there are no shorts in the field wiring.

2. Voltage test all input circuits. This shall consist of measuring all other field wires, such as vehicle detector, pedestrian pushbutton and pre-emption cables with a volt meter to ensure there is no voltage present which will damage the electronic devices.

Only then will existing and new signal wires and detector cables be connected, as indicated in the signal hook up chart provided with each cabinet.

When secondary service is initially applied to a State furnished controller cabinet, the controller unit, conflict monitor, coordination unit and other electronic equipment shall be unplugged. After the signals are flashing, the controller, conflict monitor and other equipment shall be connected, and the intersection placed in automatic operation.

**Method of Measurement:**

This work shall be measured for payment by the number of traffic controllers, cabinets and related equipment for each, picked up, installed, operating and accepted in place.

**Basis of Payment:**

This work will be paid for at the contract unit price each for "INSTALL STATE FURNISHED TRAFFIC CONTROLLER AND CABINET" complete in place, which shall include transportation from the pick up source to the location, storage, all miscellaneous electrical hardware, tools and work incidental thereto.

## **ITEM #1108665A – 10/100/1000BASE-T ETHERNET SWITCH**

### **DESCRIPTION:**

This section involves the provision, installation and configuration of the 10/100/1000 Base-T Ethernet Switch. The Contractor shall install the proposed equipment in the traffic signal cabinet.

### **MATERIALS:**

The 10/100/1000Base-T Ethernet Switch shall provide Ethernet data aggregation for all traffic signal cabinets.

The 10/100/1000Base-T Ethernet Switch shall comply with the following requirements:

1. Minimum of eight (8) 10/100/1000 Base-T Ethernet ports with RJ-45 jacks Institute of Electrical and Electrical Engineers (IEEE) 802.3u
2. At least one craft port for switch configuration
3. 10/100/1000Base-T with speed auto negotiation and full/half duplex mode
4. Packet forward and filtering rate of at least 14,880pps for 10Mbps; 148,800pps for 100Mbps; 11,900,000pps for 1000Mbps
5. 2M bits Frame buffer memory (minimum)
6. Store and forward with IEEE802.3x full duplex, non-blocking flow control
7. Support 8000 MAC address minimum and IEEE 802.1Q Virtual Lan (VLAN) Tagging
8. Support IEEE 802.1p (Quality of Service) for 4-level transmission priorities
9. Support internet protocol (IP) Multicast Filtering through Internet Group Management Protocol (IGMP) Snooping (v2) (RFC1112) and support user configurable static multicast groups
10. Support Simple Network Management Protocol (SNMP), v2 and v3 Web-based (https) management, and Secure Shell (SSH)
11. Support port-mirroring
12. Din rail mounting
13. Operating temp: -40°C - 75°C with no fans, meeting the following standards IEC61850-3, National Electrical Manufacturers Association (NEMA) TS-2, and IEC 60068.

14. Operating Humidity: 10% - 95% RH non-condensing
15. Storage Temp: -40°C - 85°C
16. Support Rapid Spanning Tree Protocol IEEE 802-1w and Multiple Spanning Tree Protocol IEEE 802.1s. The switch must support a minimum of six (6) simultaneous instances of multiple spanning tree protocol.
17. Minimum of twelve (12) selectable small form factor pluggable (SFP) 100/1000Mbps slots.
18. Minimum of six single mode 1000Mbps (SFP) optics utilizing 1310nm wavelength with a minimum rated distance of ten (10) kilometers. The optical budget for the 1000Mbps ports must be greater than or equal to 16dB at 1310nm wavelength. Optics shall be supplied in the SFP.
19. Circuit Board Conformal Coating
21. Switching Latency of seven (7) us or better
22. Port based network access control (802.1X)
23. Two redundant power supplies with no fans Din rail mounted.
24. Backplane Switching bandwidth of forty (40) Gbps or greater. (When all ports are populated)

#### Copper Cables and Connectors:

The Contractor shall furnish and install all necessary interface cabling and connectors including:

- Category 6 (CAT 6) cable to connect the equipment and patch panels.
- RJ 45 connectors.
- Power supply.

#### Manufacturer's Qualifications:

The Manufacturer of the 10/100/1000Base-T Ethernet switch shall have a minimum of five (5) years' experience in the design, manufacture, and testing of 10/100/1000Base-T Ethernet switches.



Warranty:

All equipment supplied under these items shall be warranted for parts by the Manufacturer against defects and failures, which may occur through normal use for a period of three (3) years from the date of acceptance. A copy of the warranty shall be presented to the Engineer before acceptance of the thirty (30) day test.

**CONSTRUCTION METHODS:**

All materials shall be new and approved by the Engineer. All equipment shall be the latest revision or product version under production by the equipment supplier. Obsolete, no-longer-supported, or no-longer-produced equipment shall not be acceptable.

Serial numbers and model numbers, if available, shall be permanently engraved on all removable components and hardware.

The Contractor shall preconfigure the switches and bench test them according to the fiber optic layout prior to installation.

The Contractor shall furnish and install din rail mounted hardware. Installation shall include all required interface cable types as specified in these special provisions.

The Contractor shall label all data and fiber cables which shall correspond to the As-built wiring diagrams.

Configuration and Testing:

The Contractor shall configure the switch according to Manufacturer's instructions and prior to installation; the Contractor shall demonstrate all required functions of the equipment and shall demonstrate complete operability with all connected equipment.

The newly installed 10/100/1000Base-T Ethernet Switch shall be configured to support rapid spanning tree protocol or multiple spanning tree protocol in a collapsed ring formation. Each individual collapsed ring shall have no more than six (6) Ethernet switches in a one (1) ring. Please reference the fiber optic layout plan for collapsed ring details.

All devices on the collapsed ring Ethernet network will be on one or more Virtual LAN (VLAN) with each device statically assigned a unique IP address. The Contractor shall request a range of usable IP addresses and subnet assignments from the Engineer. The Contractor will prepare IP address and subnet assignments and present them to the Engineer for approval prior to installation. The Contractor will be provided with the appropriate IP gateway assignment for communication back to the Department's Newton HQ.

The Contractor will demonstrate network resiliency and proper operation of the collapsed ring network by powering down the 10/100/1000Base-T Ethernet Switch separately in each local traffic signal cabinet. The Contractor will then ensure communication to all remaining

local traffic signal cabinets is unaffected and still accessible from the master traffic signal cabinet.

The Contractor will demonstrate network connectivity to the wireless cellular router connected in the master traffic signal cabinet to the collapsed ring Ethernet network. The contractor will also ensure all devices on the collapsed ring Ethernet network have network connectivity to the wireless router using the appropriate IP gateway address.

#### Cables and Connectors:

The Contractor shall furnish and install CAT 6 patch cables and connectors from the 10/100/1000Base T Ethernet switch to the signal controller, video detection processor, and wireless router. The Contractor shall provide the necessary patch cable lengths based on the distance and cable path between 10/100/1000Base-T Ethernet Switch and traffic signal cabinet equipment. Patch cables shall be neatly routed and secured.

#### Connections to Optical Fiber Termination Patch Panel (OFTPP):

The Contractor shall provide all termination fiber optic patch cords required from the optical fiber termination patch panel to the equipment described herein this specification.

The Contractor shall connect all 10/100/1000Base-T Ethernet Switches according to the fiber optic assignment on the Contract Drawings.

The complete end to end optical fiber path for each data link shall have been tested and verified in accordance with this Contract prior to connecting the 10/100/1000Base-T Ethernet Switch.

The Contractor shall provide to the Engineer a copy of all as-built assignments for the OFTPP.

The Contractor once all connections are made between the traffic signal cabinets will verify that light loss levels are within the proper optical budget range. If it is found that optical loss levels are too low or too high in relation to the Optical Time Domain Reflectometer (OTDR) fiber testing then the contractor will clean/replace dirty or damaged fiber patch cables for a low optical power condition and add optical attenuators for a high optical power condition.

#### Submittals:

As part of Section 1.06 "Control of Materials", the Contractor shall provide the following information as part of the shop drawing/catalog cut submittal:

- As-built Functional block diagrams, wiring diagrams, and point-to point wiring details.
- Detailed shop drawings, wiring diagrams, equipment cabinet front elevation drawings, and equipment installation drawings indicating supports and appurtenances required for proper installation.

- Product data, Operations and Maintenance manuals. Information regarding materials, finishes and accessories.

Delivery, Storage, and Handling:

- All materials shall be delivered in the Manufacturer’s original unopened protective packages.
- All materials shall be stored in their protective packaging and protected against soiling, physical damage, or wetting before installation.
- All equipment shall be protected during transportation and until installation against damage and stains.
- All equipment and materials shall be stored in a clean, dry location free from construction dust, precipitation and excess moisture.
- Replace damaged materials and equipment, as determined by the Engineer, at no cost to the Department.

**METHOD OF MEASUREMENT:**

The work to be measured for payment under these items shall be the number of 10/100/100 Base-T Ethernet switches inclusive of all optics and spare units of the type specified, installed, completed, tested and accepted..

**BASIS OF PAYMENT:**

The work to be done under these items shall be paid at the Contract Price for each 10/100/100 Base-T Ethernet switch inclusive of all optics and spare units. This price shall include all equipment, materials, power supplies, cables, Cat 6 patch cords, fiber optic patch cords, spare parts, connectors, installation, warranties, labor, shipping and incidental items required to satisfy these specifications.

<u>Pay Items</u>	<u>Pay Unit</u>
10/100/100 Base-T Ethernet Switch	Ea.

## **ITEM #1108808A – TRAINING**

### **Description:**

Training shall be arranged by the Contractor for the detection system included in the Contract.

### **Construction Methods:**

#### Equipment Type:

- 360 Degree Video Detection System
- Thermal Video Detector Assembly

#### Training:

The Training shall be provided by the manufacturer's certified trainer. Provide a minimum of six (6) hours of training for up to eight (8) representatives from the offices of District Maintenance, Traffic Engineering and Highway Operations. Include three (3) hours of classroom instruction and three (3) hours of hands-on instruction focusing on the following:

- Theory of operation; Program and operation instructions; Circuit description
- Troubleshooting; Preventative maintenance; field diagnostics; field adjustments
- Proper installation techniques

Training sessions shall be scheduled at a mutually agreed time and location after installation of the equipment.

**Method of Measurement:** Training will be measured for payment as a lump sum at the completion of all training sessions.

**Basis of Payment:** The Contract lump sum price for "Training" shall include all necessary instruction manuals, maintenance manuals, schematics of all equipment, and instruction for all attendees of the training sessions.

Pay Item	Pay Unit
Training	1.s.

## **ITEM #1108826A – OPTICAL FIBER TERMINATION PATCH PANEL**

### **DESCRIPTION:**

This section specifies the requirements for furnishing and installing Optical Fiber Termination Patch Panels (OFTPP) for termination and connection of fiber optic cables at the locations shown on the Contract Drawings. Fiber optic patch cables shall be installed between the OPTPP and the optical communication equipment.

### **MATERIALS:**

#### 1. Optical Fiber Termination Patch Panel (OFTPP):

- 1.1 The OFTPP shall be manufactured by Corning Cable Systems, WCH Series or an approved equal. The OFTPP shall include a splice enclosure to protect the fused fibers as described herein this specification. Each interconnect panel shall be equipped with SC-type connector style jacks for attachment to fiber optic drop cables.
- 1.2 The OFTPP shall be wall mountable and have the capacity to terminate twenty four optical fibers into SC-type panel connectors. SC-type connectors shall be used for the termination of the trunkline optical fibers at the master traffic signal cabinet. 1.3 All patch panel connector positions used for connection of fiber optic transmission equipment shall be identified on a label permanently affixed to the cabinet door. The label shall show the connector position and the designated fiber optic transmission equipment.
- 1.4 The OFTPP shall include all cable strain-relief, splice trays, fan-out kits, splices, tools, equipment and labor necessary to complete this item as described in this specification and as shown on the Contract Drawings.
- 1.5 The OFTPP shall have a splice tray organizer capable of terminating twenty-four (24) fibers. The organizer shall provide access to and removal of individual splice trays and permit selective splicing to allow one (1) or more fibers to be cut and splice to branch cable without disrupting other fibers.
- 1.6 All splice trays shall have a contrasting background for splicing colored fibers or as approved by the Engineer. The splice trays shall include tie-wraps to secure the buffer or transport tubes to the tray. The splice trays shall be of adequate size to prevent induced attenuation due to fiber bending.
- 1.7 The OFTPP splice closure shall protect the fiber optic cable splices from mechanical damage, shall provide strain relief for the cable, and shall be manufactured of non-corroding materials.

1.8 Vinyl markers shall be supplied to identify each fiber to be spliced within the closure. Each splice (as required for testing) shall be individually mounted and mechanically protected on the splice tray.

1.9 Polyethylene tubes shall be supplied to protect exposed individual fibers within the closure.

1.10 The approximate size of the OFTPP shall not exceed 9.25”H x 13.25”W x 3.25”D.

1.11 The OFTPP shall include connector panels for twenty-four (24) SC style fiber optic connectors.

## 2.0 Environmental Requirements:

2.1 All equipment shall be certified to operate over a temperature range of -20° Celsius to +60° Celsius with a relative humidity of 10% to 95%, non-condensing.

2.2 Termination panels shall be equipped with suitable means for routing and securing of cables and pigtails to prevent damage to fibers during all regular operation and maintenance.

## 3.0 Fiber Optic Patch Cords:

3.1 Fiber Optic Patch Cords shall be furnished in sufficient length and quantity, and installed in the traffic signal cabinet to connect the optical fiber termination patch panel to the optical equipment.

3.2 All optical fibers, coatings, tubes, metals and jackets shall be free of roughness, porosity, blisters, splits and voids in accordance with good manufacturing practice.

3.3 The cable shall be suitable for operation over a temperature range of -20°C to +60°C.

3.4 The patch cords shall be rated for indoor/outdoor use. The patch cord connector type must match to the equipment it is intended. Patch cords will be of one type SC to LC.

3.4 Materials used in the cable shall not produce hydrogen in a concentration large enough to cause any degradation in the transmission performance of the optical fibers.

## 4.0 SC-type and LC Connectors:

4.1 SC-type and LC connectors shall have a ceramic insert.

4.2 The connector shall be of the LC and SC-type and fully compatible with the fiber optic cable utilized and the mating jacks to which they will be attached.

- 4.3 The connector shall be compatible with an ultra physical contact (UPC) finish. All connectors shall be polished to a UPC finish with a minimum thirty (30) dB connector return loss.
- 4.4 The connector mean loss shall not be greater than 0.2 dB with a standard deviation of not greater than 0.1 dB.
- 4.5 The connector loss shall not vary more than 0.1 dB after 500 repeated matings.
- 4.6 The connector shall withstand an axial load of 135 N.
- 4.7 The connectors shall be attached in accordance with the Manufacturer's recommended materials, equipment and practices.
- 4.8 The connector shall be suitable for the intended environment and shall meet the following environmental conditions:
  - 4.8.1 Operating Temperature: -20 to +60° C
  - 4.8.2 Storage Temperature: -30 to +60° C
- 4.9 The connector loss shall not vary more than 0.2 dB over the operating temperature range.
- 4.10 Connectors shall be protected before installation by a suitably installed waterproof protection cap.

## 5.0 Warranty:

- 5.1 All equipment supplied under these items shall be warranted for parts by the vendor against defects and failures, which may occur through normal use for a period of one (1) year from the date of Final Acceptance. A copy of the warranty shall be presented to the Engineer before installation of the equipment.

## **CONSTRUCTION METHODS:**

### 1.0 Optical Fiber Termination Patch Panel (OFTPP):

- 1.1 The Contractor shall install and provide all splicing and termination required to connect field fiber cable to the equipment shown on the Contract Drawings and specified elsewhere in this project. The Contractor shall refer to Item 1112242A – Fiber Optic Cable Splice Enclosure for splicing requirements.
- 1.2 The Contractor shall install the OFTPP at the locations shown on the plans and shall provide and install all fiber optic patch cords between the optical equipment and the OFTPP as shown on the Contract Drawings.

- 1.3 The OFTPP shall be mounted in the master traffic signal cabinet at the approximate location as shown on the Contract Drawings or the fiber distribution cabinets as directed by the Engineer. Sufficient lengths of cable between the patch panel and the optical equipment installed in the traffic cabinet shall be coiled in the equipment cabinet to allow the OFTPP to be removed from the cabinet for splicing.
- 1.4 Splices to the fiber optic cable used in this project shall be fabricated using modern, high quality fusion type splicing equipment.
- 1.5 The maximum loss introduced by any splice shall not exceed 0.2 dB.
- 1.6 The average splice loss shall not exceed 0.1 dB for any given span, with a standard deviation not greater than 0.07 dB.
- 1.7 Each splice shall be tested for tensile strength by applying a force of not less than 200 grams.
- 1.8 All splices shall be arranged neatly in splice trays, supported and protected with a suitable splice protector.
- 1.9 The optical fiber path shall be tested and verified in accordance with this Contract prior to the connection to the equipment.
- 1.10 The Contractor shall neatly train all optical patch cords and pigtails together when routing them along the same path and shall neatly train them in the traffic signal cabinet.
- 1.11 No cables shall be installed with a bend radius less than the Manufacturer's minimum recommended bending radius.

## 2.0 Submittals:

The Contractor shall submit the following documentation:

- 2.1 Detailed shop drawings, wiring diagrams, equipment cabinet front elevation drawings, and equipment installation drawings indicating supports and appurtenances required for proper installation.
- 2.2 Product data and cut sheets, operating and maintenance manuals. Information regarding materials, finishes and accessories.
- 2.3 The Contractor shall submit four (4) copies of the "as-built" equipment manuals with the documentation for OFTPP installed. The equipment manuals shall include technical information, wiring diagrams and schematics, hookup prints, parts list and a troubleshooting guide.

## 3.0 Delivery, Storage, and Handling:



- 3.1 The Contractor shall deliver, store, handle and install all materials and equipment in such a manner as not to degrade quality, serviceability or appearance.
- 3.2 The Contractor shall be responsible for storage of the materials and equipment prior to installation in a clean, dry location free from construction dust, precipitation and excess moisture.
- 3.3 The Contractor shall be required to replace any damaged materials and equipment, as determined by the Engineer, at no additional cost to the Department.
- 3.4 All materials shall be delivered in the Manufacturer's original unopened protective packages.
- 3.5 All materials shall be stored in their original protective packaging and protected against soiling, physical damage, or wetting, before installation. All equipment shall be protected during transportation and until installation against damage and stains.

**METHOD OF MEASUREMENT:**

These items shall be measured for payment by the number of Optical Fiber Termination Patch Panels (OFTPP), with all required cabling, patch cords, connectors and other required appurtenances installed, completed, tested and accepted.

**BASIS OF PAYMENT:**

The work to be done under this Item shall be paid at the Contract Price each for the Optical Fiber Termination Patch Panel (OFTPP), which price shall include all equipment, materials, connectors, patch cords, splicing, tools, installation, labor, shipping and incidental items required to satisfy these specifications.

<u>Pay Items</u>	<u>Pay Unit</u>
Optical Fiber Termination Patch Panel	Ea.

## **ITEM #1111201A – TEMPORARY DETECTION (SITE NO. 1)**

## **ITEM #1111202A – TEMPORARY DETECTION (SITE NO. 2)**

### **Description:**

Provide a Temporary Detection (TD) system at signalized intersections throughout the duration of construction, as noted on the contract plans or directed by the Engineer. TD is intended to provide an efficient traffic-responsive operation which will reduce unused time for motorists travelling through the intersection. A TD system shall consist of all material, such as pedestrian pushbutton, accessible pedestrian signal, conduit, handholes, cable, messenger, sawcut, loop amplifier, microwave detector, Video Image Detection System (VIDS), Self-Powered Vehicle Detector (SPVD), and any additional components needed to achieve an actuated traffic signal operation.

### **Materials:**

Material used for TD is either owned by the Contractor and in good working condition, or existing material that will be removed upon completion of the contract. Approval by the Engineer is needed prior to using existing material that will be incorporated into the permanent installation. New material that will become part of the permanent installation is not included or paid for under TD.

### **Construction Methods:**

The work for this item includes furnishing, installation, relocating, realigning, and maintaining the necessary detection systems as to provide vehicle and pedestrian detection during each phase of construction. If not shown on the plan, program the TD modes (pulse or presence) as the existing detectors or as directed by the Engineer. If the TD method (loops, SPVD, microwave, VIDS, pushbutton, or other) it may be the Contractor's choice. The method chosen for TD must be indicated on the TD Plan submission.

The traffic signal plan-of-record, if not in the controller cabinet will be provided upon request. Ensure the controller phase mode (recall, lock, non-lock) and phase timing are correct for the TD. Adjust these settings as needed or as directed by the Engineer.

At least 30 days prior to implementation of each phase of construction submit a TD proposal to the Engineer for approval. Submit the TD proposal at the same time as the Temporary Signalization plan. Indicate the following information for each intersection approach:

- Phase Mode
- Temporary Detection Method
- Area of Detection
- Detector Mode

Submit the proposed temporary phase timing settings and the TD installation schedule with the TD proposal. See the example below.

Example Proposed Temporary Detection and Timing

**Site 1**

Warren, Rt. 45 at Rt. 341, Location #149-201

Approach	Phase	Phase Mode	TD Method	Area of Detection	Det Mode
<i>Rt. 45 NB</i>	<i>2</i>	<i>Min Recall</i>	<i>VIDS</i>	<i>150' from Stop Bar</i>	<i>Pulse</i>
<i>Rt. 45 SB</i>	<i>2</i>	<i>Min Recall</i>	<i>SPVD</i>	<i>150' from Stop Bar</i>	<i>Pulse</i>
<i>Rt. 341</i>	<i>4</i>	<i>Lock</i>	<i>Microwave</i>	<i>30' from Stop Bar</i>	<i>Pulse</i>
<i>Rt. 341</i>	<i>4</i>	<i>Lock</i>	<i>Pushbutton</i>	<i>At SE &amp; SW corners</i>	<i>n/a</i>

Temporary Phase Timing Settings:

Phase	Min	Ped	Ped Clr	Ext	Max 1	Max2	Yel	Red
<i>2</i>	<i>20</i>	<i>0</i>	<i>0</i>	<i>6</i>	<i>45</i>	<i>60</i>	<i>4</i>	<i>1</i>
<i>4</i>	<i>14</i>	<i>7</i>	<i>9</i>	<i>3</i>	<i>27</i>	<i>35</i>	<i>3</i>	<i>1</i>

Scheduled TD: *July 4, 2011* **Site 2**

Scotland, Rt. 14 at Rt. 97, Location #123-201

Approach	Phase	Phase Mode	TD Method	Area of Detection	Det Mode
<i>Rt. 15 WB Left Turn</i>	<i>1</i>	<i>Non-Lock</i>	<i>VIDS</i>	<i>5' in front to 10' Behind Stop Bar</i>	<i>Presence</i>
<i>Rt. 14 EB</i>	<i>2</i>	<i>Min Recall</i>	<i>Existing Loop</i>	<i>150' from Stop Bar</i>	<i>Pulse</i>
<i>Ped Phase</i>	<i>3</i>	<i>Non-Lock</i>	<i>Pushbutton</i>	<i>At all corners</i>	<i>n/a</i>
<i>Rt. 14 WB</i>	<i>6</i>	<i>Min Recall</i>	<i>VIDS</i>	<i>150' from Stop Bar</i>	<i>Pulse</i>
<i>Rt. 97</i>	<i>4</i>	<i>Lock</i>	<i>Loop, Pre-formed</i>	<i>20' from Stop Bar</i>	<i>Pulse</i>

Temporary Phase Timing Settings:

Phase	Min	Ped	Ped Clr	Ext	Max 1	Max2	Yel	Red
<i>1</i>	<i>5</i>	<i>0</i>	<i>0</i>	<i>2</i>	<i>12</i>	<i>18</i>	<i>3</i>	<i>0</i>
<i>2 &amp; 6</i>	<i>24</i>	<i>0</i>	<i>4</i>	<i>4</i>	<i>26</i>	<i>36</i>	<i>4</i>	<i>1</i>
<i>3</i>	<i>16</i>	<i>7</i>	<i>9</i>	<i>0</i>	<i>16</i>	<i>16</i>	<i>4</i>	<i>1</i>
<i>4</i>	<i>14</i>	<i>7</i>	<i>9</i>	<i>3</i>	<i>27</i>	<i>35</i>	<i>3</i>	<i>1</i>

Scheduled TD: *July 4, 2011*

When at any time during construction the existing vehicle or pushbutton detection becomes damaged, removed, or disconnected, install TD to actuate the affected approaches. Install and make TD operational prior to removing existing detection. TD must be operational throughout all construction phases.

Provide a list of telephone numbers of personnel who will be responsible for the TD to the Engineer. If the TD malfunctions or is damaged, notify the Engineer and place the associated phase on max recall. Respond to TD malfunctions by having a qualified representative at the site within three (3) hours. Restore detection to the condition prior to the malfunction within twenty-four (24) hours.

If the Engineer determines that the nature of a malfunction requires immediate attention and the Contractor does not respond within three (3) hours following the initial contact, then an alternative maintenance service will be called to restore TD. Expenses incurred by the State for alternative service will be deducted from monies due to the Contractor with a minimum deduction of \$500.00 for each service call. The alternate maintenance service may be the traffic signal owner or another qualified Contractor.

TD shall be terminated when the detection is no longer required. This may be either when the temporary signal is taken out of service or when the permanent detectors are in place and fully operational.

Any material and equipment supplied by the Contractor specifically for TD shall remain the Contractor's property. Existing material not designated as scrap or salvage shall become the property of the Contractor. Return and deliver to the owner all existing equipment used as TD that is removed and designated as salvage.

**Method of Measurement:**

Temporary Detection will be paid only once per site as a percentage of the contract Lump Sum price. Fifty percent (50%) will be paid when Temporary Detection is initially set up, approved, and becomes fully operational, and fifty percent (50%) will be paid when Temporary Detection terminates and all temporary equipment is removed to the satisfaction of the Engineer.

**Basis of Payment:**

This work will be paid at the contract Lump Sum price for "Temporary Detection (Site No.)". The price includes furnishing, installing, relocating, realigning, maintaining, and removing, the necessary detection systems and all incidental material, labor, tools, and equipment. This price also includes any detector mode setting changes, timing or program modifications to the controller that are associated with TD. All Contractor supplied material that will remain the Contractor's property will be included in the contract Lump Sum price for "Temporary Detection (Site No.)". Any items installed for TD that will become part of the permanent installation will not be paid for under this item but are paid for under the bid item for that work.

<u>Pay Item</u>	<u>Pay Unit</u>
Temporary Detection (Site No.)	L. S.

## **ITEM #1112241A – FIBER OPTIC CABLE SPLICE ENCLOSURE**

### **Description:**

This Item shall consist of furnishing and installing splice enclosures to interconnect optical fibers between two or more fiber optic cable segments.

### **Materials:**

#### **A. Applicable Publications**

1. Publications listed below form a part of these specifications to the extent referenced. The publications are referred to in the text by basic designation. All Fiber Optic Communication System hardware shall be compliant with the following specifications: Electronics Industries Association (EIA):
  - a. TIA-526-3-89 Fiber Optic Terminal Equipment Receiver Sensitivity and Maximum Receiver Input.
  - b. TIA-455-32A-90/Fiber Optic Circuit Discontinuity.
  - c. EIA-310-C Racks, Panels, and Associated Equipment.
  - d. EIA-359-A Colors for Color Identification and Coding.
  - e. EIA-TIA-455-A Standard Test Procedures for Fiber Optic Fibers, Cable Transducer Sensors, Connecting and Terminating Devices and Other Fiber Optic Components.
  - f. EIA-455-6B Cable Retention Test Procedure for Fiber Optic Cable Interconnecting Devices.
  - g. TIA/EIA-598-A Optical Fiber Cable Color Coding.

#### **B. Fiber Optic Splice Enclosure**

1. The Splice Enclosures shall accommodate from 60 to 168 fiber splices. Each splice enclosure shall have a splice tray organizer capable of holding 12 to 18 splice trays. The organizer shall provide access to and removal of individual splice trays and permit selective splicing to allow one or more fibers to be cut and spliced to branch cable(s) without disrupting other fibers.
2. The Contractor shall install Splice Enclosures of a capacity that they are capable of handling of 24 fibers more than the current fiber count at any given splice location as shown on the Drawings.
3. The Splice Enclosure shall fit within the space allocated for it as shown on the plans and to operate within the environment in which it is to be installed.

4. The Splice Enclosure shall protect the fiber optic cable splices from mechanical damage, shall provide strain relief for the cable, and shall be resistant to salt corrosion. The enclosure shall be waterproof and airtight, and shall be manufactured of non-corroding materials.
5. The Splice Enclosure shall be designed for a temperature range of  $-30^{\circ}\text{C}$  ( $-22^{\circ}\text{F}$ ) to  $+70^{\circ}\text{C}$  ( $158^{\circ}\text{F}$ ). The splice enclosure shall be capable of performing in a cable vault or pull box, environment where total and continuous submersion in water is to be expected.
6. All materials in the enclosures shall be non-reactive and shall not support galvanic cell action. The outer enclosure shall be compatible with the other enclosure components, splice trays, and cables. The end plate shall consist of two sections and shall have the capacity for a minimum of two cable entries on each end.
7. All Splice Enclosures shall employ re-usable sealing materials allowing multiple re-entrances without replacing any component. Access to the splice enclosures shall be accomplished without the use of special tools or devices. The splice enclosure shall employ a latching mechanism for entrance to the internal components of the enclosure.
8. All environmentally exposed components of the Splice Enclosures shall be UV light resistant.
9. All splice trays shall be lined to provide a contrasting background for splicing colored fibers or as approved by the Engineer.. The splice trays shall include clear snap-on covers and tie wraps to secure the buffer or transport tubes to the tray. The splice trays shall be of adequate size to prevent induced attenuation due to fiber bending.
10. Each splice tray shall be capable of accommodating a minimum of 12 fusion splices for the single mode fiber cable of the type selected.
11. The splice tray shall have features that retain the fiber loops and control the bend radius. The splice tray cover shall be clear plastic to allow for inspection of the fibers without opening the tray.
12. Vinyl markers shall be supplied to identify each fiber to be spliced within the enclosure. Each splice shall be individually mounted and mechanically protected on the splice tray.

### C. Cable Racking Hardware

1. Cable racking hardware shall be made of a high performance polymer: Each splice enclosure shall be supported in the pullbox by a medium duty rack capable of supporting a minimum load of 445 Newtons. Racks shall not be less than 150mm in length. Medium duty racks shall have 100mm arms minimum. At splice points, the pullbox shall have a horizontal rack capable of supporting, and holding securely in place, a splice closure.

### D. Warranty

1. All equipment supplied for this shall be warranted for parts by the vendor against defects and failures, which may occur through normal use for a period of one (1) year from the date of installation. A copy of the warranty must be presented to the Engineer before installation of the equipment.

## **Construction Methods:**

### A. Installation

1. Splice Enclosures shall be installed as shown in the Drawings. Unless otherwise specified, outdoor type Splice Enclosures shall be installed within vaults or pull boxes located adjacent to CCTV cameras and at fiber optic cable reel-end splice locations as shown on the Drawings.
2. The installations shall include all required components including sealing kits, cable racking hardware and mounting hardware to achieve an environmentally secure permanent installation.
3. The Contractor shall supply all materials, tools, equipment and labor including but not limited to fan out kits, connectors, trays, splice enclosures, and any other incidentals necessary to complete the installation of the fiber optic cable splice enclosure.
4. The Splice Enclosure shall be secured to the interior of the cavity of the vault or pullbox on cable racking hardware using tie-wraps.
5. The Outdoor Splice Enclosure shall be mounted in such position to allow the cable to enter and exit the enclosure without exceeding the cables minimum bending radius. Sufficient cable shall be coiled in the vault or pull box to allow the Splice Enclosure to be removed from the vault for current and future splicing and cable repairs. The Contractor shall install mounting hardware within the pullbox or splice location to support the splice enclosure and the splice enclosure shall be securely fastened in place. In no cases shall the splice Enclosure be allowed to rest on the bottom of the pullbox or vault.

6. After the splice trays are placed inside the enclosure, the enclosure shall be sealed using a procedure recommended by the manufacturer that will provide a waterproof environment for the splices. Encapsulant shall be used to ensure water resistance. The individual fibers shall be looped one full turn within the Splice Enclosure to avoid micro bending.
7. Care shall be taken at the cable entry points to ensure a tight salt resistant and waterproof seal is made which will not leak upon aging. It is acceptable to have multiple cables enter the fiber optic cable Splice Enclosure through one port as long as all spaces between the cables are adequately sealed.
8. All splices shall be protected with a thermal shrink sleeve and shall be labeled in the splice tray with permanent vinyl markers. Butt ends shall also be labeled to identify the destination of the fiber.
9. The splices shall be fabricated using modern, high quality fusion type splicing equipment. All splicing equipment shall be in good working order, properly calibrated, and meeting all industry standards and safety regulations. Cable preparation, Enclosure installation, and splicing shall be accomplished in accordance with accepted and approved industry standards.
10. Optical fibers shall be spliced as noted on the plans using the fusion type and the maximum splice loss shall not exceed 0.10 dB per splice in each direction. The Contractor shall test all splices for signal loss.
11. Each splice shall be tested for tensile strength by applying a force of not less than 200 grams.
12. All splices shall be arranged neatly in splice trays, supported and protected with a suitable splice protector.
13. Only the fibers required to be spliced to Drop Cables at the CCTV Camera and Mini-Hub locations shall be severed and spliced. Where required, the buffer tube splitting tool recommended by the manufacturer shall be used to open the correct buffer tube. Unsevered fibers in an open buffer tube shall be coiled in the splice tray. When buffer tubes do not need to be opened, at least 4.0 m of unopened buffer tubes shall be coiled in the fiber optic Splice Enclosure.
14. Drop cable entrances to the splice enclosures shall adhere to the manufacturer's recommendations for the type of cable.



15. In order to reduce the overall number of splices required, the cable shall be installed in the maximum continuous reel length provided by the manufacturer, or as shown on the plans, or as approved by the Engineer. Factory splices will not be permitted. Prior to ordering the fiber optic cable, the Contractor shall be required to submit a detailed cable layout plan showing the proposed reel lengths and splice points.
16. Fiber identification shall be in accordance with the tables and schedules provided in the Contract Drawings.
17. Upon completion of the splicing operation, all waste material shall be deposited in suitable containers, removed from the job site, and disposed of in an environmentally acceptable manner.

#### B. Submittals

1. Submit:
  - a. Functional block diagrams, cable diagrams, and point to point cabling details.
  - b. Product data, installation manuals, materials, system configuration options and features, and accessories.
  - c. Shop Drawings shall be completely dimensioned and shall indicate the intended installation method and details.
  - d. Specifications for all assemblies and subassemblies (eg. High Density Frames, Splice Housings, Connector Panels, Underground Splice Enclosures and associated Splice Trays).
  - e. Installation and maintenance manuals for all equipment.

#### C. Testing

1. Testing shall be performed to demonstrate that all furnished and installed equipment complies with the requirements of each item, and shall be conducted using Manufacturer recommended procedures, materials and test equipment.

#### D. Delivery, Storage, and Handling

1. The Contractor shall deliver, store, handle and install all materials and equipment in such a manner as not to degrade quality, serviceability or appearance.
2. The Contractor shall be responsible for storage of the materials and equipment prior to installation in a clean, dry location free from construction dust, precipitation and excess moisture.
3. Contractor shall be required to replace any damaged materials and equipment, as determined by the Engineer, at no additional cost to the owner.

**Method of Measurement:**

Work under these items shall be measured for payment by the actual number of “Fiber Optic Splice Enclosures” of the type specified, installed, tested, operating and accepted in place.

The Contractor shall note that the required racking in the pullboxes and the vaults is included in the splice Enclosure item.

**Basis of Payment:**

The work to be done under this item shall be paid at the Contract Price each for “Fiber Optic Splice Enclosure” which price shall include all materials, hardware, termination panels, labor, cables, connectors, tools, equipment and incidentals necessary to complete this work.

The Contractor shall note that the required racking in the pullboxes and the vaults is included in the splice enclosure item.

## **ITEM #1112242A – FIBER OPTIC CABLE SPLICE ENCLOSURE (SIGNAL)**

### **Description:**

This item shall consist of furnishing and installing splice enclosures to interconnect optical fibers between two (2) or more fiber optic cable segments.

### **Materials:**

#### A. Applicable Publications

1. Publications listed below form a part of these specifications to the extent referenced. The publications are referred to in the text by basic designation. All Fiber Optic Communication System hardware shall be compliant with the following specifications: Electronics Industries Association (EIA):
  - a. TIA-526-3-89 Fiber Optic Terminal Equipment Receiver Sensitivity and Maximum Receiver Input.
  - b. TIA-455-32A-90/Fiber Optic Circuit Discontinuity.
  - c. EIA-310-C Racks, Panels, and Associated Equipment.
  - d. EIA-359-A Colors for Color Identification and Coding.
  - e. EIA-TIA-455-A Standard Test Procedures for Fiber Optic Fibers, Cable Transducer Sensors, Connecting and Terminating Devices and Other Fiber Optic Components.
  - f. EIA-455-6B Cable Retention Test Procedure for Fiber Optic Cable Interconnecting Devices.
  - g. TIA/EIA-598-A Optical Fiber Cable Color Coding.

#### B. Fiber Optic Splice Enclosure

1. The Splice Enclosures shall accommodate from sixty (60) to 168 fiber splices. Each splice enclosure shall have a splice tray organizer capable of holding twelve (12) to eighteen (18) splice trays. The Organizer shall provide access to and removal of individual splice trays and permit selective splicing to allow one or more fibers to be cut and spliced to branch cable(s) without disrupting other fibers.
2. The Contractor shall install Splice Enclosures of a capacity that they are capable of handling of twenty-four (24) fibers more than the current fiber count at any given splice location as shown on the Contract Drawings.
3. The Splice Enclosure shall fit within the space allocated for it as shown on the Contract Drawings and to operate within the environment in which it is to be installed.

4. The Splice Enclosure shall protect the fiber optic cable splices from mechanical damage, shall provide strain relief for the cable, and shall be resistant to salt corrosion. The Splice Enclosure shall be waterproof and airtight, and shall be manufactured of non-corroding materials.
5. The Splice Enclosure shall be designed for a temperature range of -30° C (-22° F) to +70° C (158° F). The Splice Enclosure shall be capable of performing in a cable vault or handhole environment where total and continuous submersion in water is to be expected.
6. All materials in the Splice Enclosures shall be non-reactive and shall not support galvanic cell action. The outer enclosure shall be compatible with the other enclosure components, splice trays, and cables. The end plate shall consist of two sections and shall have the capacity for a minimum of two cable entries on each end.
7. All Splice Enclosures shall employ re-usable sealing materials allowing multiple re-entrances without replacing any component. Access to the Splice Enclosures shall be accomplished without the use of special tools or devices. The Splice Enclosure shall employ a latching mechanism for entrance to the internal components of the enclosure.
8. All environmentally exposed components of the Splice Enclosures shall be UV light resistant.
9. All splice trays shall be lined to provide a contrasting background for splicing colored fibers or as approved by the Engineer. The splice trays shall include clear snap-on covers and tie wraps to secure the buffer or transport tubes to the tray. The splice trays shall be of adequate size to prevent induced attenuation due to fiber bending.
10. Each splice tray shall be capable of accommodating a minimum of twelve (12) fusion splices for the single mode fiber cable of the type selected.
11. The splice tray shall have features that retain the fiber loops and control the bend radius. The splice tray cover shall be clear plastic to allow for inspection of the fibers without opening the tray.
12. Vinyl markers shall be supplied to identify each fiber to be spliced within the enclosure. Each splice shall be individually mounted and mechanically protected on the splice tray.

### C. Cable Racking Hardware

1. Cable racking hardware shall be made of a high performance polymer: Each splice enclosure shall be supported in the handhole or pullbox by a medium duty rack capable of supporting a minimum load of 100 lbs (445 N). Racks shall not be less than six (6) inches (150mm) in length. Medium duty racks shall have four (4) inch (100mm) arms minimum. At splice points, the pullbox shall have a horizontal rack capable of supporting and holding securely in place, a splice closure.

### D. Warranty

1. All equipment supplied for this shall be warranted for parts by the vendor against defects and failures, which may occur through normal use for a period of one (1) year from the date of installation. A copy of the warranty must be presented to the Engineer before installation of the equipment.

## **Construction Methods:**

### A. Installation

1. Splice Enclosures shall be installed as shown in the Contract Drawings or as directed by the Engineer. Unless otherwise specified, outdoor type Splice Enclosures shall be installed within vaults, pull boxes, handholes, or aerially located adjacent to traffic signal cabinets and at fiber optic cable reel-end splice locations as shown on the Contract Drawings.
2. The installations shall include all required components including sealing kits, cable racking hardware and mounting hardware to achieve an environmentally secure permanent installation.
3. The Contractor shall supply all materials, tools, equipment and labor including but not limited to fan out kits, connectors, trays, splice enclosures, and any other incidentals necessary to complete the installation of the Splice Enclosure.
4. The Splice Enclosure shall be secured to the interior of the cavity of the vault, pullbox, or hand hole on cable racking hardware using tie-wraps.
5. The Outdoor Splice Enclosure shall be mounted in such position to allow the cable to enter and exit the enclosure without exceeding the cables minimum bending radius. Sufficient cable shall be coiled in the vault or pull box to allow the Splice Enclosure to be removed from the vault for current and future splicing and cable repairs. The Contractor shall install mounting hardware within the pullbox or splice location to support the Splice Enclosure and the Splice

Enclosure shall be securely fastened in place. In no cases shall the Splice Enclosure be allowed to rest on the bottom of the pullbox, vault, or handhole.

6. After the splice trays are placed inside the enclosure, the enclosure shall be sealed using a procedure recommended by the manufacturer that will provide a waterproof environment for the splices. Encapsulant shall be used to ensure water resistance. The individual fibers shall be looped one full turn within the Splice Enclosure to avoid micro bending.
7. Care shall be taken at the cable entry points to ensure a tight salt resistant and waterproof seal is made which will not leak upon aging. It is acceptable to have multiple cables enter the Splice Enclosure through one port as long as all spaces between the cables are adequately sealed.
8. All splices shall be protected with a thermal shrink sleeve and shall be labeled in the splice tray with permanent vinyl markers. Butt ends shall also be labeled to identify the destination of the fiber.
9. The splices shall be fabricated using modern, high quality fusion type splicing equipment. All splicing equipment shall be in good working order, properly calibrated, and meeting all industry standards and safety regulations. Fiber Optic Cable preparation, Splice Enclosure installation, and splicing shall be accomplished in accordance with accepted and approved industry standards.
10. Optical fibers shall be spliced as noted on the plans using the fusion type and the maximum splice loss shall not exceed 0.10 dB per splice in each direction. The Contractor shall test all splices for signal loss.
11. Each splice shall be tested for tensile strength by applying a force of not less than 7 oz. (200 grams).
12. All splices shall be arranged neatly in splice trays, supported and protected with a suitable splice protector.
13. Only the fibers required to be spliced to fiber optic drop cables at the traffic signal cabinet locations shall be severed and spliced. Where required, the buffer tube splitting tool recommended by the Manufacturer shall be used to open the correct buffer tube. Unsevered fibers in an open buffer tube shall be coiled in the splice tray. When buffer tubes do not need to be opened, at least 4.0 m of unopened buffer tubes shall be coiled in the fiber optic Splice Enclosure.
14. Drop cable entrances to the Splice Enclosures shall adhere to the Manufacturer's recommendations for the type of cable.

15. In order to reduce the overall number of splices required, the cable shall be installed in the maximum continuous reel length provided by the Manufacturer, or as shown on the plans, or as approved by the Engineer. Factory splices will not be permitted. Prior to ordering the fiber optic cable, the Contractor shall be required to submit a detailed cable layout plan showing the proposed reel lengths and splice points.
16. Fiber identification shall be in accordance with the tables and schedules provided in the Contract Drawings.
17. Upon completion of the splicing operation, all waste material shall be deposited in suitable containers, removed from the job site, and disposed of in an environmentally acceptable manner.

#### B. Submittals

1. Submit:
  - a. Functional block diagrams, cable diagrams, and point to point cabling details.
  - b. Product data, installation manuals, materials, system configuration options and features, and accessories.
  - c. Shop Drawings shall be completely dimensioned and shall indicate the intended installation method and details.
  - d. Specifications for all assemblies and subassemblies (eg. High Density Frames, Splice Housings, Connector Panels, Underground Splice Enclosures and associated Splice Trays).
  - e. Installation and maintenance manuals for all equipment.

#### C. Testing

1. Testing shall be performed to demonstrate that all furnished and installed equipment complies with the requirements of each item, and shall be conducted using Manufacturer recommended procedures, materials and test equipment.

#### D. Delivery, Storage, and Handling

1. The Contractor shall deliver, store, handle and install all materials and equipment in such a manner as not to degrade quality, serviceability or appearance.
2. The Contractor shall be responsible for storage of the materials and equipment prior to installation in a clean, dry location free from construction dust, precipitation and excess moisture.
3. Contractor shall be required to replace any damaged materials and equipment, as determined by the Engineer, at no additional cost to the owner.

**Method of Measurement:**

Work under these items shall be measured for payment by the actual number of “Fiber Optic Splice Enclosures” of the type specified, installed, tested, operating and accepted in place.

**Basis of Payment:**

The work to be done under this item shall be paid at the Contract Price each for “Fiber Optic Splice Enclosure” which price shall include all materials, hardware, termination panels, labor, cables, connectors, tools, equipment and incidentals necessary to complete this work.

The Contractor shall note that the required racking in the pullboxes and the vaults is included in the splice enclosure item.

<u>Pay Items</u>	<u>Pay Unit</u>
Fiber Optic Cable Splice Enclosure (Signal)	Ea.



## **ITEM #1112284A – VEHICLE DETECTION MONITOR**

### **Description:**

Furnish and install a Vehicle Detection Monitor with stand in the Controller Cabinet.

### **Materials:**

All hardware shall be new, corrosion-resistant. All equipment shall be current production.

#### **Physical:**

- Compact and easily accessible stand-mounted LCD/ LED Flat Panel Display.
- Diagonal screen size minimum 10 inches and maximum 15 inches.
- Withstand temperatures ranging from -4 to 140°F (-20 to 60°C).
- Operating humidity: 10-90% non-condensing.

#### **Functional:**

- Compatible with Color or Monochrome Detection systems.
- Industrial-grade video panel.
- ANSI contrast ratio of 300:1 minimum.
- Minimum brightness level: 400 candelas per square meter (400 lux).
- Native resolutions: 1024 (horizontal) x 768 (vertical).
- Support both National Television Standards Committee (NTSC) and Phase Alternating Line (PAL) video formats with auto-sensing.
- Minimum viewing angle: 140 degrees horizontally, 120 degrees vertically.
- On-Screen Display (OSD) controls brightness, contrast, color as well as horizontal and vertical positioning.
- Compatible with video detection processor output. Use appropriate converters/ adapters if necessary.
- Operable on 110 VAC or 220 VAC, 50 or 60 Hz.
- FCC, Voluntary Control Council for Interference (VCCI), Electromagnetic Compatibility (EMC), Consumer Electronics (CE) approved, UL listed and Energy Star efficient.
- MTBF Rating: 50,000 hours minimum.

#### **Warranties and Guarantees:**

Provide warranties and guarantees to the **Department of Transportation Office of Maintenance** in accordance with Article 1.06.08 of the Standard Specifications. Warranties for all equipment furnished as part of this Contract are to cover a period of 24 months following successful completion of the entire intersection acceptance test.

#### **Method of Measurement:**

The Vehicle Detection Monitor will be measured for payment as the number of units furnished, installed, operational and accepted.

**Basis of Payment:**

This work will be paid at the Contract unit price for each accepted “Vehicle Detection Monitor,” which price shall include the Vehicle Detection Monitor, stand, documentation, warranty, labor, tools and equipment incidental thereto.

Pay Item	Pay Unit
Vehicle Detection Monitor	EA.

## **ITEM #1112285A – THERMAL VIDEO DETECTOR ASSEMBLY**

### **Description:**

Furnish and install a Thermal Video Detector Assembly (TVDA) as shown on the plans or as directed by the Engineer.

### **Materials:**

All hardware shall be new, corrosion resistant. All equipment shall be current production.

### **Thermal Detector Assembly:**

#### **Thermal Imaging Sensor:**

- Sensor Type: Focal Plane Array (FPA), Uncooled Vanadium Oxide Microbolometer
- Fixed mount pan and tilt unit bracket.
- Thermal Sensitivity: <75mk, <50 mK f/1.0 or lower.
- Active picture elements (pixels): 320(H) x 240(V), minimum. 25 micron pixel pitch.
- Thermal Output: Analog NTSC equivalent.
- Output impedance: 75 Ohms nominal.
- Operating Temperature Range: -50°C to 75°C (-58°F to 167°F)
- Lens Selection: Based on recommendation of manufacturer for each detector installed, per outcome of Site Survey.

#### **Surge Protection**

A thermal surge suppressor(s) shall be available for installation inside the traffic signal controller cabinet. The suppressor shall provide coaxial cable connection points to a Thomas Research CCTV-SP-NI or approved equal transient suppresser for each image sensor.

- Peak Surge Current (8 x 20 us)      20KA
- Technology    Hybrid, Solid State
- Attenuation    0.1db @ 10Mhz
- Response Time      <1 nanosecond
- Protection    Line to Ground
- Shield to Ground    (isolated shield modules)
- Clamp Voltage      6 volts
- Connectors    BNC
- Impedance    75 Ohms
- Temperature    -40 to +85 degrees C
- Humidity    0-95% non-condensing
- Dimensions    4.5" x 1.5" x 1.25"
- UL Listed    UL 497B

**Detector Enclosure:**

- Tamper proof constructed of painted or powder coated aluminum of at least 0.06-inch (1.59-mm) thickness.
- Environmentally sealed housing. IP-66 Rating
- Adequate adjustable sunshield should be provided.
- Internal Heater, window defroster, and a thermostat to control both.
- The enclosure shall include grounding and surge protection.
- Spare parts under projects 171-376 and 171-377 ONLY

**Documentation: (TVDA)**

Provide to the **Department of Transportation Office of Maintenance** three (3) copies of equipment manuals furnished by the manufacturer, which includes the following:

- Installation and operation procedures.
- Performance specifications (functions, electrical, mechanical and environmental) of the unit.
- Schematic diagrams.
- Pictorial of component layout on circuit board.
- List of replaceable parts including names of vendors for parts not identified by universal part numbers such as JEDEC/RETMA or EIA.
- Troubleshooting, diagnostic and maintenance procedures.

**Site Survey:**

Perform a site survey with the TVDA manufacturer representative at all TVDA locations prior to the installations of the TVDA equipment. The purpose of the survey is to optimize the performance from the TVDA equipment when it is installed and insure that it will meet the accuracy requirements specified previously. Submit the results of this survey to the Engineer in a report, which lists all TVDA locations with any recommended changes to camera locations, mounting adjustments, camera lens adjustments, and desired detection zone locations. This report shall be provided to the Engineer no later than the semi-final inspection.

**Warranties and Guarantees: (TVDA)**

Provide warranties and guarantees to the **Department of Transportation Office of Maintenance** in accordance with Article 1.06.08 of the Standard Specifications. Warranties for all equipment furnished as part of this Contract are to cover a period of 24 months following successful completion of the entire intersection acceptance test.

**Construction Methods:**

Install TVDA equipment in accordance with the manufacturer instructions and recommendations to achieve the detection zones as shown in the plans and accuracy as described in these specifications. Conduct the Site Survey as specified above. The location of

the TVDA shown on the plan may be revised as a result of the Site Survey. Provide the Site Survey report to the Engineer and review proposed TVDA relocations prior to installation of TVDA equipment.

**Method of Measurement:**

The Thermal Video Detector Assembly will be measured for payment as the number of detectors furnished, installed operational and accepted.

**Basis of Payment:**

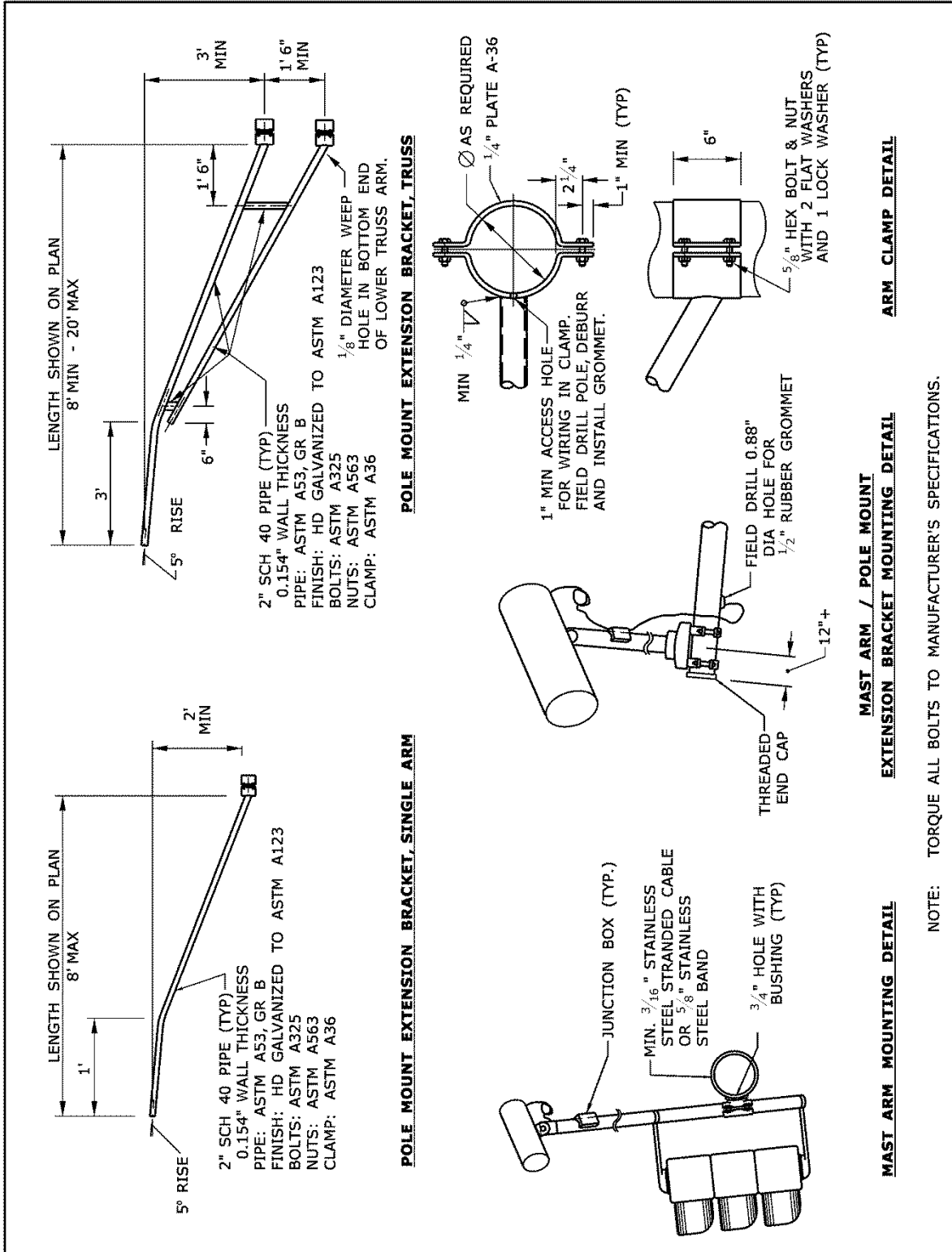
The unit bid price for Thermal Video Detector Assembly includes the detector, enclosure, surge protector, brackets used to attach the TVDA to a support structure or extension bracket, documentation, warrantee, labor, tools and equipment necessary to provide the specified video signal to the VDP and spare units under projects 171-376 and 171-377 ONLY.

Pay Item

Thermal Video Detector Assembly

Pay Unit

Ea.



## **ITEM #1111600A – EXTENSION BRACKET**

## **ITEM #1112286A – 360 DEGREE CAMERA ASSEMBLY**

## **ITEM #1112289A – 360 DEGREE CLOSED LOOP SYSTEM VIDEO DETECTION PROCESSOR**

## **ITEM #1113725A – 23 AWG 4 TWISTED PAIR CATEGORY 6 CABLE**

### **Description:**

Furnish and install a 360 Degree Video Image Detection System (360VIDS) as shown on the plans or as directed by the Engineer. The 360VIDS consists of a 360 Degree Camera Assembly (360CA), 360 Degree Closed Loop System Video Detection Processor (360CLSVDP) and 23 AWG 4 Twisted Pair Category 6 Cable. The Extension Bracket will be included on a case-by-case basis.

### **Materials:**

All hardware shall be new, corrosion resistant. All equipment shall be current production.

### **360 Degree Camera Assembly:**

#### **Camera:**

- No-aim, no-focus camera
- Downward facing lens and camera shroud
- Single Power Over Ethernet (POE) connection for power and data collection.
- Color image camera with 360 degree point of view (POV)
- Active picture elements (pixels): 2560 (H) x 1920 (V), minimum.
- Signal to noise ratio : 55dB
- Heated camera
- IP addressable

#### **Camera Enclosure:**

- Tamper proof constructed of painted or powder coated aluminum of at least 0.25 inch (6.35-mm) thickness.
- IP66-rated camera housing.

#### **Camera Mounting Hardware:**

- Swivel bracket for dual plane adjustment for leveling
- Quick connect junction box
- Hybrid terminal junction box with surge.
- Astro-Brac banded bracket
- 34 inch to 78 inch 90 degree mounting arm pole.

### **Extension Bracket:**

- Single arm [10' (3.0m) or less], or Truss type [10' (3.0m) or greater].

- Length shown on plan.
- Clamp-on attachment to pole shaft 1' (300mm) from top of pole.
- Designed to support minimum 30 lbs. (13.6 Kg), 2 sq. ft. (.2 sq. M) end load with minimal movement from wind.
- Schedule 40, 2" IPS galvanized pipe.
- Heavy duty galvanized finish
- Refer to detail drawing contained herein.

### **360 Degree Video Detection Processor:**

#### **Functional:**

- Connectivity: Local Area Network (LAN), Wide Area Network (WAN), Camera interfaces.
- NEMA TS1/ TS2, Type 170 and 2070 ATC compatible
- Four (4) USB 3.0 expansion ports.
- Front panel LED indicators displays calls and light states.
- Twenty-four (24) optically isolated I/O interface.
- Two (2) camera ports – Up to two (2) 360 Degree Camera Assembly; or one (1) 360 Degree Camera Assembly and four (4) IP video detection camera assembly (IPVDCA) or thermal cameras; or eight (8) IPVDCA or thermal cameras.
- Phase and detection display.
- Wi-Fi capable
- Power – 110/220 VAC 50/60 Hz
- Point and click zone drawing feature
- Digital flattening of image
- Omni-directional vehicle tracking
- Virtual pan-tilt-zoom
- Zone level visibility monitoring.
- Monitor phases and loops, generates calls to controllers.
- Support MJPEG video output
- Environmental : -29F to +165F (-34C to +74C), 0-95% non-condensing
- Fail-safe in the event of loss of video from 360CA or loss of power to 360CLSVDP.
- Shall be capable of configuring and adjusting the detection zone with the cabinet mounted VDM.
- Shall collect traffic data such as counts, turning movements, speed, and vehicle classification.
- Storage required to support collection of data.



- Support ability to transmit collected traffic data and alarm events from field devices to remote desktop pc

### **Application Software:**

- Shall be provided at no additional cost
- Shall be capable of searching the network for other 360CLSVDP
- Shall be compatible with Windows operating system supported by the Department.
- Shall maintain an historical log of all configurations when site is modified
- Shall be capable Point and click zone drawing
- Shall feature digital flattening of image
- Shall feature the ability to digitally pan, tilt, and zoom within the camera assembly's field of view without movement of the camera.
- Detection zone data stored in non-volatile memory so that after recovery from power interruption, all parameters are returned to latest settings.
- Shall support the import and export of program database from notebook PC or remote desktop PC. The program database shall also be allowed to be transferred through a USB flash drive.
- Shall be capable of superimposing detection zone on real time video image from selected camera with time stamping capabilities.
- Shall be capable of monitoring real time video and adjusting zones in field or remotely while 360CLSVDP is actuating the traffic controller.
- Shall provide visual confirmation of detection by highlighting detection zone symbols.
- Shall support quad view video monitoring.
- Shall be capable of syncing with a cloud network resource to allow for program database and collected traffic data backup.
- Shall maintain a database of current and historical traffic data, and allow users to run reports against the data to include traffic counts, turning movements, speed, vehicle classification, red/green occupancy, and cycle lengths.
- Shall be capable of displaying data in a graph or chart format.
- Shall be capable of selecting data collection resolution in at least 15, 30, and 60-minute intervals through software.
- Shall provide a means by which alerts can be configured to be delivered to different individuals via email
- Report output formats shall include at minimum PDF, rich text format, and Microsoft Excel formats.

### **Detection Zone Programming:**

- Point and click zone drawing
- Digital flattening of image

- Virtual pan-tilt-zoom
- Configure and adjust the detection zone with the cabinet mounted Vehicle Detection Monitor (VDM).
- Detection zone data stored in non-volatile memory so that after recovery from power interruption, all parameters are returned to latest settings.
- Ability to upload and download program database to notebook PC or remote desktop PC.
- Superimpose detection zone on real time video image from selected camera with time stamping capabilities.
- Ability to monitor real time video and adjust zones while 360VDP is actuating the traffic controller.
- Visual confirmation of detection by highlighting detection zone symbols.

**Physical:**

- Either shelf mounted, stand alone design or modular card rack design.
- Aluminum card rack frame capable of accepting four (4) 360VDP modules.
- TS1 harness cable.
- Standard Ethernet and USB connectors for video input and video output.
- Female metal shell connector with latching clamp for NEMA TS 1 detector outputs and inputs.
- LED indications to monitor all detector outputs.
- Side or rear mounted connectors and controls are not allowed on stand alone units.
- NEMA FR-4 glassepoxy or equivalent circuit boards.

**Ethernet Repeater:**

- Utilize Ethernet repeater if CAT6 cable distance is over 328’.

**Ethernet Switch:**

- Power Over Ethernet (POE) switch
- Ports for up-to four (4) traditional or thermal cameras.
- Powder coated aluminum.
- Dual purpose LED port lights.
- RJ-45 CAT6 connectivity.
- Environmental: -29F to +165F (-34C to +74C).
- NEMA TS2 compliant.

**Video Encoder:**

- Power Over Ethernet (POE)
- Video: H.264 (MPEG-4 Part 10/AVC) Baseline and Main Profile
- Compression: Motion JPEG
- Resolutions: 176x120 to 720x576, 176x120 to 1536x1152 for quad view.

- Frame rate:
  - H.264: 25/30 (50/60 Hz) fps,
  - 15fps in quad view in full resolution,
  - Motion JPEG: 25/30 (50/60 Hz) fps,
  - 15fps in quad view in full resolution.
- Video Streaming: Multi-stream H.264 and Motion JPEG: One H.264 and one JPEG stream on each channel (8 streams in total) in full frame rate individually configured streams in max. resolution at 25/30 fps; more streams if identical or limited in frame rate/ resolution. Controllable frame rate and bandwidth; VBR/CBR H.264.
- Environmental: -40F to +167F (-40C to +75C), 10-95% non-condensing.
- NEMA TS2 compliant.

**Ethernet Protection Module:**

- Either shelf mounted or stand alone design.
- Protect 360CA, IP video detection camera assembly, thermal cameras and 360VDP in the event of a surge or lightning.

**Environmental:**

- Comply with NEMA TS 2, Section 2 requirements for Controller Assembly.
- Pass following NEMA TS 2 tests and applicable test procedures.
  - Vibration: Section 3.13.3, Section 3.13.8.
  - Shock: Section 3.13.4, Section 3.13.9.
  - Transients, Temperature, Voltage and Humidity: Section 3.13.7.
  - Power Interruption: Section 3.13.10.

**Peripherals:**

- Separable Keypad & Joystick or Computer Mouse including all necessary cables for connectivity to 360CLSVDP.

**23 AWG 4 Twisted Pair Category 6 Cable:**

- Supply the 360CA power and return the video signal to the VDP.
- Outdoor Aerial CAT6 cable with UV insulation.
- Rated for 48VDC
- 250MHZ, shielded, gel-filled (flooded core) direct burial grade.
- Shall be equipped with a drain wire.
- Terminate with compatible connector.
- Polyethylene insulation.
- Shall be installed continuous between the 360CA and 360VDP.
- Cable shall be installed according to TIA/EIA-568-B.
- Other type cable may be substituted at the request of the 360VDP manufacturer.

**Documentation: (360CLSVDP and 360CA)**

Provide to the **Department of Transportation Office of Maintenance** three (3) copies of equipment manuals furnished by the manufacturer, which includes the following:

- Installation and operation procedures.
- Performance specifications (functions, electrical, mechanical and environmental) of the unit.
- Schematic diagrams (point to point wiring).
- Pictorial of component layout on circuit board.
- List of replaceable parts including names of vendors for parts not identified by universal part numbers such as JEDEC/RETMA or EIA.
- Troubleshooting, diagnostic and maintenance procedures.
- Testing results of grounding, voltage, and cable length measurements as indicated on the installation best practice verification at the end of this document.

### **Site Survey:**

Perform a site survey with the 360CLSVDP manufacturer representative at all 360VIDS locations prior to installation. The purpose of the survey is to optimize the performance from the 360VIDS equipment when it is installed and insure that it will meet the accuracy requirements specified previously. Prior to installation, submit the results of this survey to the Engineer in a report, which lists all 360VIDS locations with any recommended changes to camera locations, mounting adjustments, camera lens adjustments, and desired detection zone locations.

### **Warranties and Guarantees: (360CA and 360CLSVDP)**

Provide warranties and guarantees to the **Department of Transportation Office of Maintenance** in accordance with Article 1.06.08 of the Standard Specifications. Warranties for all equipment furnished as part of this Contract are to cover a period of 36 months following successful completion of the entire intersection acceptance test.

### **Construction Methods:**

Install 360VIDS equipment in accordance with the manufacturer instructions and recommendations to achieve the detection zones as shown in the plans and accuracy as described in these specifications. Refer to the "Installation Best Practices Guide" attached below to this specification. Note that all references to "Cat5e cable" in the attached "Installation Best Practices Guide" shall refer to "23 AWG 4 Twisted Pair Category 6 Cable" as specified above in this specification. The location of the 360CA shown on the plan may be revised as a result of the Site Survey. Peripherals are to be furnished and fully installed in an easily accessible position within the controller cabinet. Leave proper clearance(s) surrounding video monitor to allow for accessible connections and space to utilize surrounding equipment.

**Method of Measurement:**

The 360 degree Camera Assembly will be measured for payment as the number of 360 degree cameras furnished, installed operational and accepted.

The Extension Bracket will be measured for payment as the number of brackets furnished, installed and accepted.

The 360 degree Video Detection Processor will be measured for payment as the number of units including all additional work and materials listed in Basis of Payment, furnished, installed, operational and accepted.

23 AWG 4 Twisted Pair Category 6 Cable will be measured for payment as linear feet (meters), furnished, installed and accepted.

**Basis of Payment:**

The unit bid price for 360 degree Camera Assembly includes the 360 degree camera, enclosure, brackets used to attach the 360CA to a support structure or extension bracket, documentation, warrantee, labor, tools and equipment necessary to provide the specified video signal to the 360CLSVDP.

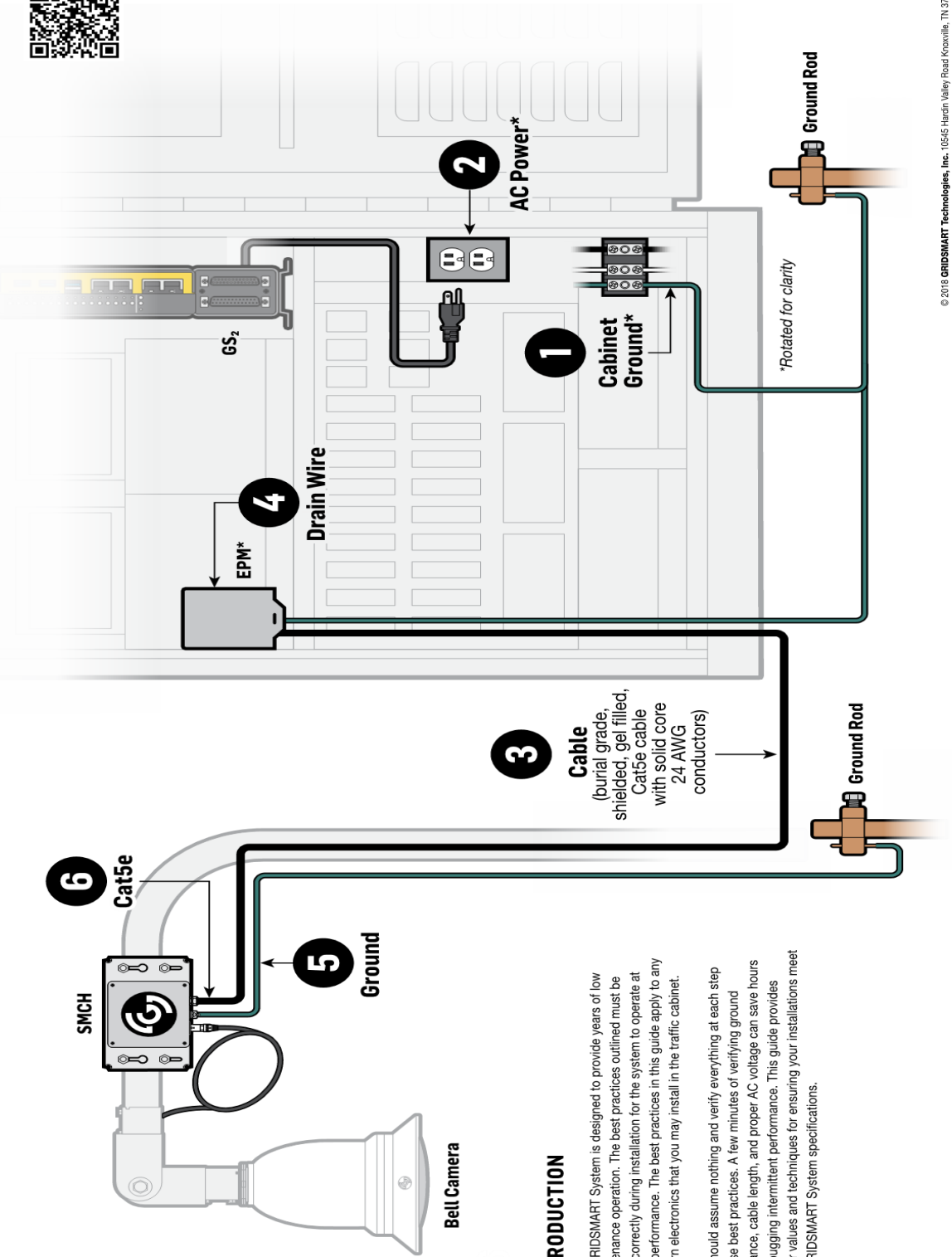
The unit bid price for Extension Bracket includes all labor, tools and equipment necessary to attach the bracket to a pole shaft.

The unit bid price for 360 degree Video Detection Processor includes the manufacturers' site survey, unlimited number of any necessary 360VIDS configuration software and license, card rack frame, power supply, all miscellaneous hardware such as PC interface cable with connectors, necessary peripherals such as Ethernet repeater, Ethernet switch, video encoder, Ethernet protection module, documentation, warrantee, labor, tools and equipment necessary to make the 360VIDS fully operational.

The unit bid price for 23 AWG 4 Twisted Pair Category 6 Cable includes all connectors, labor, tools and equipment necessary to install the cable between the 360CA and the 360CLSVDP.

<u>Pay Item</u>	<u>Pay Unit</u>
360 Degree Camera Assembly	Ea.
Extension Bracket	Ea.
360 Degree Closed Loop System Video Detection Processor	Ea.
23 AWG 4 Twisted Pair Category 6 Cable	LF (M)





**INTRODUCTION**

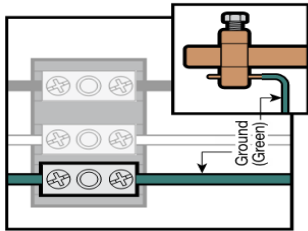
The GRIDSMART System is designed to provide years of low maintenance operation. The best practices outlined must be done correctly during installation for the system to operate at peak performance. The best practices in this guide apply to any modern electronics that you may install in the traffic cabinet.

You should assume nothing and verify everything at each step in these best practices. A few minutes of verifying ground resistance, cable length, and proper AC voltage can save hours of debugging intermittent performance. This guide provides proper values and techniques for ensuring your installations meet the GRIDSMART System specifications.

## 1 CABINET GROUNDING

A proper cabinet ground helps mitigate interference from electrical noise at the intersection.

- The U.S. National Electrical Code (NEC) recommends a maximum of 25 ohms for touch safety and telecommunications; PLC industry standards require a maximum of 5.0 ohms for logic reference purposes.
- Use a clamp-on ground meter to verify the cabinet ground.
- GRIDSMART requires the Diligent Instruments DLG Di-120b Tester (<http://www.diligentinstruments.com/di-120.html>).
- If the ground reading is higher than the recommended NEC value, check the connection between the cabinet ground wire and the ground rod for corrosion; clean if corrosion is present. If you are in an area with poor grounds, you may need to add a ground rod to the grounding system to improve the ground.



DLG Di-120b Tester

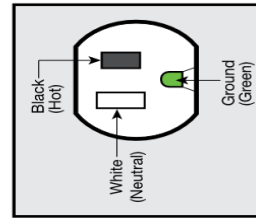


<b>SPECIFICATION:</b> 25 Ohms Max
<b>MEASURED:</b>

## 2 AC POWER

Plug the GRIDSMART Processor into an outlet on the filtered side of the cabinet power. Do not use GFCI type outlet.

- The outlet needs to be checked to verify that all three connections for the outlet are properly connected.
- Using a digital voltmeter (DVM), check the ac voltage from the line to the neutral and the line to ground. Both readings should be ~ 120/240VAC.



<b>SPECIFICATION:</b> HOT/NEU: 120/240VAC HOT/GND: 120/240VAC
<b>MEASURED:</b> HOT/NEU: HOT/GND:

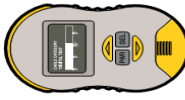
## 3 CABLE TYPE & LENGTH

All GRIDSMART installations require burial grade, shielded, fill filled, Cat5e cable with solid core 24 AWG conductors. The shield will protect the data signals from radiated noise which is present in most intersections. LED streetlights have been found to be very noisy electrically and as more streetlights are switched to LED lights, the level of radiated noise will increase. The cable that GRIDSMART supplies and requires for all installations is Vertical Cable part #059-487/S/CMXF.

- The maximum length that a segment of Cat5e can be is 300 feet. If the distance from the EPM to the camera is more than 300 feet, a repeater (RBA) must be used.
- When determining length of the cable, a cable tester that measures the length of the cable is required. Do not rely on sight distance or "walking off" the distance.
- Many times, there are service loops in the pull boxes and at the base of the pole, which will not be accounted for when you do not use a meter for measuring the cable length. GRIDSMART recommends the Triplet Real World Certifier ([www.triplet.com/shop/real-world-certifier-rwc1000k/](http://www.triplet.com/shop/real-world-certifier-rwc1000k/)) for testing the cable. The tester will provide length measurements as well as cable quality measurements.



Triplet Real World Certifier

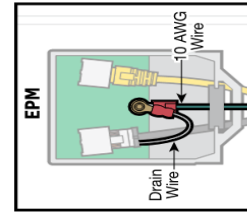


<b>SPECIFICATION:</b> Cable Length: 300 Ft. Max Real World Certification: 100 MB Min Cable Type: Vertical Cable part #059-487/S/CMXF
<b>MEASURED:</b> Cable Length: Real World Certification:

## 4 CONNECT DRAIN WIRE

The drain wire for the shielded Cat5e cable must be connected to the ground post in the EPM (Ethernet Protection Module). A crimp lug should be attached to the end of drain wire to attach it to the ground post. The drain should only be connected at the EPM end of the cable.

- If you are using an RBA, the drain must be spliced so the drain is continuous from the junction box to the EPM. A 10 AWG Wire is required to connect the EPM ground post to the traffic cabinet ground rod.



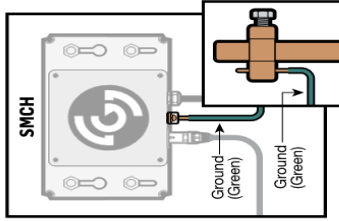
Using a digital voltmeter, you should measure 0 Ohms between the EPM Ground Post and the traffic cabinet ground rod.

<b>SPECIFICATION:</b> 0 Ohms
<b>MEASURED:</b>

## 5 GROUND CONNECTIONS AT THE SMCH

The SMCH provides lightning protection for the camera.

- Use a 10-AWG wire to connect the SMCH ground lug to a well-grounded structure or a ground rod.
- Verify the resistance to ground of the structure utilizing the clamp on ground tester.

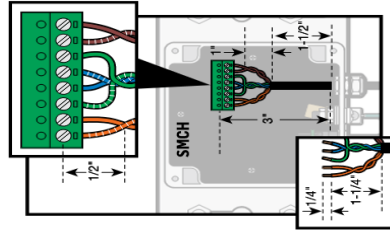


<b>SPECIFICATION:</b> 25 Ohms
<b>MEASURED:</b>

## 6 CAT5e AT SMCH

Proper terminal of the Cat5e to the SMCH Phoenix connector is required. Carefully implement the following requirements as shown.

- Remove no more than 1-1/2 inch of outer jacket from the end of the cable.
- No less than 1-1/2 inch of cable with outer jacket inside the SMCH.
- Pairs should be twisted as close as possible to the Phoenix connector.
- No more than 1/2 inch of untwisted conductors should be allowed. Strip 1/4 inch of the insulation from each conductor.



<b>Intersection:</b>
<b>Camera Serial Number:</b>
<b>GS: Processor Serial Number:</b>



## **ITEM #1113552A – DETECTOR CABLE (OPTICAL) (MODIFIED)**

### **SYSTEM DESCRIPTION:**

The emergency vehicle traffic signal priority control system shall enable designated vehicles to remotely cause the traffic signal controller to advance to and/or hold a desired traffic signal display by using existing controller functions. The control shall be effective for a range of 12M (40 feet) to 548M ( 1,800 feet ) along an unobstructed "line of sight" path.

The system shall consist of the following components:

- A. Vehicle Emitter: mounted on the emergency vehicle shall transmit optical energy signals only in the forward direction. Optical emitters must be capable of activating other major manufacturers' optical detectors.
- B. Phase Selector: shall cause the signal controller to advance to and/or hold the desired traffic signal display for the emergency vehicle. A **pre-emption system chassis** shall house two phase selectors.
- C. Optical Detector: mounted on or near a traffic signal shall receive the optical energy signals generated by the vehicle emitter. Optical detectors must be capable of receiving other major manufacturers' optically emitted signals.
  - 1. Detector (Type A) 1 Direction, 1 Channel
  - 2. Detector (Type B) 2 Direction, 1 Channel
  - 3. Detector (Type C) 2 Direction, 2 Channel
- D. Detector Cable (Optical).

### **System Component:**

- D. Detector Cable (Optical)
  - 1. 3 Conductor cable with shield and ground wire.
  - 2. AWG #20 (7x28) stranded.
  - 3. Individually tinned copper strands.
  - 4. Conductor insulation: 600 volt , 75 deg. C (167 F.).
  - 5. 1 conductor yellow, 1 conductor blue, 1 conductor orange.
  - 6. Aluminized mylar shield tape or equivalent.
  - 7. AWG #20 (7x28) stranded uninsulated drain wire
  - 8. DC resistance not to exceed 11.0 ohms per 305M(1000 feet).
  - 9. Capacitance from one conductor to other two conductors and shield not to exceed 157pf/M (48 pf./ft.).
  - 10. Jacket: 600 volts, 80 deg. C (176 F.), minimum average wall thickness - 1.14mm (.045").
  - 11. Finished O.D.: 7.62mm (0.3") max.

**Construction Methods:**

All equipment except the vehicle emitter assembly shall be installed and wired in a neat and orderly manner in conformance with the manufacturers' instructions. Detector cables shall be installed continuous with no splices between the optical detector and the AEC.

**Method of Measurement:**

Detector Cable (Optical) will be measured by the number of linear feet supplied, installed and accepted.

**Basis of Payment:**

Payment for Detector Cable (Optical) will include the item unit cost, including the cost of installation.

Pay Item	Pay Unit
Detector Cable (Optical)	LF

**ITEM #1113604A – OPTICAL FIBER CABLE, SINGLE MODE, LOOSE  
BUFFER TUBE CABLE, 6 FIBER**

**ITEM #1113618A – OPTICAL FIBER CABLE, SINGLE MODE, LOOSE  
BUFFER TUBE CABLE, 36 FIBER**

**Description:**

This item specifies the requirements for furnishing, installing in conduit or aerial between utility poles, splicing, and connectorizing fiber optic cables. As part of this item, the Contractor shall install a pull tape in specific conduits within the contract limits of work, as necessary to install the fiber optic cable. The specific areas where pull tape may be required are delineated in the Construction Methods section of this specification.

**Materials:**

A. General:

1. Outdoor fiber optic cable shall be installed in conduit or aerial between utility poles, spliced as required and terminated in traffic signal cabinets, as shown on the Contract Drawings.
2. A six (6) fiber optic drop cable shall be utilized to interconnect the thirty-six (36) fiber trunk line cable per the Contract Drawings. The six (6) fiber optic drop cable shall be installed to all local traffic signal controller cabinets. A thirty six (36) fiber optic drop cable shall be installed to the master traffic signal controller cabinet.
3. The fiber optic cable, splices, connectors and interconnect panels shall meet all requirements stated in this specification.
4. **Optical fiber cable installed for this project shall be dielectric, dry-filled, loose-tubed, duct-type.**

B. Applicable Publications:

1. Publications listed below form a part of this specification to the extent referenced. The publications are referred to in the text by basic designation. All Fiber Optic Communication System hardware shall be compliant with the following specifications:

Electronics Industries Association (EIA):

- a. EIA-310-C Racks, Panels, and Associated Equipment.
- b. EIA-359-A Colors for Color Identification and Coding.
- c. EIA-422-A Electrical Characteristics of Balanced Voltage Digital Interface Circuits.

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- d. EIA-TIA-455-A Standard Test Procedures for Fiber Optic Fibers, Cable Transducer Sensors, Connecting and Terminating Devices and Other Fiber Optic Components.
  - e. EIA-455-6B Cable Retention Test Procedure for Fiber Optic Cable Interconnecting Devices.
  - f. EIA-485 Standard for Electrical Characteristics of Generators and Receivers for use in Balanced Digital Multipoint Systems.
  - g. TIA/EIA-598-A Optical Fiber Cable Color Coding.
2. USDA Rural Utilities Service (RUS) 7 CFR 1755.900.
  3. ANSI/ICEA Standard for Fiber Optic outside Plant Communications Cable, ANSI/ICEA S-87-640-1992.
  4. UL-listed OFNR
  5. CSA-listed FT-4

C. Outdoor Fiber Optic Cable Requirements:

1. The Outdoor Fiber Optic Cable shall be an accepted product of the United States Department of Agriculture Rural Utilities Service (RUS) 7 CFR 1755.900 and meet the requirements of the ANSI-ICEA Standard for Fiber Optic outside Plant Communications Cable, ANSI/ICEA S-87-640-1992.
2. The Outdoor Fiber Optic Cable shall be stranded loose tube cable with the required number of fibers as shown in the Contract Drawings.
3. The Contractor shall provide manufacturer's documentation certifying that the Outdoor Fiber Optic Cable complies with the following performance requirements:
  - a. When tested in accordance with FOTP-3, "Procedure to Measure Temperature Cycling Effects on Optical Fibers, Optical Cable, and Other Passive Fiber Optic Components," the change in attenuation at extreme operational temperatures of -40 °F and 158 °F (-40°C and +70°C) shall not exceed .24 dB/mile (0.15 dB/km) at 1550 nm for single mode fiber.
  - b. When tested in accordance with FOTP-82, "Fluid Penetration Test for Fluid-Blocked Fiber Optic Cable." a three (3) foot (one-meter) length of unaged cable shall withstand a 3 foot (one-meter) static head or equivalent continuous pressure of water for cable end.
  - c. When tested in accordance with FOTP-81, "Compound Flow (Drip) Test for Filled Fiber Optic Cable", the cable shall exhibit no flow (drip or leak) of filling and/or flooding material at 158 °F (70°C).
  - d. When tested in accordance with FOTP-41, "Compressive Loading Resistance of Fiber Optic Cables," the cable shall withstand a minimum compressive load of 125 lbf/in (220

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N/cm) applied uniformly over the length of the sample. The 125 lbf/in (220 N/cm) load shall be applied at a rate of 0.1 inch (2.5 mm) per minute. The load shall be maintained for a period of one (1) minute. The load shall then be decreased to 63 lbf/in (110 N/cm). Alternatively, it is acceptable to remove the 125 lbf/in (220 N/cm) load entirely and apply the 63 lbf/in (110 N/cm) load within five minutes at a rate of 0.1 inch (2.5 mm) per minute. The 63 lbf/in (110 N/cm) load shall be maintained for a period of ten (10) minutes. Attenuation measurements shall be performed before release of the 63 lbf/in (110 N/cm) load. The change in attenuation shall not exceed 0.15 dB at 1550 nm for single-mode fibers and 0.30 dB at 1300 nm for multimode fiber.

- e. When tested in accordance with FOTP-104, "Fiber Optic Cable Cyclic Flexing Test," the cable shall withstand twenty-five (25) mechanical flexing cycles around a sheave diameter not greater than twenty (20) times the cable diameter. The change in attenuation shall not exceed 0.15 dB at 1550 nm for single mode fiber.
- f. When tested in accordance with FOTP-25, "Repeated Impact Testing of Fiber Optic Cables and Cable Assemblies," except that the number of cycles shall be two (2) at three (3) locations along a three (3) foot (one meter) cable length and the impact energy shall be at least 3.25 lb-ft (4.4 Nm) (in accordance with ICEA S-87-640)", the change in attenuation shall not exceed 0.15 dB at 1550 nm for single-mode fiber.
- g. When tested in accordance with FOTP-33, "Fiber Optic Cable Tensile Loading and Bending Test," using a maximum mandrel and sheave diameter of twenty-two (22) inches (560 mm), the cable shall withstand a rated tensile load of 601 lbf (2670N) and residual load of 30% of the rated installation load. The axial fiber strain shall be  $\leq 60\%$  of the fiber proof level after completion of sixty (60) minute conditioning and while the cable is under the rated installation load. The axial fiber strain shall be  $\leq 20\%$  of the fiber proof level after completion of ten (10) minute conditioning and while the cable is under the residual load. The change in attenuation at residual load and after load removal shall not exceed 0.15 dB at 1550 nm for single mode fiber and 0.30 dB at 1300 nm for multimode fiber.
- h. When tested in accordance with FOTP-85, "Fiber Optic Cable Twist Test," a length of cable no greater than six (6) feet (2 meters) shall withstand ten (10) cycles of mechanical twisting. The change in attenuation shall not exceed 0.1 dB at 1550 nm for single mode fiber.
- i. When tested in accordance with FOTP-181, "Lightning Damage Susceptibility Test for Optic Cables with Metallic Components," the cable shall withstand a simulated lightning strike with a peak value of the current pulse equal to 80 kA without loss of fiber continuity. A damped oscillatory test current shall be used with a maximum time-to-peak value of fifteen (15)  $\mu\text{s}$  (which corresponds to a minimum frequency of 16.7 kHz) and a maximum frequency of thirty (30) kHz. The time to half-value of the waveform envelope shall be from forty (40) – seventy (70)  $\mu\text{s}$ .

- j. When tested in accordance with FOTP-37, "Low or High Temperature Bend Test for Fiber Optic Cable," the cable shall withstand four full turns around a mandrel of  $\leq$  twenty (20) times the cable diameter after conditioning for four hours at test temperatures of -22 °F and 140 °F (-30°C and +60°C). Neither the inner or outer surfaces of the jacket shall exhibit visible cracks, splits, tears, or other openings. The change in attenuation shall not exceed 0.30 dB at 1550 nm for single mode fiber and 0.50 dB at 1300 nm for multimode fiber.
4. All optical fibers, coatings, tubes, metals and jackets shall be free of roughness, porosity, blisters, splits and voids in accordance with good manufacturing practice.
5. The color coding and position of fibers / buffer tubes within the cable shall be in accordance with TIA/EIA-598-A "Optical Fiber Cable Color Coding". Fibers shall be colored with ultraviolet curable ink. In buffer tubes containing multiple fibers, the colors shall be stable across the specified storage and operating temperature range and not subject to fading or smearing onto adjacent fibers or into the gel filing material. Color materials shall not cause fibers to stick together.
6. The buffer tubes shall be resistant to external forces and shall meet the buffer tube cold bend and shrinkback requirements of 7 CFR 1755.900.
7. The cable shall be suitable for operation over a temperature range of -40 °F to 158 °F (-40°C to +70°C) and shall be suitable for installation in outdoor ducts or installed aerial between wood poles.
8. The cable shall provide mechanical support and protection for the specified number of fibers.
9. The central anti-buckling member shall consist of a dielectric, glass reinforced plastic (GRP) rod. The GRP rod shall be coated with a black colored thermoplastic when required to achieve dimensional sizing to accommodate buffer tubes/fillers.
10. Each buffer tube shall contain a water-swellable yarn for water-blocking protection. The water-swellable yarn shall be non-nutritive to fungus, electrically non-conductive, and homogeneous. It shall also be free from dirt or foreign matter. This yarn will preclude the need for other water-blocking material; the buffer-tube shall be gel-free.
11. Buffer tubes shall be stranded around the dielectric central member using the reverse oscillation, or "S-Z", stranding process. Water blocking yarn(s) shall be applied longitudinally along the central member during stranding.
12. A water blocking tape shall be applied longitudinally around the outside of the stranded tubes/fillers. The tape shall be held in place by a single polyester binder yarn. The water blocking tape shall be non-nutritive to fungus and electrically non-conductive.

13. The cable shall be able to withstand a maximum pulling tension of 600 lb (2700 N) during installation without any resulting damage. Tensile strength shall be provided by dielectric yarns. The high tensile strength dielectric yarns shall be helically stranded evenly around the cable core.
14. Non-armored cables shall be sheathed with medium density polyethylene (MDPE). The minimum nominal jacket thickness shall be 0.055 inches (1.4 mm). Jacketing material shall be applied directly over the tensile strength members (as required) and water-swellable tape. The polyethylene shall contain carbon black to provide ultraviolet light protection and shall not promote the growth of fungus. The MDPE jacket material shall be as defined by ASTM D1248, Type II, Class C, Category 4 and Grades J4, E7 and E8.
15. The cable shall contain at least one ripcord under the sheath (outer cable jacket) for easy sheath removal of all-dielectric cable.
16. Cable jackets shall be marked with the manufacturer's name, month and year of manufacture, sequential foot (meter) markings, a telecommunication handset symbol as required by Section 350G of the National Electrical Safety Code<sup>□</sup> (NESC<sup>□</sup>), fiber count, and fiber type. The actual length of the cable shall be within -0/+1% of the length markings. The print color shall be white, with the exception that cable jackets containing one or more coextruded white stripes, which shall be printed in light blue. The height of the marking shall be approximately 0.098 inches (2.5 mm).
17. Materials used in the cable shall not produce hydrogen in a concentration large enough to cause any degradation in the transmission performance of the optical fibers.
18. Materials used in the cable shall not support galvanic action.

D. Fiber Optic Trunk Cable:

1. This item consists of furnishing and installing optical fiber cables and connectors of the size and type specified at the locations shown on the Contract Drawings or as indicated by the Engineer, in accordance with these specifications.
2. Fiber optic cable shall be installed in conduit, inner-duct, or aerial as shown on the Contract Drawings by the Methods defined in this specification. Fiber optic cable shall be installed in the lowest available inner duct in the conduit, as specified below.
3. The Contractor shall provide multiple fiber, stranded, loose tube cable with single mode fiber that shall be suitable for placement in an aerial and underground environment as shown in the Contract Drawings.
4. The Contractor shall provide a manufacturer's certification that the offered cable complies with all optical and mechanical requirements set forth in this specification. Any deviation of

the offered cable from the specifications set forth herein shall be clearly noted in the Contractor's proposal.

E. Fiber Optic Drop Cables:

1. Fiber optic drop cables are used for connecting traffic signal cabinets to the fiber optic trunk cable.
2. The fiber optic drop cables shall consist of single mode fibers housed in a protective jacket. One end of the fiber shall be terminated at a patch panel within the traffic signal cabinet, the other end shall be spliced into a fiber optic trunk cable at an underground or aerial splice enclosure within an adjacent hand hole or above ground Splice Case attached to the nearest utility pole or wood pole.
3. The fiber optic drop cables shall be suitable for operation over the temperature range of -40 °F to 158 °F (-40° C to +70° C).
4. Fiber optic drop cables shall be of length suitably long to be connected to the rack mounted fiber optic transmission equipment within the Traffic Signal Cabinet and the fiber optic cable splice case or splice enclosure in the adjacent handhole. Sufficient slack shall be left at each end to allow removal of the Splice enclosure and trays.
5. The attenuation of fiber optic drop cable after installation, not including the connector loss, shall not exceed 0.15 dB measured at 1310 nm and 1550 nm.
6. All optical fiber cable used for a fiber optic drop cable shall comply with all other aspects of these specifications for optical fiber cable as set forth. The fiber optic drop cable shall be spliced and connected as shown in the Contract Drawings and within these specifications.



F. Single Mode Optical Fibers:

1. The Single Mode fiber shall consist of a doped silica core surrounded by a concentric silica cladding. The fiber shall be matched clad design.
2. The dispersion un-shifted or dispersion flattened single mode fiber shall conform to the following specifications:
  - a. The Single Mode fiber core shall have a diameter of between 8.2 to nine (9)  $\mu\text{m}$  inclusive with a tolerance of  $\pm 1.3 \mu\text{m}$ .
  - b. The Single Mode fiber cladding shall have an outer diameter of 125  $\mu\text{m}$  with a tolerance of  $\pm 0.7 \mu\text{m}$ .
  - c. The core-to-cladding offset shall not be greater than 0.5  $\mu\text{m}$ .
  - d. The cladding Non-Circularity shall not be greater than 0.7% defined as:  
Minimum Cladding Diameter/Maximum Cladding Diameter) x 100
  - e. The Single Mode fiber shall be coated with a protective polymer to preserve the strength of the fiber. The coating shall be removable by mechanical or chemical means. The coating shall retain its color when subject to the Manufacturer's recommended fiber cleaning and splicing preparation methods.
  - f. The SM fiber shall have attenuation and bandwidth specified at two (2) wavelength windows.
    - i. The first wavelength window shall be at and around 1310 nm.
    - ii. The second wavelength window shall be at and around 1550 nm.
3. The maximum optical attenuation at 1310 nm shall not be greater than 0.64 dB/mile (0.4 dB/km).
4. The maximum optical attenuation at 1550 nm shall not be greater than 0.48 dB/mile (0.3 dB/km).
5. The fiber attenuation shall not vary more than 0.32 dB/mile (0.2 dB/km) over the specified cable operational temperature range.
6. The zero dispersion wavelength shall be at a wavelength of  $1310 \pm 10 \text{ nm}$ .
7. The maximum dispersion at 1550 nm shall not exceed eighteen (18) ps / (nm-km).
8. The maximum dispersion in the wavelength range of 1285 to 1330 nm shall not exceed 3.2 ps / (nm-km).

G. Fiber Optic Connectors:

1. The connector shall have a ceramic ferrule with a nickel-plated nut and body.
2. The connector shall be of the SC-type and fully compatible with the fiber optic cable utilized and the mating jacks to which they will be attached.
3. The connector shall be compatible with an ultra-physical contact (UPC) finish. All connectors shall be polished to a UPC finish with a minimum thirty (30) dB connector return loss.
4. The connector mean loss shall not be greater than 0.2 dB with a standard deviation of not greater than 0.1 dB.
5. Index matching fluids or gels shall not be used.
6. The connector loss shall not vary more than 0.2 dB after 500 repeated matings.
7. The connector shall withstand an axial load of 11.2 lb (50 N) at 0° pull out angle with strength members and 0.5 lb (2.2 N) at 0° pull out angle without strength members.
8. The connectors shall be attached in accordance with the manufacturer's recommended materials, equipment and practices.
9. The connector shall be suitable for the intended environment and shall meet the following environmental conditions.
  - a. Operating Temperature: -4 °F to 122 °F (-20 to +50° C)
  - b. Storage Temperature: -22 °F to 140 °F (-30 to +60° C)
  - c. The connector loss shall not vary more than 0.2 dB over the operating temperature range.
  - d. Connectors shall be protected by a suitably installed waterproof protection cap.

## H. Fiber Optic Cable Fabrication:

### 1. Packing and Shipment

- a. The cable shall be supplied on reels. Top and bottom end of the cable shall be available for testing. Both ends of the cable shall be sealed to prevent ingress of moisture.
- b. The optical cable shall be in one (1) continuous length per reel with no factory splices in the fiber. Each reel shall be marked to indicate the direction the reel should be rolled to prevent loosening of the cable. Installation procedures and technical support shall be furnished upon request.
- c. Each reel shall have the following information clearly labeled on it:
  - i. Customer
  - ii. Customer order number
  - iii. Reel number
  - iv. Destination
  - v. Ship date
  - vi. Manufactured date
  - vii. Manufacturer's name
  - viii. Cable code
  - ix. Length of cable

### I. Pull Tape

1. The pull tape shall be NEPTCO Part No. DP1250P, or approved equal, for cable sizes of less than ninety-seven (97) fibers.
2. The detectable pull tape shall have the following properties:
  - 1250 lb (5.56 kN) tensile strength
  - flat, not round, construction
  - printed foot markings
  - pre-lubricated for reduced pulling tension at start of cable pull
  - low susceptibility to absorption of moisture; moisture resistant

### J. Warranty:

1. All equipment supplied for this shall be warranted for parts and labor by the vendor against defects and failures, which may occur through normal use for a period of one (1) year from the date of installation. A copy of the warranty must be presented to the Engineer before installation of the equipment.

K. Quality Assurance:

1. The Contractor shall have a Quality Assurance Program in place.
2. A minimum of ten (10) years' experience in the design, manufacture, and testing of Fiber Optic Cable and Connectors is required. The cable and connectors shall be designed and manufactured according to world class quality standards. The manufacturer shall be ISO 9001 certified.

**Construction Methods:**

A. Submittals:

1. Submit:
  - a. Functional block diagrams, cabling diagrams, and point to point cabling details, including locations of all trunk cable splice points (both fiber optic drop cable splices and reel-end splices.)
  - b. As-built drawings including a cable route diagram indicating the actual cable route and "foot (meter) marks" for all interchanges, intersections, directional change points in the cable routing, and all termination points. The Contractor shall record these points during cable installation. Cable system "as-built" drawings showing the exact cable route shall be provided by the Contractor to the Department. Information such as the location of slack cable and its quantity shall also be recorded in the cable route diagram.
  - c. Product data, Manufacturer's test certifications, installation manuals, materials, system configuration options and features, and accessories.
  - d. Shop Drawings shall be completely dimensioned and shall indicate the intended installation method and details.
  - e. Specifications of cable, connectors, and fiber splice kits.
  - f. Operating and maintenance manuals for all equipment.
  - g. Vendor Optical Time Domain Reflectometer (OTDR) certification for each reel of fiber optic cable listing each specification compliant fiber by fiber color code and group color code.

B. Delivery, Storage, and Handling:

1. The Contractor shall deliver, store, handle and install all materials and equipment in such a manner as not to degrade quality, serviceability or appearance.

2. The Contractor shall be responsible for storage of the materials and equipment prior to installation in a clean, dry location free from construction dust, precipitation and excess moisture.
3. Contractor shall be required to replace any damaged materials and equipment, as determined by the Engineer, at no additional cost to the owner.
4. Cable shall be transported to site using cable reel trailers.
5. Care shall be taken at all times to avoid scraping, denting, or otherwise damaging the cable before, during or after installation. Damaged cable shall be replaced by the Contractor without additional compensation.
6. Sufficient slack shall be pulled to allow cable cutting and connection to communications equipment.

C. Installation in Ducts or Conduit:

1. Cable shall be installed in innerduct, duct or conduit in the field in accordance with the Contract Drawings.
2. The Contractor shall install cables in innerducts consistently throughout the project; crossover of a cable from one innerduct to another is not allowed.
3. Duct and conduit ends shall have all rough ends smoothed to prevent scraping the cable.
4. Where cable will be installed directly in new or existing conduit with no innerduct, a stiff bristle brush shall be pulled through each section of conduit before installing a pull tape. Once a pull tape is installed the contractor will then install the fiber optic cable.
5. The Contractor shall not exceed the Manufacturer's recommended safe pulling tension and minimum bending radius during delivery and installation.
6. A Manufacturer's recommended lubricant shall be applied to the cable to reduce friction between the cable and the duct.
7. A cable grip shall be attached to the cables so that no direct force is applied to the optical fiber. The cable grip shall have a ball bearing swivel to prevent the cable from twisting during pulling.
8. Cable rollers and feeders and winch cable blocks shall be used to guide the cable freely into the duct and at handhole locations.
9. Mechanical aids and pulling cable or ropes shall be used as required.

10. The Contractor shall employ personnel at as many pull points as need be to achieve the longest continuous cable segment as possible to reduce the need for excessive main-line splices.
11. Personnel equipped with two-way radios shall be stationed at each maintenance handhole, cabinet and communications vault at which the cable is to be pulled to observe and lubricate the cable.
12. Where mechanical pulling is required (i.e. all runs greater than 164 feet (50 m), a dynamometer shall be used to record installation tension and a tension limiting device shall be used to prevent exceeding the maximum pulling tension as defined by the cable manufacturer. The maximum pulling tension shall be recorded for each run of cable. The cable shall be taken up at intermediate pulling points with an intermediate cable take-up device as approved by the Engineer to prevent over tension on the cable. Cable pulls shall be continuous and steady between pull points and shall not be interrupted until the entire run of cable has been pulled.
13. Trunk fiber cable segment lengths shall be the maximum tolerable length within the maximum pulling tension defined by the manufacturer. The number of trunk cable reel-end splices shall be minimized. The Contractor shall provide a plan to the Engineer showing the reel-end splice point locations following a field investigation of the conduit and shall not install cable until receiving the Engineer's approval of the reel-end splice location plan. The Contractor shall obtain the Engineer's approval for all required changes to the reel-end splice point location plans. Cable segments installed with reel-end splices not approved by the Engineer will be replaced by the Contractor at no additional cost to the Department.
14. The Contractor shall be responsible for ensuring the cable length is sufficient to allow for connection between the communication equipment and the splice enclosures including provision for slack, vertical runs, cable necessary for splicing, wastage and cable to allow for the removal of the splice enclosure for future splicing.
15. Drop Cable fibers in the Traffic Signal Cabinets shall be connectorized and the Active Fiber connected directly to the 10/100/1000Base-T Ethernet Switch to the Traffic Signal Controller and Video Detection System Processor. The Spare Fiber with connector shall be safely and securely attached to the interior of the equipment rack with plastic ties. The cable shall not be stressed beyond the minimum bending radius at any time.
16. All cable ends, connectors, and fiber optic jacks shall be protected from moisture ingress by using properly sealed caps.
17. Following installation of the cable in the ducts or conduit, all duct and conduit entrances at pedestals and cabinets shall be sealed with duct sealing compound to prevent the ingress of moisture, foreign materials, and rodents.

18. Fifty (50) feet of cable going to and coming from each splice enclosure shall be coiled in the first maintenance hole on each side of each splice closure. In addition, fifty (50) feet of cable shall be left coiled in the first maintenance handhole for the fiber optic drop cable.
19. Where trunk cable terminations are left “dead ended”, hundred (100) feet (30 m) of cable shall be left coiled.
20. All coiled cables shall be securely fastened in place with a minimum of four galvanized steel conduit straps.
21. At intermediate pulling points, to prevent over tension on the cable, the cable shall be either taken up with an intermediate cable take up device as approved by the Engineer, or all excess cable shall be laid out on the ground in a figure eight configuration before subsequent installation.
22. Following installation in duct, a label shall be affixed to each cable end in a pull box or cable vault and the label shall contain the following information:
  - Customer order number
  - Reel number
  - Ship date
  - Manufactured date
  - Manufacturer's name
  - Cable designation as shown on the Drawings
  - Length of cable to next reel-end splice point
  - Location of other end of cable (reel-end splice point)
  - Cable test data

D. Aerial Installation:

1. The Contractor shall provide the proper clearance between the aerial cable and the adjacent electric or telephone service cable. This is to assure the proper gain is attained between cables. The Contractor shall verify the proper clearance with the appropriate utility company.
2. Cables shall be double lashed to messenger supports.
3. Cables shall be attached to existing wood poles with 3-bolt suspension clamp with J-hooks. Cable lashings shall be provided on either side of the wood pole.
4. Cable guards shall be provided at bends to ensure proper termination of lashing wire and insertion of spacers at each pole location as shown on the plans.

5. Seventy-five (75) feet of cable going to and coming from each splice enclosure shall be coiled in an aerial snow shoe bracket on each side of each splice enclosure. In addition, seventy-five (75) feet of cable shall be left coiled in the first maintenance handhole for the fiber optic drop cable.

E. Splicing:

1. Splicing of the cable shall only be permitted at splice enclosure, splice case or field fiber optic interconnect panel locations as indicated in the Contract Drawings, unless authorized by the Engineer.
2. The Contractor shall prepare for splicing the designated fibers of the cable to the fiber optic drop cables connecting the communications equipment located in the traffic signal cabinets. Sufficient cable shall be coiled in the pullbox/cabinet to allow for consumption during the splicing and to permit the splice enclosure to be removed from the pullbox/cabinet for future splicing.
3. At least three (3) feet (1.0m) of each fiber shall be stored in the splice trays. The Contractor shall further splice all additional fibers provided in order to meet the fiber requirements specified in the Contract and including any fibers provided which are additional to the Contract requirements.
5. For aerial installations, the Contractor shall install splice cases constructed with a watertight cover assembly to prevent ingress of moisture. Splice cases shall be provided with clamp assemblies and end caps to securely fasten the splice trays.
6. Aerial splices shall only be done at existing wood poles. Splice cases shall be installed to one side of the wood pole to allow for the free movement of optical fiber cable from the splice case to the duct entrance of an adjacent conduit riser or to accommodate the direction change of a two (2) fiber or six (6) fiber drop cable.

F. Testing:

1. Test Documentation:
  - a. The Contractor shall be responsible for all testing and documentation required to establish approval and acceptance of this Item.
  - b. The Contractor shall submit test procedures and documented test results to the Engineer. The test procedures shall document the nature of test activities to be performed.
  - c. The test procedures shall be submitted to the Engineer prior to initiation of the testing. The procedures will be returned to the Contractor within two (2) weeks indicating either



“accepted” or “make corrections noted”. If corrections are required, the Contractor shall submit revisions within one (1) week.

- d. Four (4) copies of the final test procedures shall be submitted to the Engineer prior to commencement of testing.

2. Pre-Installation Testing:

- a. Reels of cable shall be tested for attenuation prior to installation in ducts. The Contractor shall measure and record the attenuation of 100% of the total single mode fibers on each reel. Attenuation shall meet or exceed the specified performance requirements in accordance with the Contract.
- b. The Contractor shall ensure that specifications for the fiber optic cable are met prior to installation.

3. Proof of Performance Testing:

- a. The Contractor shall measure the attenuation per mile (kilometer) of fiber in each length of cable after installation.
- b. The Contractor shall measure the attenuation of a randomly selected minimum of 10% of the total single mode fibers, which will be connected to equipment.
- c. All (100%) of optical fibers assigned to be spare or reserved shall be individually tested for optical attenuation.
- d. The Contractor shall sequence the fibers which are to be measured after each pull, such that the same fibers are not measured on consecutive lengths.
- e. The Contractor shall record the reel number from which the cable came, the identification of the fibers measured and the attenuation in dB/mile (dB/km) of the fibers measured.
- f. The Contractor shall measure and record the splice quality of each fusion splice performed. The Engineer shall be provided with access to interim results.

4. Optical Time Domain Reflectometer (OTDR) Testing:

- a. The Contractor shall perform Single Mode Fiber OTDR testing after each cable has been installed.
- b. The Contractor shall provide the Engineer with information regarding OTDR test equipment make and model with the equipment calibration procedures and certification dates prior to conducting the test routine.

- c. An OTDR shall be used for backscattered light measurements. The OTDR shall operate at a nominal wavelength of 1310 nm and 1550 nm and shall include all necessary hardware required to couple it with single mode fiber.
- d. The backscatter light measurement of each single mode fiber and each single mode optical link shall be measured in both directions and at both 1310 nm and 1550 nm wavelengths. Each single mode optical link shall be defined as being the total length of interconnected single mode fibers and the splices which form a continuous end-to-end optical link.
- e. The Contractor shall maintain a test result record of each single mode optical link and each single mode fiber by means of printer copy of the OTDR measured cable attenuation profile. Single mode optical links shall be identified in the test results by identifying the fiber under test and by identifying the cabinet site at which the OTDR was connected.
- f. The test results shall include the following measurements:
  - i. Total length of the single mode link
  - ii. Total attenuation of the single mode link
  - iii. Attenuation of each splice in the link under test
  - iv. Attenuation per mile (kilometer) of each interconnected fiber in the link under test
- g. Attenuation shall be measured in decibels referencing optical power.
- h. Each single mode fiber and splice tested shall be tested to meet the performance requirements in accordance with the Contract. Fiber strands failing this test shall be re-terminated and re-tested.

**Method of Measurement:**

Work under this item shall be measured for payment by the number of linear foot (meter) of "Optical Fiber Cable - SM, LB Tube Cable" of the type indicated, furnished and installed, as specified and shown on the Drawings.

**Basis of Payment:**

The work to be done under this item shall be paid at the Contract unit price for each foot (meter) of the Optical Fiber Cable - SM, LB Tube Cable" of the type indicated, furnished and installed as described in this specification. This work shall include all cable, connectors, splicing, equipment, pull tape, materials and incidental items required to satisfy these specifications.

Splice enclosures will be furnished and installed separately under Item 1112242A “Fiber Optic Cable Splice Enclosure (Signals)”.

<u>Pay Items</u>	<u>Pay Unit</u>
Optical Fiber Cable – SM, LB Tube Cable, 6 Fiber	LF (m)
Optical Fiber Cable – SM, LB Tube Cable, 36 Fiber	LF (m)

**ITEM #1113621A – OPTICAL FIBER CABLE, SINGLE MODE, LOOSE BUFFER TUBE CABLE, 72 FIBER**

**Description:**

This Item specifies the requirements for furnishing, installing in conduit or aerial between utility poles, splicing, and connectorizing fiber optic cables. As part of this item, the Contractor shall install a pull tape in specific conduits within the contract limits of work, as necessary to install the fiber optic cable. The specific areas where pull tape may be required are delineated in the Construction Methods section of this specification.

**Materials:**

A. General:

1. Outdoor fiber optic cable shall be installed in conduit or aerial between utility poles, spliced as required and terminated in Traffic Management System Cabinets (TMSC), as shown on the Drawings.
2. Six-fiber Drop Cable shall be utilized to interconnect the mainline communications cable with the equipment within the CCTV TMSC and/or the Variable Message Sign Controllers, as shown on the Drawings.
3. Two-fiber Drop Cable shall be utilized to interconnect the equipment between the CCTV TMSC and the Variable Message Sign Controllers, as shown on the plans.
4. The fiber optic cable, splices, connectors and interconnect panels shall meet all requirements stated in this Specification.
5. **All optical fiber cables used in this project shall be manufactured by Corning Incorporated, and splice-compatible with the Department's existing Siecorm SMF/DS dispersion-shifted fiber optic cable. Optical fiber cable installed for this project shall be dielectric, dry-filled, loose-tubed, duct-type.**

B. Applicable Publications:

1. Publications listed below form a part of this specification to the extent referenced. The publications are referred to in the text by basic designation. All Fiber Optic Communication System hardware shall be compliant with the following specifications:

Electronics Industries Association (EIA):

- a. EIA-310-C Racks, Panels, and Associated Equipment.
  - b. EIA-359-A Colors for Color Identification and Coding.
  - c. EIA-422-A Electrical Characteristics of Balanced Voltage Digital Interface Circuits.
  - d. EIA-TIA-455-A Standard Test Procedures for Fiber Optic Fibers, Cable Transducer Sensors, Connecting and Terminating Devices and Other Fiber Optic Components.
  - e. EIA-455-6B Cable Retention Test Procedure for Fiber Optic Cable Interconnecting Devices.
  - f. EIA-485 Standard for Electrical Characteristics of Generators and Receivers for use in Balanced Digital Multipoint Systems.
  - g. TIA/EIA-598-A Optical Fiber Cable Color Coding.
2. USDA Rural Utilities Service (RUS) 7 CFR 1755.900.
  3. ANSI/ICEA Standard for Fiber Optic Outside Plant Communications Cable, ANSI/ICEA S-87-640-1992.
  4. UL-listed OFNR
  5. CSA-listed FT-4

C. Outdoor Fiber Optic Cable Requirements:

1. The cable shall be an accepted product of the United States Department of Agriculture Rural Utilities Service (RUS) 7 CFR 1755.900 and meet the requirements of the ANSI-ICEA Standard for Fiber Optic Outside Plant Communications Cable, ANSI/ICEA S-87-640-1992.
2. The Outdoor Fiber Optic Cable shall be stranded tight tube cable with the required number of fibers as shown in the Contract Drawings.
3. The Contractor shall provide manufacturer's documentation certifying that the Outdoor Fiber Optic Cable complies with the following performance requirements:
  - a. When tested in accordance with FOTP-3, "Procedure to Measure Temperature Cycling Effects on Optical Fibers, Optical Cable, and Other Passive Fiber Optic Components," the change in attenuation at extreme operational temperatures of -40 °F and 158 °F (-40°C and +70°C) shall not exceed .24 dB/mile (0.15 dB/km) at 1550 nm for single mode fiber.
  - b. When tested in accordance with FOTP-82, "Fluid Penetration Test for Fluid-Blocked Fiber Optic Cable." a 3 foot (one-meter) length of unaged cable shall withstand a 3 foot (one-meter) static head or equivalent continuous pressure of water for cable end.
  - c. When tested in accordance with FOTP-81, "Compound Flow (Drip) Test for Filled Fiber Optic Cable", the cable shall exhibit no flow (drip or leak) of filling and/or flooding material at 158 °F (70°C).

- d. When tested in accordance with FOTP-41, "Compressive Loading Resistance of Fiber Optic Cables," the cable shall withstand a minimum compressive load of 125 lbf/in (220 N/cm) applied uniformly over the length of the sample. The 125 lbf/in (220 N/cm) load shall be applied at a rate of 0.1 inch (2.5 mm) per minute. The load shall be maintained for a period of 1 minute. The load shall then be decreased to 63 lbf/in (110 N/cm). Alternatively, it is acceptable to remove the 125 lbf/in (220 N/cm) load entirely and apply the 63 lbf/in (110 N/cm) load within five minutes at a rate of 0.1 inch (2.5 mm) per minute. The 63 lbf/in (110 N/cm) load shall be maintained for a period of 10 minutes. Attenuation measurements shall be performed before release of the 63 lbf/in (110 N/cm) load. The change in attenuation shall not exceed 0.15 dB at 1550 nm for single-mode fibers and 0.30 dB at 1300 nm for multimode fiber.
- e. When tested in accordance with FOTP-104, "Fiber Optic Cable Cyclic Flexing Test," the cable shall withstand 25 mechanical flexing cycles around a sheave diameter not greater than 20 times the cable diameter. The change in attenuation shall not exceed 0.15 dB at 1550 nm for single mode fiber.
- f. When tested in accordance with FOTP-25, "Repeated Impact Testing of Fiber Optic Cables and Cable Assemblies," except that the number of cycles shall be two at three locations along a 3 foot (one meter) cable length and the impact energy shall be at least 3.25 lb-ft (4.4 Nm) (in accordance with ICEA S-87-640)", the change in attenuation shall not exceed 0.15 dB at 1550 nm for single-mode fiber.
- g. When tested in accordance with FOTP-33, "Fiber Optic Cable Tensile Loading and Bending Test," using a maximum mandrel and sheave diameter of 22 inches (560 mm), the cable shall withstand a rated tensile load of 601 lbf (2670N) and residual load of 30% of the rated installation load. The axial fiber strain shall be  $\leq$  60% of the fiber proof level after completion of 60 minute conditioning and while the cable is under the rated installation load. The axial fiber strain shall be  $\leq$  20% of the fiber proof level after completion of 10 minute conditioning and while the cable is under the residual load. The change in attenuation at residual load and after load removal shall not exceed 0.15 dB at 1550 nm for single mode fiber and 0.30 dB at 1300 nm for multimode fiber.
- h. When tested in accordance with FOTP-85, "Fiber Optic Cable Twist Test," a length of cable no greater than 6 feet (2 meters) shall withstand 10 cycles of mechanical twisting. The change in attenuation shall not exceed 0.1 dB at 1550 nm for single mode fiber
- i. When tested in accordance with FOTP-181, "Lightning Damage Susceptibility Test for Optic Cables with Metallic Components," the cable shall withstand a simulated lightning strike with a peak value of the current pulse equal to 80 kA without loss of fiber continuity. A damped oscillatory test current shall be used with a maximum time-to-peak value of 15  $\mu$ s (which corresponds to a minimum frequency of 16.7 kHz) and a maximum frequency of 30 kHz. The time to half-value of the waveform envelope shall be from 40 - 70  $\mu$ s.

- j. When tested in accordance with FOTP-37, "Low or High Temperature Bend Test for Fiber Optic Cable," the cable shall withstand four full turns around a mandrel of  $\leq 20$  times the cable diameter after conditioning for four hours at test temperatures of -22 °F and 140 °F (-30°C and +60°C). Neither the inner or outer surfaces of the jacket shall exhibit visible cracks, splits, tears, or other openings. The change in attenuation shall not exceed 0.30 dB at 1550 nm for single mode fiber and 0.50 dB at 1300 nm for multimode fiber.
4. All optical fibers, coatings, tubes, metals and jackets shall be free of roughness, porosity, blisters, splits and voids in accordance with good manufacturing practice.
5. The color coding and position of fibers / buffer tubes within the cable shall be in accordance with TIA/EIA-598-A "Optical Fiber Cable Color Coding". Fibers shall be colored with ultraviolet curable ink. In buffer tubes containing multiple fibers, the colors shall be stable across the specified storage and operating temperature range and not subject to fading or smearing onto adjacent fibers or into the gel filing material. Color materials shall not cause fibers to stick together.
6. The buffer tubes shall be resistant to external forces and shall meet the buffer tube cold bend and shrinkback requirements of 7 CFR 1755.900.
7. The cable shall be suitable for operation over a temperature range of -40 °F to 158 °F (-40°C to +70°C) and shall be suitable for installation in outdoor ducts or installed aerial between wood poles.
8. The cable shall provide mechanical support and protection for the specified number of fibers.
9. The central anti-buckling member shall consist of a dielectric, glass reinforced plastic (GRP) rod. The GRP rod shall be coated with a black colored thermoplastic when required to achieve dimensional sizing to accommodate buffer tubes/fillers.
10. Each buffer tube shall contain a water-swellable yarn for water-blocking protection. The water-swellable yarn shall be non-nutritive to fungus, electrically non-conductive, and homogeneous. It shall also be free from dirt or foreign matter. This yarn will preclude the need for other water-blocking material; the buffer-tube shall be gel-free.
11. Buffer tubes shall be stranded around the dielectric central member using the reverse oscillation, or "S-Z", stranding process. Water blocking yarn(s) shall be applied longitudinally along the central member during stranding.
12. A water blocking tape shall be applied longitudinally around the outside of the stranded tubes/fillers. The tape shall be held in place by a single polyester binder yarn. The water blocking tape shall be non-nutritive to fungus and electrically non-conductive.
13. The cable shall be able to withstand a maximum pulling tension of 600 lb (2700 N) during installation without any resulting damage. Tensile strength shall be provided by dielectric

yarns. The high tensile strength dielectric yarns shall be helically stranded evenly around the cable core.

14. Non-armored cables shall be sheathed with medium density polyethylene (MDPE). The minimum nominal jacket thickness shall be 0.055 inches (1.4 mm). Jacketing material shall be applied directly over the tensile strength members (as required) and water swellable tape. The polyethylene shall contain carbon black to provide ultraviolet light protection and shall not promote the growth of fungus. The MDPE jacket material shall be as defined by ASTM D1248, Type II, Class C, Category 4 and Grades J4, E7 and E8.
15. The cable shall contain at least one ripcord under the sheath (outer cable jacket) for easy sheath removal of all-dielectric cable.
16. Cable jackets shall be marked with the manufacturer's name, month and year of manufacture, sequential foot (meter) markings, a telecommunication handset symbol as required by Section 350G of the National Electrical Safety Code<sup>□</sup> (NESC<sup>□</sup>), fiber count, and fiber type. The actual length of the cable shall be within -0/+1% of the length markings. The print color shall be white, with the exception that cable jackets containing one or more coextruded white stripes, which shall be printed in light blue. The height of the marking shall be approximately 0.098 inches (2.5 mm).
17. Materials used in the cable shall not produce hydrogen in a concentration large enough to cause any degradation in the transmission performance of the optical fibers.
18. Materials used in the cable shall not support galvanic action.

D. Fiber Optic Trunk Cable:

1. This item consists of furnishing and installing optical fiber cables and connectors of the size and type specified at the locations shown on the Drawings or as indicated by the Engineer, in accordance with these Specifications.
2. Fiber Optic cable shall be installed in conduit or inner-duct as shown on the Drawings by the Methods defined in this Specification. Fiber Optic cable shall be installed in the lowest available innerduct in the conduit, as specified below.
3. The Contractor shall provide multiple fiber, stranded, loose tube cable with single mode fiber that shall be suitable for placement in an underground environment as shown in the Drawings.
4. The Contractor shall provide a manufacturer's certification that the offered cable complies with all optical and mechanical requirements set forth in this Specification. Any deviation of the offered cable from the specifications set forth herein shall be clearly noted in the Contractor's proposal.

E. Fiber Optic Drop Cables:



1. Drop cables are used for connecting Camera Hub cabinets to the fiber optic trunk cable and for connecting Variable Message Sign controllers to the Camera Hub cabinet.
2. The Drop Cable shall consist of single mode fibers housed in a protective jacket. One end of the fiber shall be connectorized for termination within the Camera Hub, the other end shall be spliced into a fiber optic trunk cable at an underground Splice Closure within an adjacent pullbox or above ground Splice Case attached to the nearest utility pole or wood pole. Drop Cables used for interconnection of the Variable Message Sign Controller cabinets with the Camera Hub equipment shall be field connectorized at both ends of the cable for termination within the Camera Hub cabinet and Variable Message Sign Controller cabinet.
3. The drop cables shall be suitable for operation over the temperature range of -40 °F to 158 °F (-40° C to +70° C).
4. Drop Cables shall be of length suitably long to be connected to the rack mounted fiber optic transmission equipment within the Camera Hub and the fiber optic cable splice case or splice enclosure in the adjacent pullbox. Sufficient slack shall be left at each end to allow removal of the Splice enclosure and trays.
5. The attenuation of Drop Cable after installation, not including the connector loss, shall not exceed 0.15 dB measured at 1310 nm and 1550 nm.
6. All optical fiber cable used for a drop cable shall comply with all other aspects of these Specifications for optical fiber cable as set forth. The drop cable shall be spliced and connected as shown in the Drawings and within these Specifications.

F. Single Mode Optical Fibers:

1. The Single Mode fiber shall consist of a doped silica core surrounded by a concentric silica cladding. The fiber shall be matched clad design.
2. The dispersion un-shifted or dispersion flattened single mode fiber shall conform to the following specifications:
  - a. The Single Mode fiber core shall have a diameter of between 8.2 to 9  $\mu\text{m}$  inclusive with a tolerance of  $\pm 1.3 \mu\text{m}$ .
  - b. The Single Mode fiber cladding shall have an outer diameter of 125  $\mu\text{m}$  with a tolerance of  $\pm 0.7 \mu\text{m}$ .
  - c. The core-to-cladding offset shall not be greater than 0.5  $\mu\text{m}$ .
  - d. The cladding Non-Circularity shall not be greater than 0.7% defined as:  
Minimum Cladding Diameter/Maximum Cladding Diameter) x 100
  - e. The Single Mode fiber shall be coated with a protective polymer to preserve the strength of the fiber. The coating shall be removable by mechanical or chemical means. The coating shall retain its color when subject to the manufacturer's recommended fiber cleaning and splicing preparation methods.
  - f. The SM fiber shall have attenuation and bandwidth specified at two wavelength windows.
    - i. The first wavelength window shall be at and around 1310 nm.
    - ii. The second wavelength window shall be at and around 1550 nm.
3. The maximum optical attenuation at 1310 nm shall not be greater than 0.64 dB/mile (0.4 dB/km).
4. The maximum optical attenuation at 1550 nm shall not be greater than 0.48 dB/mile (0.3 dB/km).
5. The fiber attenuation shall not vary more than 0.32 dB/mile (0.2 dB/km) over the specified cable operational temperature range.
6. The zero dispersion wavelength shall be at a wavelength of  $1310 \pm 10 \text{ nm}$ .
7. The maximum dispersion at 1550 nm shall not exceed 18 ps / (nm-km).
8. The maximum dispersion in the wavelength range of 1285 to 1330 nm shall not exceed 3.2 ps / (nm-km).

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G. Fiber Optic Connectors:

1. The connector shall have a ceramic ferrule with a nickel-plated nut and body.
2. The connector shall be of the ST-type and fully compatible with the fiber optic cable utilized and the mating jacks to which they will be attached.
3. The connector shall be compatible with a physical contact (PC) finish. All connectors shall be polished to a PC finish such that the return loss per mated pair of connectors is at least 25 dB. The return loss when the connector is mated with previously installed connectors shall be at least 18 dB.
4. The connector mean loss shall not be greater than 0.2 dB with a standard deviation of not greater than 0.1 dB.
5. Index matching fluids or gels shall not be used.
6. The connector loss shall not vary more than 0.2 dB after 500 repeated matings.
7. The connector shall withstand an axial load of 11.2 lb (50 N) at 0° pull out angle with strength members and 0.5 lb (2.2 N) at 0° pull out angle without strength members.
8. The connectors shall be attached in accordance with the manufacturer's recommended materials, equipment and practices.
9. The connector shall be suitable for the intended environment and shall meet the following environmental conditions.
  - a. Operating Temperature: -4 °F to 122 °F (-20 to +50° C)
  - b. Storage Temperature: -22 °F to 140 °F (-30 to +60° C)
  - c. The connector loss shall not vary more than 0.2 dB over the operating temperature range.
  - d. Connectors shall be protected by a suitably installed waterproof protection cap.

H. Fiber Optic Cable Fabrication:

1. Packing and Shipment

- a. The cable shall be supplied on reels. Top and bottom end of the cable shall be available for testing. Both ends of the cable shall be sealed to prevent ingress of moisture.
- b. The optical cable shall be in one continuous length per reel with no factory splices in the fiber. Each reel shall be marked to indicate the direction the reel should be rolled to prevent loosening of the cable. Installation procedures and technical support shall be furnished upon request.
- c. Each reel shall have the following information clearly labeled on it:
  - i. Customer
  - ii. Customer order number
  - iii. Reel number
  - iv. Destination
  - v. Ship date
  - vi. Manufactured date
  - vii. Manufacturer's name
  - viii. Cable code
  - ix. Length of cable

I. Warranty:

1. All equipment supplied for this shall be warranted for parts and labor by the vendor against defects and failures, which may occur through normal use for a period of one (1) year from the date of installation. A copy of the warranty must be presented to the Engineer before installation of the equipment.

J. Quality Assurance:

1. The Contractor shall have a Quality Assurance Program in place.
2. A minimum of ten (10) year's experience in the design, manufacture, and testing of Fiber Optic Cable and Connectors is required. The cable and connectors shall be designed and manufactured according to world class quality standards. The manufacturer shall be ISO 9001 certified.

**Construction Methods:**

A. Submittals:

1. Submit:

- a. Functional block diagrams, cabling diagrams, and point to point cabling details, including locations of all trunk cable splice points (both drop cable splices and reel-end splices.)
- b. As built drawings including a cable route diagram indicating the actual cable route and “foot (meter) marks” for all interchanges, intersections, directional change points in the cable routing, and all termination points. The Contractor shall record these points during cable installation. Cable system “as-built” drawings showing the exact cable route shall be provided by the Contractor to ConnDOT. Information such as the location of slack cable and its quantity shall also be recorded in the cable route diagram.
- c. Product data, manufacturer’s test certifications, installation manuals, materials, system configuration options and features, and accessories.
- d. Shop Drawings shall be completely dimensioned and shall indicate the intended installation method and details.
- e. Specifications of cable, connectors, and fiber splice kits.
- f. Operating and maintenance manuals for all equipment.
- g. Vendor Optical Time Domain Reflectometer (OTDR) certification for each reel of fiber optic cable listing each specification compliant fiber by fiber color code and group color code.

B. Delivery, Storage, and Handling:

1. The Contractor shall deliver, store, handle and install all materials and equipment in such a manner as not to degrade quality, serviceability or appearance.
2. The Contractor shall be responsible for storage of the materials and equipment prior to installation in a clean, dry location free from construction dust, precipitation and excess moisture.
3. Contractor shall be required to replace any damaged materials and equipment, as determined by the Engineer, at no additional cost to the owner.
4. Cable shall be transported to site using cable reel trailers.

5. Care shall be taken at all times to avoid scraping, denting, or otherwise damaging the cable before, during or after installation. Damaged cable shall be replaced by the Contractor without additional compensation.
6. Sufficient slack shall be pulled to allow cable cutting and connection to communications equipment.

C. Installation in Ducts:

1. The Contractor shall contact Mr. James Gannon of ConnDOT Highway Operations (203-673-7373) at least fourteen (14) days prior to fiber optic cable installation in the duct system. Mr. Gannon will identify the specific fiber optic conduit innerducts that shall be used for cable installation.
2. Cable shall be installed in innerduct, duct or conduit in the field in accordance with the Contract Drawings.
3. The Contractor shall install cables in innerducts consistently throughout the project; crossover of a cable from one innerduct to another is not allowed.
4. Duct ends shall have all rough ends smoothed to prevent scraping the cable.
5. Where cable will be installed directly in conduit with no innerduct, a stiff bristle brush shall be pulled through each section of duct before pulling cable.
6. The Contractor shall not exceed the manufacturer's recommended safe pulling tension and minimum bending radius during delivery and installation.
7. A manufacturer's recommended lubricant shall be applied to the cable to reduce friction between the cable and the duct.
8. A cable grip shall be attached to the cables so that no direct force is applied to the optical fiber. The cable grip shall have a ball bearing swivel to prevent the cable from twisting during pulling.
9. Cable rollers and feeders and winch cable blocks shall be used to guide the cable freely into the duct and at maintenance hole locations.
10. Mechanical aids and pulling cable or ropes shall be used as required.
11. The Contractor shall employ personnel at as many pull points as need be to achieve the longest continuous cable segment as possible to reduce the need for excessive main-line splices.

12. Personnel equipped with two-way radios shall be stationed at each maintenance hole, cabinet and communications vault at which the cable is to be pulled to observe and lubricate the cable.
13. Where mechanical pulling is required (i.e. all runs greater than 164 feet (50 m), a dynamometer shall be used to record installation tension and a tension limiting device shall be used to prevent exceeding the maximum pulling tension as defined by the cable manufacturer. The maximum pulling tension shall be recorded for each run of cable. The cable shall be taken up at intermediate pulling points with an intermediate cable take-up device as approved by the Engineer to prevent over tension on the cable. Cable pulls shall be continuous and steady between pull points and shall not be interrupted until the entire run of cable has been pulled.
14. Trunk fiber cable segment lengths shall be the maximum tolerable length within the maximum pulling tension defined by the manufacturer. The number of trunk cable reel-end splices shall be minimized. The Contractor shall provide a plan to the Engineer showing the reel-end splice point locations following a field investigation of the conduit and shall not install cable until receiving the Engineer's approval of the reel-end splice location plan. The Contractor shall obtain the Engineer's approval for all required changes to the reel-end splice point location plans. Cable segments installed with reel-end splices not approved by the Engineer will be replaced by the Contractor at no additional cost to the Department.
15. The Contractor shall be responsible for ensuring the cable length is sufficient to allow for connection between the communication equipment and the splice enclosures including provision for slack, vertical runs, cable necessary for splicing, wastage and cable to allow for the removal of the splice enclosure for future splicing.
16. Drop Cable fibers in the Camera Hub Cabinets shall be connectorized and the Active Fiber connected directly to the Optical Video/Data Transceiver. The Spare Fiber with Connector shall be safely and securely attached to the interior of the equipment rack with plastic ties. The cable shall not be stressed beyond the minimum bending radius at any time.
17. All cable ends, connectors, and fiber optic jacks shall be protected from moisture ingress by using properly sealed caps.
18. Following installation of the cable in the ducts, all duct entrances at pedestals and cabinets shall be sealed with duct sealing compound to prevent the ingress of moisture, foreign materials, and rodents.
19. 20 feet (6 m) of cable going to and coming from each Splice Closure shall be coiled in the first maintenance hole on each side of each closure. In addition, 50 feet (15 m) of cable shall be left coiled in the first maintenance hole on each side of all surface mounted conduit systems.

20. Where trunk cable terminations are left “dead ended”, 100 feet (30 m) of cable shall be left coiled.
21. All coiled cables shall be securely fastened in place with a minimum of four galvanized steel conduit straps.
22. At intermediate pulling points, to prevent over tension on the cable, the cable shall be either taken up with an intermediate cable take up device as approved by the Engineer, or all excess cable shall be laid out on the ground in a figure eight configuration before subsequent installation.
23. Following installation in duct, a label shall be affixed to each cable end in a pull box or cable vault and the label shall contain the following information:
  - Customer order number
  - Reel number
  - Ship date
  - Manufactured date
  - Manufacturer's name
  - Cable designation as shown on the Drawings
  - Length of cable to next reel-end splice point
  - Location of other end of cable (reel-end splice point)
  - Cable test data

D. Aerial Installation:

1. The Contractor shall provide the proper clearance between the aerial cable and the adjacent electric or telephone service cable. This is to assure the proper gain is attained between cables. The Contractor shall verify the proper clearance with the appropriate utility company.
2. Cables shall be double lashed to messenger supports.
3. Cables shall be attached to existing wood poles with 3-bolt suspension clamp with J-hooks. Cable lashings shall be provided on either side of the wood pole.
4. Cable guards shall be provided at bends to ensure proper termination of lashing wire and insertion of spacers at each pole location as shown on the plans.

E. Splicing:

1. The Contractor shall contact Mr. James Gannon of ConnDOT Highway Operations (203-676-7373) at least fourteen (14) days prior to fiber optic cable splicing. Mr. Gannon will



provide direction on splicing the drop cable to the existing/proposed fiber cable network, and identify the specific fibers that will be utilized for the camera locations shown on the plans.

2. Splicing of the cable shall only be permitted at splice enclosure, splice case or field fiber optic interconnect panel locations as indicated in the Drawings, unless authorized by the Engineer.
3. The Contractor shall prepare for splicing the designated fibers of the cable to the Drop Cables connecting the communications equipment located in the Camera cabinets. Sufficient cable shall be coiled in the pullbox/cabinet to allow for consumption during the splicing and to permit the splice closure to be removed from the pullbox/cabinet for future splicing.
4. At least 3 feet (1.0m) of each fiber shall be stored in the splice trays. The Contractor shall further splice all additional fibers provided in order to meet the fiber requirements specified in the Contract and including any fibers provided which are additional to the Contract requirements.
5. For aerial installations, the Contractor shall install splice cases constructed with a watertight cover assembly to prevent ingress of moisture. Splice cases shall be provided with clamp assemblies and end caps to securely fasten the splice trays.
6. Aerial splices shall only be done at existing wood poles. Splice cases shall be installed to one side of the wood pole to allow for the free movement of optical fiber cable from the splice case to the duct entrance of an adjacent conduit riser or to accommodate the direction change of a 2-Fiber or 6-Fiber drop cable.

F. Testing:

1. Test Documentation:

- a. The Contractor shall be responsible for all testing and documentation required to establish approval and acceptance of this Item.
- b. The Contractor shall submit test procedures and documented test results to the Engineer. The test procedures shall document the nature of test activities to be performed.
- c. The test procedures shall be submitted to the Engineer prior to initiation of the testing. The procedures will be returned to the Contractor within two weeks indicating either “accepted” or “make corrections noted”. If corrections are required, the Contractor shall submit revisions within 1 week.
- d. Four copies of the final test procedures shall be submitted to the Engineer prior to commencement of testing.

2. Pre-Installation Testing:

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- a. Reels of cable shall be tested for attenuation prior to installation in ducts. The Contractor shall measure and record the attenuation of 100% of the total single mode fibers on each reel. Attenuation shall meet or exceed the specified performance requirements in accordance with the Contract.
- b. The Contractor shall ensure that specifications for the fiber optic cable are met prior to installation.

3. Proof of Performance Testing:

- a. The Contractor shall measure the attenuation per mile (kilometer) of fiber in each length of cable after installation.
- b. The Contractor shall measure the attenuation of a randomly selected minimum of 10% of the total single mode fibers, which will be connected to equipment.
- c. All (100%) of optical fibers assigned to be spare or reserved shall be individually tested for optical attenuation.
- d. The Contractor shall sequence the fibers which are to be measured after each pull, such that the same fibers are not measured on consecutive lengths.
- e. The Contractor shall record the reel number from which the cable came, the identification of the fibers measured and the attenuation in dB/mile (dB/km) of the fibers measured.
- f. The Contractor shall measure and record the splice quality of each fusion splice performed. The Engineer shall be provided with access to interim results.

4. Optical Time Domain Reflectometer (OTDR) Testing:

- a. The Contractor shall perform Single Mode Fiber OTDR testing after each cable has been installed.
- b. The Contractor shall provide the Engineer with information regarding OTDR test equipment make and model with the equipment calibration procedures and certification dates prior to conducting the test routine.
- c. An OTDR shall be used for backscattered light measurements. The OTDR shall operate at a nominal wavelength of 1310 nm and 1550 nm and shall include all necessary hardware required to couple it with single mode fiber.
- d. The backscatter light measurement of each single mode fiber and each single mode optical link shall be measured in both directions and at both 1310 nm and 1550 nm wavelengths. Each single mode optical link shall be defined as being the total length of

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interconnected single mode fibers and the splices which form a continuous end-to-end optical link.

- e. The Contractor shall maintain a test result record of each single mode optical link and each single mode fiber by means of printer copy of the OTDR measured cable attenuation profile. Single mode optical links shall be identified in the test results by identifying the fiber under test and by identifying the cabinet site at which the OTDR was connected.
- f. The test results shall include the following measurements:
  - i. Total length of the single mode link
  - ii. Total attenuation of the single mode link
  - iii. Attenuation of each splice in the link under test
  - iv. Attenuation per mile (kilometer) of each interconnected fiber in the link under test
- g. Attenuation shall be measured in decibels referencing optical power.
- h. Each single mode fiber and splice tested shall be tested to meet the performance requirements in accordance with the Contract. Fiber strands failing this test shall be re-terminated and re-tested.

**Method of Measurement:**

Work under this item shall be measured for payment by the number of linear foot (meter) of "Optical Fiber Cable - SM, LB Tube Cable" of the type indicated, furnished and installed, as specified and shown on the Drawings.

**Basis of Payment:**

The work to be done under this item shall be paid at the Contract unit price for each foot (meter) of the Optical Fiber Cable - SM, LB Tube Cable" of the type indicated, furnished and installed as described in this Specification. This work shall include all cable, connectors, splicing, equipment, materials and incidental items required to satisfy these Specifications.

Splice enclosures will be furnished and installed separately under Item 1112241A “Fiber Optic Cable Splice Enclosure”.

PAY ITEMS

Optical Fiber Cable – SM, LB Tube Cable, 72 Fiber

PAY UNIT

LF (m)

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## **ITEM #1113814A – REMOVAL AND/OR RELOCATION OF ATMS**

### **Description:**

This Item includes the work for removal and relocation of the existing ConnDOT Advanced Traffic Management System (ATMS) in the Branford segment of the I-95 Incident Management System. The ATMS includes the removal and relocation of the existing 95S-088 Service Cable, the installation of service cabinet foundation, and the removal and relocation of 95S-088 Service Cabinet, “Notice to Contractor – IMS Installation” and as shown on the Incident Management System Plan sheets.

The project equipment is shown on the Contract Drawings for the project, as originally installed. The full set of full size plans for the existing ATMS can be purchased from ConnDOT’s Engineering Records Division, State Project No. 14-170.

### **Materials:**

There are no specific material requirements for the removal and relocation, as the work entails turn-off of the existing system for the removal and relocation of the existing 95S-088 Service Cable and 95S-088 Service Cabinet. If the use of any materials is required for the removal and/or relocation then said equipment shall be in conformance with the Standard Specifications, Form 817.

The material requirements for the installation of the new service cabinet foundation are below:

The foundation shall conform to Section 10.02.

The pedestal shall conform to Section 11.02, 3 ft (900 mm) Aluminum Pedestal.

Ground rod shall conform to Article M.15.15-7.

Trenching and Backfilling shall conform to Section 10.01.

Rigid Metal Conduit shall conform to Section 10.08.

### **Construction Methods:**

The Contractor shall completely install the conduit, foundation, and required equipment as indicated on the plans or as directed by the Engineer. The Contractor shall install the service cabinet foundation at locations shown on the plans or as directed by the Engineer. The Contractor shall install in the pedestal foundation one spare 2 in (50 mm) RMC conduit sweep.

The service cabinet should be located behind metal beam rail, beyond fixed objects such as proposed wood poles or utility poles, abutments and beyond the travel way. The location of the service cabinet should not create an obstacle in the sight line of vehicles traveling on the adjacent roadways. The location of the service cabinet foundation shall be adjusted with respect to roadway geometry as directed by the Engineer.

The service cabinet shall provide power to a CCTV cabinet as indicated on the plans.

The service cabinet foundation shall be installed prior to the “Approved Downtime.”

The removal and relocation of the existing 95S-088 Service Cable and 95S-088 Service Cabinet shall be performed During Approved Downtime for Camera 95S-088 described in the “Notice to Contractor – IMS Installation” and as shown on the Incident Management System Plan sheets.

The existing 95S-088 Service Cable will be removed from the existing 95S-088 Service Cabinet to the existing 95S-088 Camera Cabinet and relocated to a new 2” RMC by way of newly installed Handhole “A”. The existing 95S-088 Service Cabinet will be relocated to the newly installed foundation.

#### During Approved Downtime for Camera 95N-194

- Remove CCTV 95S-088 service cable from CCTV 95S-088 service cabinet to CCTV 95S-088 camera cabinet.
- Install Type II Handhole “A”. Connect 2 inch RMCs to Handhole “A”.
- Relocate CCTV 95S-088 service cabinet.
- Install existing CCTV 95S-088 service cable from CCTV 95S-088 camera cabinet to relocated CCTV 95S-088 service cabinet.

#### **Method of Measurement:**

Work under this item shall not be measured for payment. A lump sum fee will be provided for the total removal work under this item, “Removal and/or Relocation of Existing ATMS”.

#### **Basis of Payment:**

The work to be done under this item shall be paid for at the Contract lump sum price for “Removal and/or Relocation of Existing ATMS”, which price shall include all removal, relocation, materials, hardware, labor, tools, equipment, testing, trenching and backfilling, foundation, and incidentals necessary to complete this work.

## **ITEM #1114101A – MESSENGER**

### **Article 11.14.02 – Materials:**

Replace section M.16.15.1 with the following:

Messenger wire shall be ¼ in. diameter, double galvanized 7 strand coated wire cable not less than .080 in. diameter, extra high strength grade 6650 lbs. breaking strength, Class B 1.20 oz./sq. minimum weight of coating.

## **ITEM#1118012A – REMOVAL AND/OR RELOCATION OF TRAFFIC SIGNAL EQUIPMENT**

Section 11.18: Replace the entire section with the following:

### **11.18.01 – Description:**

Remove all abandoned traffic signal equipment. Restore the affected area. Where indicated on the plans remove and reinstall existing traffic signal equipment to the location(s) shown.

Lead paint is presumed present on the painted surface of all cabinets and structures located within project limits. Any activities performed by the contractor that results in a painted surface being impacted or altered, shall be performed in accordance OSHA Lead in Construction Standard 29CFR 1926.62, or the painted surface shall be tested prior to any paint being disturbed by a qualified third party hired by the contractor to confirm that no lead is present.

### **11.18.02 – Materials:**

The related sections of the following specifications apply to all incidental and additional material required for the proper relocation of existing equipment and the restoration of any area affected by this work.

- Division III, “Materials Section” of the Standard Specifications.
- Current Supplemental Specifications to the Standard Specifications.
- Applicable Special Provisions to the Standard Specifications.
- Current Department of Transportation, Functional Specifications for Traffic Control Equipment.

### **Article 11.18.03 - Construction Methods:**

Schedule/coordinate the removal and/or relocation of existing traffic signal equipment with the installation of new equipment to maintain uninterrupted traffic signal control. This includes but is not limited to vehicle signals and detectors, pedestrian signals and pushbuttons, co-ordination, and pre-emption.

#### **Abandoned Equipment**

The contract traffic signal plan usually does not show existing equipment that will be abandoned. Consult the existing traffic signal plan for the location of abandoned material especially messenger strand, conduit risers, and handholes that are a distance from the intersection. A copy of the existing plan is usually in the existing controller cabinet. If not, a plan is available from the Division of Traffic Engineering upon request.

Unless shown on the plans it is not necessary to remove abandoned conduit in-trench and conduit under-roadway



When a traffic signal support strand, rigid metal conduit, down guy, or other traffic signal equipment is attached to a utility pole, secure from the pole custodian permission to work on the pole. All applicable Public Utility Regulatory Authority (PURA) regulations and utility company requirements govern. Keep utility company apprised of the schedule and the nature of the work. Remove all abandoned hardware, conduit risers, and down guys, Remove anchor rods, to 6” (150mm) below grade.

When underground material is removed, backfill the excavation with clean fill material. Compact the fill to eliminate settling. Remove entirely the following material: pedestal foundation; controller foundation; handhole; pressure sensitive vehicle detector complete with concrete base. Unless otherwise shown on the plan, remove steel pole and mast arm foundation to a depth of 2 feet (600mm) below grade. Restore the excavated area to a grade and condition compatible with the surrounding area.

- If in an unpaved area apply topsoil and establish turf in accordance with Section 9.44 and Section 9.50 of the Standard Specifications.
- If in pavement or sidewalk, restore the excavated area in compliance with the applicable Sections of Division II, “Construction Details” of the Standard Specifications.

Relocated Equipment

In the presence of the Engineer, verify the condition of all material that will be relocated and reused at the site. Carefully remove all material, fittings, and attachments in a manner to safeguard parts from damage or loss. Replace at no additional cost, all material which becomes damaged or lost during removal, storage, or reinstallation.

Salvage Equipment

<b>Salvage Material</b>	<b>Stock No.</b>	<b>Value</b>
Controller Cabinet, Complete including but not limited to the following: Conflict Monitor Coordination Equipment Vehicle Detection Equipment	330-03-7010	\$ 500.00
Controller Unit	330-03-7005	\$ 500.00
Steel Span Pole, 30’ (9.0 m)	330-16-7050	\$ 250.00
Steel Span Pole, all other lengths	330-16-7016	\$ 250.00

All material not listed as salvage becomes the property of the Contractor; which assumes all liabilities associated with material’s final disposition.

In the presence of the Engineer, verify the condition and quantity of salvage material prior to removal. After removal transport and store the material protected from moisture, dirt, and other damage. Coil and secure copper cable separate from other cable such as galvanized support strand.

Within 4 working days of removal, return the State owned salvage material to the Department of Transportation Stores warehouse listed below. Supply all necessary manpower and equipment to load, transport, and unload the material. The condition and quantity of the material after unloading will be verified by the Engineer.

DOT Salvage Store #134  
660 Brook Street  
Rocky Hill, CT

Contact Materials Management Salvage Coordinator, at (860) 258-1980, at least 24 hours prior to delivery.

Municipal Owned Traffic Signal Equipment

Return all municipal owned material such as pre-emption equipment to the Town.

**Article 11.18.04 – Method of Measurement:**

This work will be measured as a Lump Sum.

**Article 11.18.05 – Basis of Payment:**

This work will be paid for at the contract lump sum price for “Removal and/or Relocation of Traffic Signal Equipment” which price shall include relocating signal equipment and associated hardware, all equipment, material, tools and labor incidental thereto. This price shall also include removing, loading, transporting, and unloading of signal equipment/materials designated for salvage and all equipment, material, tools and labor incidental thereto. This price shall also include removing and disposing of traffic signal equipment not to be salvaged and all equipment, material, tools and labor incidental thereto.

Payment is at the contract lump sum price for “Removal and/or Relocation of Traffic Signal Equipment” inclusive of all labor, vehicle usage, storage, and incidental material necessary for the complete removal of abandoned equipment/material and/or relocation of existing traffic signal equipment/material. Payment will also include the necessary labor, equipment, and material for the complete restoration of all affected areas.

A credit will be calculated and deducted from monies due the Contractor equal to the listed value of salvage material not returned or that has been damaged and deemed unsalvageable due to the Contractor’s operations.

Pay Item

Pay Unit

## Removal and/or Relocation of Traffic Signal Equipment

L.S. (L.S.)

s:\traffic1406\signal specs\specs\1118012A-REMO & RELO T S EQUIP-Projects

**ITEM #1118051A – TEMPORARY SIGNALIZATION (SITE NO. 1)**

**ITEM #1118052A – TEMPORARY SIGNALIZATION (SITE NO. 2)**

**Description:**

Provide Temporary Signalization (TS) at the intersections shown on the plans or as directed by the Engineer.

1. Existing Signalized Intersection: Keep each traffic signal completely operational at all times during construction through the use of existing signal equipment, temporary signal equipment, new signal equipment, or any combination thereof once TS has started as noted in the section labeled Duration.

2. Unsignalized Intersection: Provide TS during construction activities and convert the temporary condition to a permanent traffic signal upon project completion. Furnish, install, maintain, and relocate equipment to provide a complete temporary traffic signal, including but not limited to the necessary support structures, electrical energy, vehicle and pedestrian indications, vehicle and pedestrian detection, pavement markings, and signing.

**Materials:**

- Pertinent articles of the Standard Specifications
- Supplemental Specifications and Special Provisions contained in this contract

**Construction Methods:**

*Preliminary Inspection*

In the presence of the Engineer and a representative from the DOT Electrical Maintenance Office (Town representative for a Town owned signal), inspect and document the existing traffic signal's physical and operational condition prior to Temporary Signalization. Include but do not limit the inspection to the following:

- Controller Assembly (CA)
  - Controller Unit (CU)
  - Detection Equipment
  - Pre-emption Equipment
  - Coordination Equipment
- Vehicle and Pedestrian Signals
- Vehicle and Pedestrian Detectors
- Emergency Vehicle Pre-emption System (EVPS) \*
- Interconnect Cable and Splice Enclosures
- Support Structures
- Handholes, Conduit and Cable

It may be necessary to repair or replace equipment that is missing, damaged, or malfunctioning. Develop a checklist of items for replacement or repair after the inspection. If authorized by the Engineer, this work will be considered "Extra Work" under Article 1.09.04.

\* At a State owned signal the EVPS equipment is usually owned by the municipality. It is recommended to apprise the municipality of the inspection schedule and results.

#### TS Plan

At least 30 days prior to implementation of each stage, submit a 1:40 (1:500 metric) scale TS plan for each location to the Engineer for review and comment. Include but do not limit the plan to the following:

- Survey Ties
- Dimensions of Lanes, Shoulders, and Islands
- Slope Limits
- Clearing and Grubbing Limits
- Signal Phasing and Timing
- Location of Signal Appurtenances such as Supports, Signal Heads, Pedestrian Push buttons, Pedestrian Signals
- Location of Signing and Pavement Markings (stop bars, lane lines, etc.)
- Location, method, and mode of Temporary Detection

Review of the TS plan does not relieve the Contractor of ensuring the TS meets the requirements of the MUTCD. A copy of the existing traffic signal plan for State-owned traffic signals is available from the Division of Traffic Engineering upon request. Request existing traffic signal plans for Town-owned traffic signals from the Town. Do not implement the TS plan until all review comments have been addressed.

#### Earthwork

Perform the necessary clearing and grubbing and the grading of slopes required for the installation, maintenance, and removal of the TS equipment. After TS terminates restore the affected area to the prior condition and to the satisfaction of the Engineer.

#### Maintenance and Protection of Traffic

Furnish, install, maintain, relocate, and remove signal-related signing (lane-use, signal ahead, NTOR, etc.) and pavement markings as needed. Install, relocate, and/or remove equipment in a manner to cause no hazard to pedestrians, traffic or property. Maintain traffic as specified in the Special Provisions "Prosecution and Progress" and "Maintenance and Protection of Traffic."

#### Electrical Service and Telephone Service at Existing Signalized Intersections

If the electrical service or the telephone service source must be changed or relocated make all arrangements with the utility company and assume all charges. The party previously responsible for the monthly payment of service shall continue to be responsible during TS.

#### Electrical Service at Unsignalized Intersections

Assume all charges and make all arrangements with the power company, including service requests, scheduling, and monthly bills in accordance with Section 10.00.12 and Section 10.00.13 of the Standard Specifications,. A metered service is recommended where TS equipment will be removed when no longer needed.

Temporary Signalization

Furnish, install, maintain, relocate, and remove existing, temporary, and proposed traffic signal equipment and all necessary hardware; modify or furnish a new CA; reprogram the CU phasing and timing; as many times as necessary for each stage/phase of construction to maintain and protect traffic and pedestrian movements as shown on the plans or as directed by the Engineer.

Inspection

When requested by the Engineer, the TS will be subject to a field review by a representative of the Division of Traffic Engineering and/or the Town, which may generate additional comments requiring revisions to the temporary signal.

Detection

Provide vehicle detection on the existing, temporary, and/or new roadway alignment for all intersection approaches that have existing detection, that have detection in the final condition as shown on the signal plan, or as directed by the Engineer. Keep existing pedestrian pushbuttons accessible and operational at all times during TS. Temporary Detection is described and is paid for under Item # 11112XXA - Temporary Detection (Site No. X)

Emergency Vehicle Pre-emption System (EVPS)

Furnish, install, maintain, relocate, and remove the equipment necessary to keep the existing EVPS operational as shown on the plan. Do not disconnect or alter the EVPS without the knowledge and concurrence of the Engineer and the EVPS owner. Schedule all EVPS relocations so that the system is out of service only when the Contractor is actively working. Ensure EVPS is returned to service and is completely operational at the end of the work day. Keep the EVPS owner apprised of all changes to the EVPS.

Coordination

Furnish, install, maintain, relocate, and remove the equipment necessary to keep the intersection coordinated to adjacent signals as shown on the plan. Do not disconnect the interconnect without the approval of the Engineer.

- Closed Loop System: If it is necessary to disconnect the communication cable, notify the Engineer and the Bridgeport Operation Center (BOC) or the Newington Operation Center (NOC) prior to disconnect and also after it is reconnected.
- Time Base System: Program and synchronize all Time Clock/Time Base Coordination (TC/TBC) units as necessary.

Maintenance

Once TS is in effect, assume maintenance responsibilities of the entire installation in accordance with Section 1.07.12 of the Standard Specifications. Notify the Engineer for the project records the date that Temporary Signalization begins. Notify the following parties that maintenance responsibility has been transferred to the Contractor:

Signal Owner  
CT DOT Electrical Maintenance Office or  
Town Representative  
Local Police Department

Provide the Engineer a list of telephone numbers of personnel who will be on-call during TS. Respond to traffic signal malfunctions by having a representative at the site within three hours from the initial contact. Within twenty-four (24) hours have the traffic signal operating according to plan.

If the Engineer determines that the nature of a malfunction requires immediate attention and/or the Contractor does not respond within three (3) hours, then an alternate maintenance service will be called to repair the signal. Expenses incurred by the alternate maintenance service for each call will be deducted from monies due to the Contractor with a minimum deduction of \$1,000. The alternate maintenance service may be the owner of the signal or another qualified electrical contractor.

#### Duration

Temporary Signalization shall commence when any existing signal equipment is disturbed, relocated, or altered based on the inspection checklist in any way for the TS.

For intersections with a State furnished controller, TS terminates when the inspection of the permanent signal is complete and operational and is accepted by the Engineer. For intersections with a Contractor furnished controller, Temporary Signalization terminates at the beginning of the 30 day test period for the permanent signal.

#### Ownership

Existing equipment, designated as salvage, remains the property of the owner. Salvable equipment will be removed and delivered to the owner upon completion of use. Temporary equipment supplied by the Contractor remains the Contractor's property unless noted otherwise.

#### **Method of Measurement:**

Temporary Signalization shall be paid only once per site on a percentage of the contract Lump Sum price. Fifty percent (50%) shall be paid when TS is operational as shown on the plan or to the satisfaction of the Engineer. Fifty percent (50%) shall be paid when TS terminates.

#### **Basis of Payment:**

This work shall be paid at the contract Lump Sum price for "Temporary Signalization (Site No.)" for each site. This price includes the preliminary inspection, TS plan for each stage/phase, furnishing, installing, maintaining, relocating and revising traffic signal equipment, controller assembly modifications, controller unit program changes such as phasing and timing, removing existing, temporary, and proposed traffic signal equipment, arrangements with utility companies, towns or cities including the fees necessary for electric and telephone service, clearing and grubbing, grading, area restoration and all necessary hardware, materials, labor, and work incidental thereto.

All material and work for signing and pavement markings is paid for under the appropriate Contract items.

All material and work necessary for vehicle and pedestrian detection for TS is paid for under items 1111201A - Temporary Detection (Site No. 1) and 1111202A - Temporary Detection (Site No. 2).

All Contractor supplied items that will remain the Contractor's property shall be included in the contract Lump Sum price for "Temporary Signalization."

Any items installed as part of the permanent installation are not paid for under this item but are paid for under the bid item for that work.

<u>Pay Item</u>	<u>Pay Unit</u>
Temporary Signalization (Site No.)	L.S.



**ITEM #1118301A – RELOCATE PRE-EMPTION SYSTEM (SITE NO. 1)**

**ITEM #1118302A – RELOCATE PRE-EMPTION SYSTEM (SITE NO. 2)**

**Description:**

Relocate existing town owned emergency vehicle pre-emption system (EVPS) (either optical or siren) as shown on the plan or as directed by the Engineer. The EVPS equipment includes but is not limited to the following material:

- Optical Detectors
- Siren Detectors
- Phase Selectors
- System Chassis
- Auxiliary Equipment Cabinets (AEC)
- Confirmation Light
- Detector Cable (where practical)

Install new cable from the controller to the pre-emption detectors where the existing cable cannot be practically relocated.

**Material:**

All material is existing except for miscellaneous hardware necessary for reinstallation (e.g. changing detector attachment from span wire to mast arm) and the Detector Cable.

Miscellaneous Hardware:

1. Mounting hardware designed and manufactured specifically for use with the existing EVPS.
2. Corrosion and rust resistant.

Detector Cable (Optical):

1. 3-Conductor cable with shield and ground wire.
2. AWG #20 (7x28) stranded.
3. Individually tinned copper strands.
4. Conductor insulation: 600 volt, 167<sup>o</sup> F (75 deg. C).
5. 1 Conductor-yellow; 1 Conductor-blue; 1 Conductor-orange.
6. Aluminized mylar shield tape or equivalent.
7. AWG #20 (7x28) stranded uninsulated drain wire
8. DC resistance not to exceed 11.0 ohms per 1000 feet (305M).
9. Capacitance from one conductor to other two conductors and shield not to exceed 157pf/M (48 pf./ft.).
10. Jacket: 600 volts, 176<sup>o</sup> F (80 deg. C), minimum average wall thickness - 0.045" (1.14mm).
11. Finished O.D.: 0.3" (7.62mm) max.

Detector Cable (Audio):

1. 2-Conductor cable with shield and ground wire.
2. AWG #14.
3. IMSA Spec 50-2 Detector Lead-In.

### **Construction Methods:**

Conduct an initial evaluation test before removal and a final test after reinstallation. Thirty days prior to disconnection and removal of the existing pre-emption equipment, test and verify that the system is operational as shown on the plan. The thirty days is intended to provide the EVPS owner an opportunity to correct and resolve any deficiencies identified during the test. If during the thirty days the owner repairs, replaces, or corrects any malfunctioning, disconnected, or missing components, re-test that feature prior to removal. The contractor is not responsible to correct any part of the EVPS that is found to be malfunctioning, disconnected, or missing during the initial test. If the contractor is to assume maintenance responsibility of the traffic signal during Temporary Signalization, the EVPS equipment will not be included. Maintenance responsibility remains with the owner.

### **EVPS Test Procedure**

1. Notify the system owner/user, such as the municipal fire chief or public works director, of the scheduled inspection.
2. Request a fire department representative and an emergency vehicle, which has an activation device to conduct the test. If not available, the contractor shall provide an activation device.
3. In the presence of the Engineer and the municipal representative, test each pre-empted approach with the emergency vehicle. Test the following items of the system:
  - \* Confirm that the emitter or siren activates the phase selector and the phase selector activates the correct pre-emption input to the controller.
  - \* Confirm adequate range. The traffic signal must be pre-empted to green sufficiently in advance of the emergency vehicle arrival. The vehicle emitter or siren shall initiate pre-emption at a minimum distance of 548.6M (1800 feet).  
Exception: An obstructed line-of-sight may reduce the minimum distance. Town concurrence is required.
  - \* Confirm there are no false calls. Keep the emitter or siren active as the emergency vehicle passes through the intersection. No other detectors shall activate.
4. Document the test. Provide the Engineer and the municipality copies of the test results. Attached is a sample test procedure form.

Keep the appropriate fire department official apprised of when (day and time) the system is disconnected and taken out of operation.

Store all pre-emption equipment intended for re-installation in a suitable location to prevent damage from elements and construction activities. Return all pre-emption equipment not intended for re-installation to the Town.

Mount the AEC on the left side of the controller cabinet, when facing the door. Confirm that the inside of the cabinet wall is clear, so that the installation of the AEC will not damage any equipment inside the controller cabinet. Drill a 25mm (1") hole through the side of the controller cabinet. Install a close nipple through the 25mm (1") hole. Apply clear silicon caulk to both ends of the close nipple. Tighten lock-nuts and fiber bushings. Apply additional caulk if necessary to prevent moisture from entering the controller cabinet and the AEC.

Re-install and wire the pre-emption equipment in a neat and orderly manner, as shown on the plan or as directed by the Engineer. Pre-emption detector locations shown on the plan are for illustration purposes only. Field locate the detectors for the best possible line-of-sight. Install the detector cables continuous with no splices between the optical detector and the AEC. Make all connections from the phase selector to the "D" harness and to the cabinet wiring at the pre-emption termination panel.

Conduct a final test, identical to the initial test, to verify that the EVPS is as operational as before removal. If the initial test was not conducted, it is assumed the EVPS was fully operational

as shown on the plan. The Contractor is then responsible for all damaged; faulty; missing; and replacement material necessary to restore the EVPS to fully operational.

If a malfunction is found other than identified during the initial test, or the system needs adjustment (such as range, emitter intensity, or detector location), schedule a follow-up test. Repeat the test procedure for all approaches that did not pass.

Notify the appropriate fire department official that the EVPS has been re-installed and is operational.

If not present in an existing traffic controller cabinet install a pre-emption disconnect switch. When switched off, the traffic controller shall not be affected by EVPS calls.

**Method of Measurement:**

Work under this item is measured as Lump-Sum per site. Detector Cable shall be measured by the number of linear feet (meters) supplied and installed.

**Basis of Payment:**

This work shall be paid at the contract Lump Sum price for “Relocate Pre-Emption System (Site No.)” for each site. This item shall include all prior testing, removal, storage, re-installation, final testing, any corrective adjustments, replacement components if necessary, documentation, disconnect switch if necessary, and all necessary hardware, materials, labor and work incidental thereto.

All material and work necessary for installing detector cable is paid for under item 111355XA – Detector Cable (Optical).

<u>Pay Item</u>	<u>Pay Unit</u>
Relocate Pre-emption System (Site No.1)	L.S.
Relocate Pre-emption System (Site No.2)	L.S.

**EVPS TEST PROCEDURE**

<b>Confirm that the emitter or siren activates the phase selector and the phase selector activates the correct pre-emption input to the controller.</b>	
<b>Confirm adequate range.</b>	
<b>Confirm there are no false calls.</b>	

## **ITEM #1206023A – REMOVAL AND RELOCATION OF EXISTING SIGNS**

Section 12.06 is supplemented as follows:

### **Article 12.06.01 – Description is supplemented with the following:**

Work under this item shall consist of the removal and/or relocation of designated side-mounted extruded aluminum and sheet aluminum signs, sign posts, sign supports, and foundations where indicated on the plans or as directed by the Engineer. Work under this item shall also include furnishing and installing new sign posts and associated hardware for signs designated for relocation.

### **Article 12.06.03 – Construction Methods is supplemented with the following:**

The Contractor shall take care during the removal and relocation of existing signs, sign posts, and sign supports that are to be relocated so that they are not damaged. Any material that is damaged shall be replaced by the Contractor at no cost to the State.

Foundations and other materials designated for removal shall be removed and disposed of by the Contractor as directed by the Engineer and in accordance with existing standards for Removal of Existing Signing.

Sheet aluminum signs designated for relocation are to be re-installed on new sign posts.

### **Article 12.06.04 – Method of Measurement is supplemented with the following:**

Payment under Removal and Relocation of Existing Signs shall be at the contract lump sum price which shall include all extruded aluminum and sheet aluminum signs, sign posts, and sign supports designated for relocation, all new sign posts and associated hardware for signs designated for relocation, all extruded aluminum signs, sheet aluminum signs, sign posts and sign supports designated for scrap, and foundations and other materials designated for removal and disposal, and all work and equipment required.

### **Article 12.06.05 – Basis of Payment is supplemented with the following:**

This work will be paid for at the contract lump sum price for “Removal and Relocation of Existing Signs” which price shall include relocating designated extruded aluminum and sheet aluminum signs, sign posts, and sign supports, providing new posts and associated hardware for relocated signs, removing and disposing of foundations and other materials, and all equipment, material, tools and labor incidental thereto. This price shall also include removing, loading, transporting, and unloading of extruded aluminum signs, sheet aluminum signs, sign posts, and sign supports designated for scrap and all equipment, material, tools and labor incidental thereto.

<u>Pay Item</u>	<u>Pay Unit</u>
Removal and Relocation of Existing Signs	L.S.

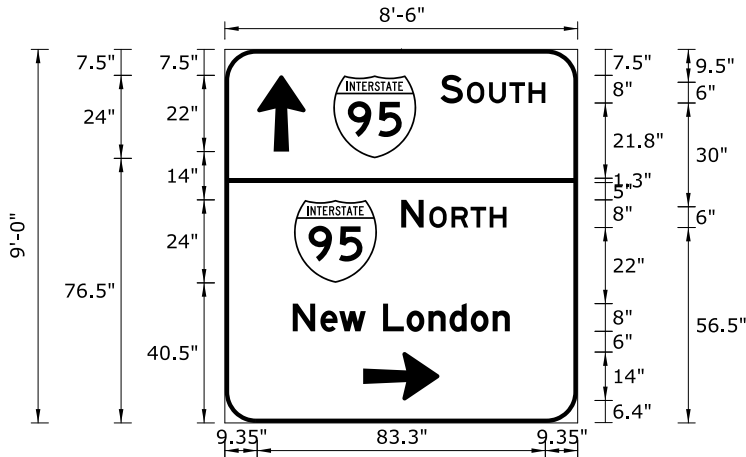
**ITEM #1207034A – SIGN FACE - EXTRUDED ALUMINUM**

**Article 12.07.01 – Description is revised as follows:** Sign Face – Extruded Aluminum is supplemented with the sign details that follow.

<b>Pay Item</b>	<b>Pay Unit</b>
Sign Face - Extruded Aluminum (Type IV Retroreflective Sheeting)	S.F.

# SIGN DETAIL

1:60



Dimensions are in Inches.  
 Material : Extruded Aluminum  
 Mounted : Ground  
 Sign Support No. N/A

Location : Branford Route 1 (E. Main Street) at Route I-95 N.B. Ramp # 177  
 Project No. 014-185

Engineer : C. Meronnis / Designed by : J. Fascione / Checked by : L. Conroy

REV'D /

SIGN NUMBER	095N-014-R177-EX55-A
SIGN PANEL	8'-6" x 9'-0"
EXIT CROWN	
TOTAL AREA	76.5 Sq.Ft.
BDR INSET/WIDTH	0" / 1.25"
CORNER RADIUS	9"
BACKGROUND	TYPE: IV
	COLOR: Green
LEGEND/BORDER	TYPE: IV
	COLOR: White/White

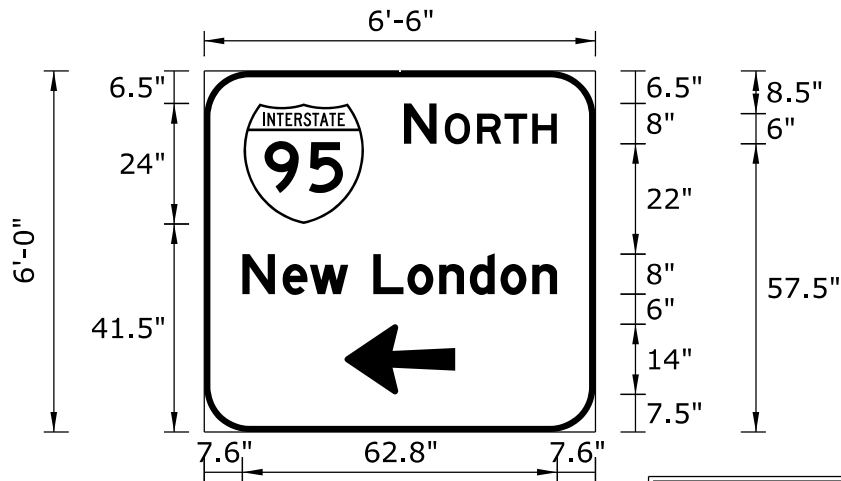
SYMBOL	ROT	X	Y	WID	HT
AR_Type A	0	9.3	78.5	14	22
M1_1	0	31.3	76.5	24	24
M1_1	0	20	40.5	24	24
AR_Type A	270	40	6.5	14	22

PLOTTED : 05/08/18

LETTER POSITIONS (X)											LENGTH	SERIES/SIZE
	S		O	U	T	H						E 2000
62.3	6.5	1.2	6.4	5.9	5.5	4.9	9.3				30.3	8,6
	N		O	R	T	H						E 2000
51	6.5	1.6	6.4	5.5	5.5	4.9	20.6				30.4	8,6
	N	e	w		L	o	n	d	o	n		E 2000
19.6	8	5.4	7.7	5	6.8	6.3	6.1	6.2	6.3	5	19.6	8/6

# SIGN DETAIL

1:40



Dimensions are in Inches.  
Material : Extruded Aluminum  
Mounted : Ground

Sign Support No. N/A  
Location : Branford Route 1 (E. Main Street) at Route I-95 N.B. Ramp # 177  
Project No. 014-185  
Engineer : C. Meronnis / Designed by : J. Fascione / Checked by : L. Conroy

REV'D /

SIGN NUMBER	095N-014-R177-EX55-B
SIGN PANEL	6'-6" x 6'-0"
EXIT CROWN	
TOTAL AREA	39.0 Sq.Ft.
BDR INSET/WIDTH	0" / 1.25"
CORNER RADIUS	9"
BACKGROUND	TYPE: IV
	COLOR: Green
LEGEND/BORDER	TYPE: IV
	COLOR: White/White

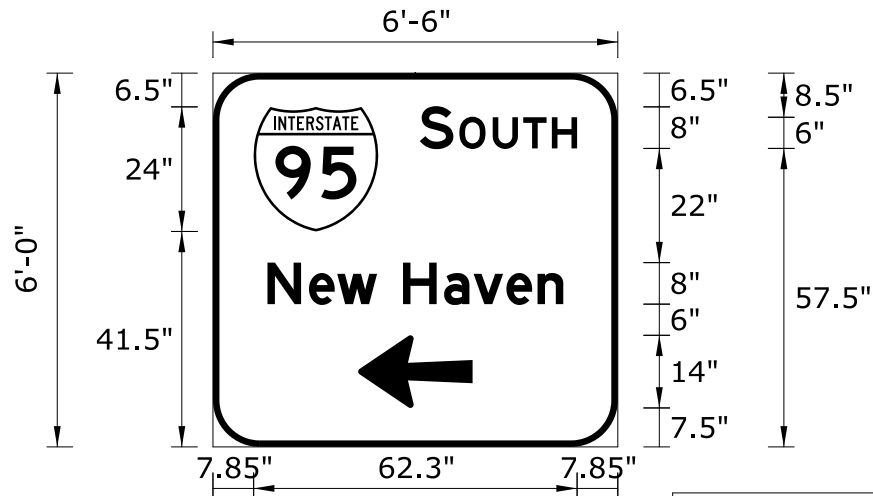
SYMBOL	ROT	X	Y	WID	HT
M1_1	0	7.8	41.5	24	24
AR_Type A	90	28	7.5	14	22

PLOTTED : \$DATE\$

LETTER POSITIONS (X)													LENGTH	SERIES/SIZE		
	N		O	R	T	H									E 2000	
39.8	6.5	1.6	6.4	5.5	5.5	4.9	7.7								30.4	8,6
	N	e	w		L	o	n	d	o	n						E 2000
7.6	8	5.4	7.7	5	6.8	6.3	6.1	6.2	6.3	5	7.6				62.8	8/6

# SIGN DETAIL

1:40



Dimensions are in Inches.  
 Material : Extruded Aluminum  
 Mounted : Ground  
 Sign Support No. N/A

Location : Branford Route 1 (E. Main Street) at Route I-95 S.B. Ramp # 174

Project No. 014-185

Engineer : C. Meronnis / Designed by : J. Fascione / Checked by : L. Conroy

REV'D /

SIGN NUMBER	095S-014-R174-EX55-A
SIGN PANEL	6'-6" x 6'-0"
EXIT CROWN	
TOTAL AREA	39.0 Sq.Ft.
BDR INSET/WIDTH	0" / 1.25"
CORNER RADIUS	9"
BACKGROUND	TYPE: IV
	COLOR: Green
LEGEND/BORDER	TYPE: IV
	COLOR: White/White

SYMBOL	ROT	X	Y	WID	HT
M1_1	0	7.8	41.5	24	24
AR_Type A	90	28	7.5	14	22

PLOTTED : 05/08/18

LETTER POSITIONS (X)															LENGTH	SERIES/SIZE		
	S		O	U	T	H											E 2000	
39.8	6.5	1.2	6.4	5.9	5.5	4.9	7.8										30.3	8,6
	N	e	w		H	a	v	e	n									E 2000
10.5	8	5.4	7.7	5	7.9	5.7	6.3	6	5	10.5							57	8/6





**ITEM #1208931A – SIGN FACE - SHEET ALUMINUM (TYPE IX RETROREFLECTIVE SHEETING)**

**ITEM #1208932A – SIGN FACE - SHEET ALUMINUM (TYPE IV RETROREFLECTIVE SHEETING)**

*Section 12.08 is supplemented and amended as follows:*

**12.08.01—Description:**

*Add the following:*

This item shall also include field testing of metal sign base posts as directed by the Engineer.

**12.08.03—Construction Methods:**

*Delete the last sentence and add the following:*

Metal sign base posts shall be whole and uncut. Sign base post embedment and reveal lengths shall be as shown on the plans. The Contractor shall drive the metal sign base posts by hand tools, by mechanical means or by auguring holes. If an obstruction is encountered while driving or placing the metal sign base post, the Contractor shall notify the Engineer who will determine whether the obstruction shall be removed, the sign base post or posts relocated, or the base post installation in ledge detail shall apply. Backfill shall be thoroughly tamped after the posts have been set level and plumb.

**Field Testing of Metal Sign Posts:** When the sign installations are complete, the Contractor shall notify the Engineer the Project is ready for field testing. Based on the number of posts in the Project, the Engineer will select random sign base posts which shall be removed by the Contractor for inspection and measurement by the Engineer. After such inspection is completed at each base post location, the Contractor shall restore or replace such portions of the work to the condition required by the Contract. Refer to the table in 12.08.05 for the number of posts to be field tested.

**12.08.04—Method of Measurement:**

*Add the following:*

The work required to expose and measure sign base post length and embedment depth using field testing methods, and restoration of such work, will not be measured for payment and shall be included in the general cost of the work.

**12.08.05—Basis of Payment:**

*Replace the entire Article with the following:*

This work will be paid for at the Contract unit price per square foot for “Sign Face - Sheet Aluminum” of the type specified complete in place, adjusted by multiplying by the applicable Pay Factor listed in the table below. The price for this work shall include the completed sign, metal sign post(s), span-mounted sign brackets and mast arm-mounted brackets, mounting hardware, including reinforcing plates, field testing, restoration and replacement of defective base post(s), and all materials, equipment, and work incidental thereto.

**Pay Factor Scale:** Work shall be considered defective whenever the base post length or base post embedment depth is less than the specified length by more than 2 inches. If the number of defects results in rejection, the Contractor shall remove and replace all metal sign base posts on the Project, at no cost to the Department.

**Number of Posts to be Tested and Pay Factors (Based on Number of Defects)**

<b>Number of Posts in Project =&gt;</b>	<b>51-100</b>	<b>101-250</b>	<b>251-1000</b>	<b>&gt;1000</b>
<b>Sample Size=&gt;</b>	<b>5 Posts</b>	<b>10 Posts</b>	<b>40 Posts</b>	<b>60 Posts</b>
0 Defects	1.0	1.0	1.025	1.025
1 Defect	0.9	0.95	0.975	0.983
2 Defects	Rejection	0.9	0.95	0.967
3 Defects	Rejection	Rejection	0.925	0.95
4 Defects	Rejection	Rejection	0.9	0.933
5 Defects	Rejection	Rejection	Rejection	0.917
6 Defects	Rejection	Rejection	Rejection	0.9
7 or more Defects	Rejection	Rejection	Rejection	Rejection

Note: Projects with 50 or fewer posts will not include field testing.

**ITEM #1301966A – 8” SOLID SLEEVE**

**ITEM #1301968A - 12” SOLID SLEEVE**

**ITEM #1302004A – 8” GATE VALVE**

**ITEM #1302006A - 12” GATE VALVE**

**ITEM #1400000A – TEST PIT EXCAVATION (SANITARY SEWER)**

**ITEM #1400003A – TRENCH EXCAVATION 0’-10’ DEEP (SANITARY SEWER)**

**ITEM #1400004A – ROCK IN TRENCH EXCAVATION 0’-10’ DEEP (SANITARY SEWER)**

**ITEM #1400051A – DEWATERING (SANITARY SEWER)**

**ITEM #1401242A – 8” DUCTILE IRON PIPE (SANITARY SEWER)**

**ITEM #1401254A – 12” DUCTILE IRON PIPE (SANITARY SEWER)**

**ITEM #1401991A – 1/2” CRUSHED STONE BEDDING (SANITARY SEWER)**

**ITEM #1401994A – SAND BLANKET COVER (SANITARY SEWER)**

**ITEM #1403608A – REMOVAL OF EXISTING SANITARY SEWER**

**ITEM #1405081A – GRANULAR FILL (SANITARY SEWER)**

**Description:** The Contractor shall furnish and install ductile iron pipe, of the sizes indicated, and all the fittings and appurtenances to the lines and grades shown on the Contract Drawings, complete as shown, specified or directed, including but not limited to; bends, restraints, couplings, gate valves, gate boxes, tees, transporting materials, digging test pits, the clearing,

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trenching, disposing of unused excavated materials, furnishing, installing and field testing the pipelines complete with pipe restraints, utility identification tape, all trenching, rock removal, refilling trenches, filter fabric, furnishing additional material for refilling, trench compaction/testing, temporary and permanent surface restoration, miscellaneous grading, sheeting, bracing, dewatering and all incidental work where required, to the specifications and details of the Contract Documents.

**Materials:**

**1. Pipe:** Ductile Iron conforming to ANSI/AWWA C151/A21.51.

Laying Length: Nominal 18 feet.

Thickness: Thickness Class 56

Unrestrained Joint Type: Push-on type capable of being deflected after assembly conforming to ANSI/AWWA C111/A21.11.

Restrained Joint Type: Boltless, restrained, push-on type capable of being deflected after assembly conforming to ANSI/AWWA C111/A21.11. Designs using set screws or requiring field welding are not acceptable. Acceptable products are as follows:

1. Flex-Ring, as manufactured by American Cast Iron Pipe Company
2. TR-FLEX, as manufactured by McWane Cast Iron Pipe Company
3. TR FLEX, as manufactured by United States Pipe and Foundry Company, LLC
4. Engineer approved equivalent

Joint Gasket: Nitrile (NBR) (Acrylonitrile Butadiene) conforming to ANSI/AWWA C111/A21.11.

Exterior Coating: Asphaltic coating conforming to ANSI/AWWA C151/A21.51.

Interior Lining: Ceramic quartz filled amine cured novalac epoxy lining, minimum 40 mil thickness, Protecto 401 as manufactured by Induron Coatings, Inc. Coat areas damaged by cutting or handling with manufacture's repair kit as directed by manufacturer's written instructions.

**2. Fittings:** Ductile-Iron conforming to ANSI/AWWA C110/A21.10. Gray-iron fittings or "compact" fittings will not be acceptable. Solid sleeve fittings shall be of the long form. Provide manufacturer's certification as required by paragraph 5.1.3 of ANSI/AWWA C110/A21.10. Pressure Rating: 350 psi rated working pressure

Joint Type: Mechanical joint or Flanged as indicated.

1. Mechanical joints conforming to ANSI/AWWA C111/A21.11 with ductile-iron Restrained glands. Gray-iron glands will not be acceptable.
2. Flanged joints conforming to ANSI/ AWWA C111/A21.11, ductile iron, with full face gaskets.

Joint Gasket: Nitrile (NBR) (Acrylonitrile Butadiene) conforming to ANSI/AWWA C111/A21.11. Gaskets for flanged joints shall be full face.

Exterior and Interior Coating: Exterior coating shall be 46H-413 Hi-Build Tneme Tar as manufactured by Tnemec, Hi-Mil Sher-Tar as manufactured by Sherwin Williams or equal.

Interior coating shall be ceramic quartz filled amine cured novalac epoxy lining, minimum 40 mil thickness, Protecto 401 as manufactured by Induron Coatings, Inc. or Series 431 Perma-Shield PL as manufactured by Tnemec. Interior surface holiday testing shall be performed.

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**Restrained Glands:** Ductile-iron gland with multiple gripping wedges providing mechanical joint restraint. Restrained glands shall conform to the following requirements:

1. Acceptable Products:
  - a. Series 1100 Megalug with Mega-Bond coating, as manufactured by EBAA Iron Sales, Inc.
  - b. Engineer approved equivalent.
2. Restrained glands shall be Listed by Underwriters Laboratories (3” through 24” inch size) and Approved by Factory Mutual (3” through 12” inch size).
3. Restrained glands shall have a working pressure rating of 350 psi for 3-16 inch diameter, and 250 psi for 18-48 inch diameter. Ratings are for water pressure and must include a minimum safety factor of 2 to 1 in all sizes.
4. Restrained gland body, wedges and wedge actuating components shall be cast from grade 65-45-12 ductile iron material in accordance with ASTM A536.
5. Ductile iron gripping wedges shall be heat treated within a range of 370 to 470 BHN.
6. Restrained glands shall be processed through a phosphate wash, rinse, and drying operation and then coated with a epoxy or polyester based heat cured coating.
7. Proper actuation of the gripping wedges shall be ensured with torque limiting twist off nuts.

**Mechanical Joint Bolts and Nuts:** Cor-Ten T-bolts and nuts conforming to the requirements of ANSI/AWWA C111/A21.11 with minimum 1.2 mil thick blue, resin-bonded, thermally cured, fluoropolymer coating.

**Flanged Joint Bolts and Nuts:** Type 316L stainless steel, hex head conforming to ASTM F593 or ASTM F594 as applicable. Threads shall be coated with Never-Seez anti-seize and lubricating compound as manufactured by Bostik, Inc.

3. **Polyethylene Encasement:** V-Bio™ co-extruded 3-layer linear low density polyethylene film conforming to the requirements of ANSI/AWWA C105/A21.5 and ASTM A674. Provide Affidavit of Compliance as described in Section 5.1.2 of ANSI/AWWA C105/A21.5.

4. **Resilient Seated Gate Valves:** Conform to the requirements of ANSI/AWWA C515 as modified herein. Provide catalog data, assembly drawings, and manufacturer’s affidavit as required by Section 6.3 of ANSI/AWWA C515.

Acceptable manufacturers:

1. American Flow Control
2. Clow Valve Company
3. Mueller Company
4. Engineer approved equal.

**Operator:** Non rising stem with wrench nut operator. Valve opening direction to be clockwise (open right). All cast ferrous components shall be ductile-iron. Valve stem seal shall be O-ring type, replaceable under pressure.

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Valve Ends: Mechanical joint conforming to ANSI/AWWA C111 with Nitrile (NBR) (Acrylonitrile Butadiene) gaskets and ductile-iron restrained glands.

Bolting: Valve bolts, studs and nuts shall be Type 304L stainless steel conforming to ASTM F593 or ASTM F594 as applicable with an anti-galling coating.

Interior and Exterior Coatings: Fusion bonded epoxy coating conforming to ANSI/AWWA C550. Interior surface holiday testing shall be performed.

5. **Valves Boxes:** Valve Boxes to be manufactured from cast iron conforming to ASTM A48 and coated with a water-based bituminous coating. Valve boxes to be two piece adjustable sliding type with 8-inch minimum diameter base section, minimum 5-1/4 inch minimum shaft diameter and cast iron cover. Minimum wall thickness to be 3/16-inch. Valve box to be marked with the word “SEWER” cast into the cover.

Acceptable Manufacturers:

1. Bingham & Taylor
2. Bibby Ste. Croix
3. East Jordan Iron Works
4. Engineer approved equal

6. **Crushed Stone:** Crushed stone shall consist of clean, crushed, non-porous rock, or crushed gravel, uniformly blended. Crushed stone shall meet the gradation requirements of Form 817, Section M.01.01” No. 8

7. **Sand:** Sand shall consist of clean, crushed, non-porous rock, or crushed gravel, uniformly blended conforming to Form 817, M03.01, 2.

8. **Granular Fill:** Select fill shall consist of hard durable sand or sand and gravel, free from trash, organic matter, clay, surface coatings and other deleterious materials. Select fill placed between the mid-height of a pipe and twelve (12) inches above a pipe shall have a maximum stone size of four (4) inches. Select fill used for other purposes shall have a maximum stone size of two thirds of the loose lift thickness and that portion passing the four (4) inch sieve shall meet the following gradation requirements, as determined by ASTM C136 and ASTM C117:

U.S. Sieve Size	Percent Passing
4 inch	100
No. 10	30-100
No. 40	0-70
No. 200	0-15

9. **Utility Warning Tape:** Utility warning tape shall be 6-inch wide, minimum 6-mil thickness, magnetically detectable, green color, imprinted with “CAUTION – BURIED FORCE MAIN LINE” text, as manufactured by Stranco Inc. Michigan City, IN, Reef Industries, Houston, TX or approved equal.

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- 10. Extruded Polystyrene Insulation Board:** Extruded Polystyrene insulation board shall conform to ASTM C578, Type IV.

**Construction Methods:**

Perform the work so that no damage occurs to adjacent utilities, structures, property, or any other installation located in or adjacent to Work areas. Damaged utilities shall be repaired with similar or better materials of the same size and to the requirements of the utility owner. Have on site the necessary manpower, materials and equipment such as pumps, piping, and the like as required to protect and maintain uninterrupted flows in existing utilities during construction. Excavations shall be kept free from water, snow and ice during construction. Bedding and backfill material shall not be placed in water. Water shall not be allowed to rise upon or flow over bedding and backfill material. Maintain all benchmarks, monuments and other reference points and, if disturbed, shall replace them at no additional cost to the Owner. Excavating equipment shall be of such size and type, and used in a manner, that will not damage existing items such as, but not limited to, paved surfaces, utilities, structures and/or trees. The finished subgrade shall not be disturbed by traffic or other operations and shall be maintained in a satisfactory condition until the finished surfaces are placed. No pavement materials shall be installed thereon until the Engineer has observed the subgrade is in compliance with this requirement. Take whatever steps necessary to prevent catch basins and drain lines from receiving silt and sediment washed from Project Work areas. Clean out catch basins and drain lines that have not been properly protected.

- 1. General excavation:** Excavation shall consist of the removal of soil, rock, and other materials to the limits shown on the Contract Drawings, specified herein, and as required to provide firm bearing. No structures, pavements, utilities or fill materials of any kind shall be placed in, or upon excavated areas until such areas have been observed by the Engineer. Rippable rock shall be considered earth excavation. Rippable rock is defined as rock which can be excavated using a single tooth hydraulic ripper pulled by a Caterpillar D8 Dozer or equivalent equipment. Excavating equipment shall be of such size and type, and operated in a manner, that will not damage items such as, but not limited to, existing paved surfaces, utilities, structures and trees.

Excavated materials meeting the requirements for the various fill materials specified herein shall be stockpiled for reuse. Unsuitable or excess suitable materials shall be legally disposed of off-site unless otherwise specified.

Excavation shall be to the limits as necessary to install utilities or other facilities unless otherwise specified. Excavation of unsuitable material beyond the limits necessary shall only be performed as authorized by the Engineer. Over-excavation beyond the specified or detailed limits shall be backfilled and properly compacted and at no additional cost to the Owner.

The proposed contour lines and spot grades shown on the Contract Drawings are finish elevations. Excavation to subgrade shall be the distance below these elevations as may be

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required by the size and thickness of pavements, structures, utilities and surface treatments as shown on the Contract Drawings, details and sections, and/or as specified herein.

Excavate under guy wires, alongside of poles, buildings, and other objects as necessary to complete the Work at no additional cost to the Owner. This may require hand excavation. There shall be no special compensation for this Work unless otherwise noted herein. The relocation of utility poles, and the like, shall be done at no additional cost to the Owner.

Make excavations at locations authorized by the Engineer, for the purpose of confirming the location and depth of existing utilities or structures. Additional experimental excavations may be requested to precisely locate utilities and underground structures that may be affected by the Work. Backfill the experimental excavations with materials meeting the specification for common fill, unless directed otherwise by the Engineer. Backfill of experimental excavation shall be compacted in accordance with the requirements for Trench Backfilling.

2. **Trench excavation:** Trench excavation shall consist of the removal of all materials encountered. Excavations shall be made to accommodate the elevation, depth of cover, or detail shown on the Contract Drawings and/or as specified. Trench widths shall be kept to the minimum practicable but shall be at least three (3) feet wide or two (2) feet plus the diameter of the pipe, whichever is greater. The bottom of the trenches shall be firm and free of water and shall be accurately graded and shaped to allow placement of required bedding beneath the bottom of all barrels, bells or couplings of all pipes installed. Design criteria require that pipe be laid in trench conditions; therefore trenches for utilities in fill areas shall be excavated after all fill materials have been placed, spread and compacted to an elevation at least twelve (12) inches above the top of the proposed utility. This requirement is necessary to fulfill design criteria and should not be construed as a dictation of means and methods of construction. If, through error, the excavations are carried beyond the specified limits, or if inadequate dewatering causes softening of the subgrade that necessitates removal, backfill shall be with gravel fill, placed and compacted as specified hereinafter under Trench Backfilling. Backfill shall be performed at no additional cost to the Owner.

Existing soils, which are considered unsuitable foundation materials by the Engineer, shall be removed to the limits directed by the Engineer. The lateral limit for the excavation of unsuitable material beneath structures shall be defined as the intersection point, with suitable subgrade material, of an imaginary line drawn downward at a 45 degree angle from the outside edge of the foundation. For pipelines, the horizontal limits are defined as two (2) feet plus the diameter of the pipe or a minimum total width of three (3) feet whichever is larger unless otherwise directed by the Engineer. The horizontal limits are defined as two feet outside the outside face of the manholes or catch basin bases.

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The exposed subgrade shall be compacted and the area backfilled with gravel fill. The Engineer shall be present during the excavation of all unsuitable soils in order to permit verification of the limits of and volume of material removed.

- 3. Temporary earth support:** Design, furnish, install and maintain temporary earth support systems, as required, to prevent injury to persons, collapse of the sides of the excavation, and damage, disturbance and settlement of adjacent property. Sheeting and bracing shall be of adequate type; size and strength for the conditions encountered and shall be driven to true alignment in a workmanlike manner.

Timber sheeting shall be straight and sound and shall be tongue and grooved where groundwater is encountered. Minimum thickness of timber sheeting shall be a nominal three inches. Steel sheeting shall have a minimum thickness of 3/8 inch. Steel sheeting shall be designed for the conditions encountered and shall be driven tight. Sheeting may be either left in place or removed. Sheeting left in place shall be cut off at least one (1) foot above the crown of the pipe. In no case shall the top of sheeting be left in place within five (5) feet of the finished grade.

Excavated slopes in rock shall be appropriately laid back or be stabilized by rock bolts or other appropriate means. Loose or semi-detached rock shall be scaled from the rock surface. When necessary, wire mesh or other appropriate means shall be installed to prevent injury to workers from falling rock.

Engage an independent Registered Professional Engineer (in the state where the project is located) with experience in the design of temporary earth support to evaluate the proposed methods of excavation and provide guidance regarding proper slopes and to design or provide guidance of temporary earth support during construction. Submit a notarized letter to the Engineer certifying conformance to the above requirements, before the start of any construction.

- 4. Control of Water:** Evaluate the impact of the anticipated subsurface soil and groundwater conditions on proposed method of excavation and dewatering and other operations. If subsurface conditions so dictate, provide wells, wellpoints, pumps, or any other facilities to control groundwater and surface water in order to permit work to be performed under dry and stable conditions. Provide any facilities required to remove subsurface water from the construction area in advance of excavation. Dewatering shall continue until all work below groundwater level has been completed or otherwise stabilized against uplift or other disturbance. Pumping shall be continuous where required to protect the Work and to maintain satisfactory progress. All dewatering wells shall be backfilled upon completion of the work.

Control all surface water within the work area. Excavations shall be protected from flooding by surface water by use of berms, ditches or other appropriate means. Pay special attention to areas where difficult soil and groundwater conditions are anticipated and evaluate the subsurface conditions in these areas from the geotechnical data provided in the Contract Document or by other means. All pipeline(s) and structures not stable against uplift during construction or prior

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to completion of installation shall be thoroughly braced or otherwise protected. Dewater in a manner that does not cause loss of ground or disturbance to the bearing soil or soil supporting adjacent structures.

Engage an independent Registered Professional Engineer (in the state where the Project is located) with experience in the design of temporary dewatering systems to evaluate the proposed method(s) for control of water and to design dewatering system(s) or provide guidance during construction. Submit a notarized letter to the Engineer certifying conformance to the above requirements, before the start of any construction.

5. **Pipe Bedding:** Pipe and/or structures shall be placed on specified bedding materials, to provide uniform support and a stable foundation for the pipeline(s) or structure(s) and backfill material. No bedding shall be placed on unstable subgrade soils. An unstable subgrade is defined as a condition of running sand, running silt, quick bottom, or otherwise soft, soupy or spongy bottom. If an unstable condition exists, or develops during the excavation, excavate, dewater and stabilize the subgrade to the extent necessary to provide a firm stable foundation prior to placing bedding, pipe and/or structures. The height of fill adjacent to structures and pipelines shall be increased at approximately the same rate on all sides to prevent displacement.

Pipeline(s) and appurtenant items of Work shall be laid in the bedding material, from the bottom of the excavation to the mid-diameter of the pipe, for the full width of trench. Bedding material shall be compacted to a minimum density of ninety-five (95) percent of the maximum density as determined by ASTM D1557 (Modified Proctor) and shall meet the requirements for gravel fill or crushed stone. The type and thickness of bedding material shall be adjusted based on field conditions, as follows:

- a. Gravel fill or crushed stone bedding material shall be placed to a depth of 6 inches below the pipe as shown on the Contract Drawings and compacted to the top of the pipe as specified hereinbefore.”
- b. The excavation shall be made to a depth of six (6) inches below the bottom of pipe for placement of bedding material.

Where the bottom of the trench excavation is below the groundwater level and pumping of water is done from within the excavation, utilize a bedding system which provides a stable working surface which limits the disturbance of the subgrade and prevents migration or washing of fine soils from the subgrade due to the flow of water into the trench.

Excavation beyond the required limits shall be backfilled with compacted gravel fill at no additional cost to the Owner. Gravel Fill used to replace unsuitable material or unauthorized excavation shall be compacted to a minimum density of ninety-two (92) percent of the maximum density determined by ASTM D1557, (Modified Proctor).

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6. **Pipe and fitting installation:** Verify that excavations are ready to accept pipes, fittings, valves and accessories. Visually inspect pipes, fittings, valves and accessories for damage prior to installation. Mark and remove damaged or defective materials from site. Visually inspect interiors of pipes, fittings and valves for foreign matter and remove if found.

Prepare excavations for installation of pipe, fittings, valves and accessories. Protect stored valves and appurtenances from damage due to exposure to sunlight, heat, dirt, debris, freezing and thawing, vandalism, etc.

Install pipe, fittings, valves and appurtenances in accordance with the requirements of ANSI/AWWA C600 except as modified herein. Handle pipe with non-metallic slings so as not to damage pipe exterior coating. Repair cuts, nicks, and scrapes to interior and exterior pipe coatings prior to pipe installation. Cut pipes with milling type cutters or saws. Snap cutters, torch, hammer and chisel cutting methods shall not be used. Chamfer cut ends of pipe per joint manufacturer’s written recommendations. Do not cut glass or polyethylene lined pipes.

Do not allow deflection of alignment at joints to exceed permissible deflection as specified below:

**PIPE DEFLECTION ALLOWANCES**

Maximum permissible deflection, in.*		
Size of pipe, in	Push-on joint	Mechanical joint
4	10	16
6	10	14
8	10	10
10	10	10
12	10	10

\*Maximum permissible deflection for 20-ft. lengths; for other lengths in proportion of such lengths to 20ft.

When pipe laying not in progress, close open ends of pipe with temporary watertight plugs. If water in trench, do not remove plug until danger of water entering pipe passed. Provide valves with extension stems where required for operation. Provide extension stems for valves installed underground and elsewhere so that operating wrench does not exceed 6 ft. in length. Provide valve boxes for each buried valve. Set box so top is flush with finished surface and so box does not bear on valve. Install polyethylene encasement by methods A or B as described in Section 4.3 of ANSI/AWWA C105/A21.5.

7. **Trench Backfilling:** Backfill materials, meeting the requirements for Select Fill, shall be placed above the mid diameter of the pipe to twelve (12) inches above the pipe. The Select Fill backfill shall be compacted to a density of at least ninety-two (92) percent of the maximum density as determined by ASTM D1557 (Modified Proctor).

Backfill materials placed from twelve (12) inches above the pipe to the bottom of the roadway base course in paved areas or to the bottom of loam shall meet the requirements for Common backfill. Fill shall be placed and compacted so that a density of at least ninety (90)

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percent of the maximum density is achieved as determined by ASTM D1557 (Modified Proctor). Select equipment and establish procedures consistent with the backfill materials being used to achieve the required density. Backfill materials with more than fifteen (15) percent passing the No. 200 sieve shall be placed at a moisture content between two (2) percent dry and three (3) percent wet of the optimum moisture content as determined by ASTM D1557.

Puddling or jetting of the backfill materials may be utilized, however, any water used for puddling or jetting shall be secured in sufficient quantity and pressure to obtain the required result and shall be provided at no additional cost to the Owner.

All settlement of trench backfill shall be repaired at no additional cost to the Owner. All repairs shall be made with materials meeting the requirements of the specifications compacted as specified. After trenches have been backfilled as specified, all surplus material shall be removed and legally disposed of at no additional cost to the Owner. The removal of surplus material and clean-up of trench surfaces shall closely follow the pipe laying Work. Where hardened surfaces or roadways, driveways, or walls are disturbed, special attention shall be given to backfilling and compaction prior to resurfacing.

8. **Testing and adjustment:** Conduct hydrostatic testing in conformance with the requirements of Section 5.2 of AWWA C600. Test duration shall be two hours. Test pressure shall be 80 psi. No visible leakage will be allowed and any visible leakage shall be repaired. Contractor shall provide all temporary testing materials and appurtenances required for performing hydrostatic testing, repeatedly if necessary, to achieve satisfactory results. Maintain section full of water for 24 hours before conducting hydrostatic testing. If section fails hydrostatic test, locate, uncover, and repair or replace defective pipe, fitting, or joint, at no additional expense and without time extension. Conduct additional tests and repairs until section passes hydrostatic test.

Adjust valve boxes to finish grade. Demonstrate operation of all valves. Record number of turns required to open or close valve.

Protect completed installation from damage.

**Method of Measurement:**

“8” Solid Sleeve” shall be measured for payment by the actual number of each fitting installed in accordance with the specifications and as designated on the plans.

“12” Solid Sleeve” shall be measured for payment by the actual number of each fitting installed in accordance with the specifications and as designated on the plans.

“8” Gate Valve” shall be measured for payment by the actual number of each valve and corresponding valve box installed in accordance with the specifications and as designated on the plans.

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“12” Gate Valve” shall be measured for payment by the actual number of each valve and corresponding valve box installed in accordance with the specifications and as designated on the plans.

“Test Pit Excavation (Sanitary Sewer)” shall be measured for payment to the nearest cubic yard volume of each test pit excavated in accordance with the specifications and as designated on the plans.

“Trench Excavation 0’-10’ Deep (Sanitary Sewer)” shall be measured to the nearest cubic yard of soil encountered and removed.

“Rock in Trench Excavation 0’-10’ Deep (Sanitary Sewer)” shall be measured to the nearest cubic yard of soil encountered and removed.

“Dewatering” shall be measured to the nearest number of weeks required for control of water.

“8” Ductile Iron Pipe (Sanitary Sewer)” shall be measured for payment to the nearest number of linear feet of accepted pipe of the type or size installed, measured along the centerline of the pipe through fittings in each continuous section.

“12” Ductile Iron Pipe (Sanitary Sewer)” shall be measured for payment to the nearest number of linear feet of accepted pipe of the type or size installed, measured along the centerline of the pipe through fittings in each continuous section.

“1/2” Crushed Stone Bedding (Sanitary Sewer)” shall be measured to the nearest cubic yard of crushed stone installed in the trench.

“Sand Blanket Cover (Sanitary Sewer)” shall be measured to the nearest cubic yard of sand installed in the trench.

“Removal of Existing Sanitary Sewer” shall be measured to the nearest linear foot of abandoned pipe removed during Stage 2A of construction.

“Granular Fill (Sanitary Sewer)” shall be measured to the nearest cubic yard of granular fill installed in the trench.

**Basis of Payment:**

“8” Solid Sleeve” will be paid for at the contract unit price per each for the type or designation indicated on the plan or ordered by the Engineer, complete in place. The price shall include all materials including but not limited to fittings, glands, gaskets, bolts, polyethylene encasement, equipment, and tools and labor incidental to the installation.

ITEM #1301966A#1301968A,  
#1302004A, #1302006A, #1400000A,  
#1400003A, #1400004A, #1400051A,  
#1401242A, #1401254A, #1401991A,  
#1401994A, #1403608A, #1405081A

“12” Solid Sleeve” will be paid for at the contract unit price per each for the type or designation indicated on the plan or ordered by the Engineer, complete in place. The price shall include all materials including but not limited to fittings, glands, gaskets, bolts, polyethylene encasement, equipment, and tools and labor incidental to the installation.

“8” Gate Valve” will be paid for at the contract unit price per each for the type or designation indicated on the plan or ordered by the Engineer, complete in place. The price shall include all materials including but not limited to valves, valve boxes, glands, gaskets, bolts, polyethylene encasement, equipment, and tools and labor incidental to the installation.

“12” Gate Valve” will be paid for at the contract unit price per each for the type or designation indicated on the plan or ordered by the Engineer, complete in place. The price shall include all materials including but not limited to valves, valve boxes, glands, gaskets, bolts, polyethylene encasement, equipment, and tools and labor incidental to the installation.

“Test Pit Excavation (Sanitary Sewer)” will be paid for at the contract unit price per each cubic yard as indicated on the plan or ordered by the Engineer. The price shall include all materials, equipment, and tools and labor incidental to the excavation and refilling of the test pit.

“Trench Excavation 0’-10’ Deep (Sanitary Sewer)” will be paid for at the contract unit price per each cubic yard as indicated on the plan or ordered by the Engineer. The price shall include all materials, equipment, and tools and labor incidental to the excavation. The price shall also include the cost of disposing of excavated materials; and temporary earth support.

“Rock in Trench Excavation 0’-10’ Deep (Sanitary Sewer)” will be paid for at the contract unit price per each cubic yard as indicated on the plan or ordered by the Engineer. The price shall include all materials, equipment, and tools and labor incidental to the excavation. The price shall also include the cost of furnishing backfill materials and disposing of excavated materials; and temporary earth support.

“Dewatering” will be paid for at the contract unit price per week. The price shall include all materials, equipment, and tools and labor incidental to the excavation. The price shall include wells, well points, pumps, power or fuel, all materials, equipment, and tools and labor as required to keep the work dry and stable.

“8” Ductile Iron Pipe (Sanitary Sewer)” will be paid for at the contract unit price per linear foot of pipe installed as indicated on the plan or ordered by the Engineer. The price shall also include removing and disposing of the present sewer pipes and any appurtenances as needed for construction of the new pipeline (abandoned pipeline in conflict with future utilities to be removed under a separate pay item); furnishing and installing the pipelines complete as shown on plans or as directed, including fittings, bends, joint restraints, anchors, polyethylene encasement, pressure testing taps, polystyrene insulation board, utility identification tape; backfilling trenches with suitable material; grading; pressure testing as specified herein, and all

ITEM #1301966A#1301968A,  
#1302004A, #1302006A, #1400000A,  
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#1401242A, #1401254A, #1401991A,  
#1401994A, #1403608A, #1405081A

incidental work, except as otherwise herein provided for. No claim will be allowed because the number of pipes and joints may be greater than estimated by the Contractor. The price shall also include all material, transportation, labor, and equipment necessary to construct the pipelines in accord with the Contract Drawings, the Specifications and the requirements of the Engineer there under.

“12” Ductile Iron Pipe (Sanitary Sewer)” will be paid for at the contract unit price per linear foot of pipe installed as indicated on the plan or ordered by the Engineer. The price shall also include removing and disposing of the present sewer pipes and any appurtenances as needed; furnishing and installing the pipelines complete as shown on plans or as directed, including fittings, bends, joint restraints, anchors, polyethylene encasement, pressure testing taps, polystyrene insulation board, utility identification tape; backfilling trenches with suitable material; grading; pressure testing as specified herein, and all incidental work, except as otherwise herein provided for. No claim will be allowed because the number of pipes and joints may be greater than estimated by the Contractor. The price shall also include all material, transportation, labor, and equipment necessary to construct the pipelines in accord with the Contract Drawings, the Specifications and the requirements of the Engineer there under.

“1/2” Crushed Stone Bedding (Sanitary Sewer)” will be paid for at the contract unit price per cubic yard for the type or designation indicated on the plan or ordered by the Engineer, complete in place. The price shall include all materials including but not limited to crushed stone, geotextile fabric, equipment, and tools and labor incidental to the installation.

“Sand Blanket Cover (Sanitary Sewer)” will be paid for at the contract unit price per cubic yard for the type or designation indicated on the plan or ordered by the Engineer, complete in place. The price shall include all materials, equipment, and tools and labor incidental to the installation.

“Removal of Sanitary Sewer” will be paid for at the contract unit price per linear foot of pipe removed as indicated on the plan or ordered by the Engineer. The price shall include all materials, equipment, and tools and labor incidental to the removal and disposal, as well as the installation of mechanical joint caps for the existing pipe to remain in place as shown on the Drawings.

“Granular Fill (Sanitary Sewer)” will be paid for at the contract unit price per cubic yard for the type or designation indicated on the plan or ordered by the Engineer, complete in place. The price shall include all materials, equipment, and tools and labor incidental to the installation.

Pay Item	Pay Unit
8” Solid Sleeve	EA
12” Solid Sleeve	EA
8” Gate Valve	EA
12” Gate Valve	EA
Test Pit Excavation (Sanitary Sewer)	CY

ITEM #1301966A#1301968A,  
 #1302004A, #1302006A, #1400000A,  
 #1400003A, #1400004A, #1400051A,  
 #1401242A, #1401254A, #1401991A,  
 #1401994A, #1403608A, #1405081A



Trench Excavation 0'-10' Deep (Sanitary Sewer)	CY
Rock in Trench Excavation 0'-10' Deep (Sanitary Sewer)	CY
Dewatering	Weeks
8" Ductile Iron Pipe (Sanitary Sewer)	LF
12" Ductile Iron Pipe (Sanitary Sewer)	LF
1/2" Crushed Stone Bedding (Sanitary Sewer)	CY
Sand Blanket Cover (Sanitary Sewer)	CY
Removal of Existing Sanitary Sewer	LF
Granular Fill (Sanitary Sewer)	CY

ITEM #1301966A#1301968A,  
#1302004A, #1302006A, #1400000A,  
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#1401242A, #1401254A, #1401991A,  
#1401994A, #1403608A, #1405081A

## **ITEM #1303238A – RESET FIRE SUPPRESSION SYSTEM**

### **Description:**

This work shall consist of removing, modifying, and resetting the existing fire suppression system. This includes furnishing, fabricating, transporting and installing all necessary components and all appurtenances for fire protection at locations shown on the plans and in accordance with this specification. This work shall also include all piping support, mounting hardware and concrete inserts.

All work shall conform to the requirements of the National Fire Protection Association's "NFPA 14 - Installation of Standpipe and Hose Systems", 2003 edition, and the latest AASHTO LRFD Specifications.

The existing stand pipe system and its components and attachments shall be reused except for concrete anchoring hardware. In addition, it shall be extended vertically to fit with the new superstructure as shown in the Contract Documents. Where new components are required, as approved by the Engineer, they shall comply with the requirements noted herein.

### **Materials:**

#### **Certified Test Reports, Materials Certificate, and Certificate of Compliance**

The Contractor shall furnish the Owner with a written certification, signed by the pipe manufacturer, the pipe fittings manufacturer, the pipe joint gasket manufacturer, and the anchorage system manufacturer; all duly notarized, certifying that the particular products provided for this contract are suitable for the intended use (i.e. conveyance of potable water under high pressure); and that the manufacturer has supplied the same product for other jobs with similar applications. The form of certification shall be, in all respects, in conformance with Section 1.06.07, and satisfactory to the Engineer.

#### **Pipe Supports**

Structural steel for support members and anchorage plates shall conform to the requirements of ASTM A709, Grade 36 and shall be galvanized after fabrication to meet the requirements of ASTM A123.

Threaded rods, anchor bolts, bolts and nuts shall conform to the requirements of ASTM F1554, Grade 36 and shall be galvanized to meet the requirements of ASTM A153.

#### **Anchorage System**

Threaded concrete inserts shall be compatible with the galvanized steel threaded rods and capable of developing the required loads as shown on the plans.

#### **Storz Couplings**

The existing storz coupling and caps (top and bottom) shall be inspected and reused. If discovered as defective, it shall be promptly removed and replaced with in-kind.

### Steel Pipe, Fittings and Couplings

Existing steel pipe, fittings and couplings shall be reused. Where new components are required, as approved by the Engineer, they shall comply with the requirements noted herein:

Pipe shall be mild steel, seamless or welded, Schedule 40, galvanized, ASTM A53M, with threaded or cut grooved connections, as indicated on the plans. No rolled groove connections will be permitted.

Fittings shall be malleable iron threaded Class 150, galvanized, ANSI/ASTM B16.3, and ductile iron fittings for grooved connections, galvanized.

Pipe couplings shall be ductile iron, galvanized, at least 300psi maximum working pressure and 10,000lb maximum end load, flexible or rigid type, as indicated on the Contract Drawings. Flexible couplings shall be Victualic Style 77 or approved equal, rigid couplings shall be Victualic Style 07 Zero-Flex or approved equal. Gaskets for grooved connections must be as recommended by the couplings manufacturer for the required service.

Other acceptable manufacturers of fittings and couplings for grooved connections are Anvil International and Tyco Fire Products. All fittings, couplings and gaskets for grooved connections must be from one manufacturer.

### Pipe Guides

Pipe Guides shall be as shown on the drawings. All elements of the guide shall be galvanized.

### Pipe Anchors

Pipe Anchors shall be as shown on the drawings. All elements of the anchor shall be galvanized. U-bolts shall be tightened securely to provide reliable anchoring of the pipe.

### Galvanizing

Areas in which galvanizing has been damaged shall be given two (2) coats of zinc paint conforming to the requirements of the Federal Specification TT-P-641b or Military Specification MIL-P-21035.

### **Construction Methods:**

#### Shop Drawings:

Prior to the commencement of work and fabrication of any materials, the Contractor shall take all field measurements necessary to assure proper fit of the finished standpipe assemblies, and shall submit shop drawings to the Engineer for approval in accordance with Article 1.05.02-3. These drawings shall include, but not be limited to the following information:

- a. A layout plan and elevation indicating pipe lengths for vertical and horizontal standpipe runs indicating sections of existing standpipe system being reused and shop

drawings for any new components, type and number of fittings, couplings, supports and appurtenances for each location.

- b. Commercial items shall be identified by manufacturer, trade name and catalog number. Catalog sheets, including pertinent specifications, shall be included with the submission.
- c. All pipe supports, as shown on the plans, shall be detailed.
- d. All field measurements shall be submitted for reference.

Horizontal standpipe runs shall be installed with a minimum 0.5% cross slope to assure proper drainage of the system.

Installation:

Install flexible connections so that pipes are in alignment at 50 degrees Fahrenheit.

Welding of pipe joints and welding of piping to supports shall not be permitted.

All existing and new pipe, fittings and such other items shall be carefully examined for defects immediately prior to installation and no pipe or fittings shall be used which is known to be defective in any way. Any pipe or fittings discovered as defective shall be promptly removed and replaced at no additional cost to the State. Proper and suitable tools and equipment for the safety and convenient handling and laying of the pipe, fittings and appurtenance shall be used, and great care shall be taken to prevent damage to the pipe coating and lining.

Pipe and fittings shall be thoroughly cleaned before being installed and shall be kept clean until accepted in the completed work. Open ends shall be closed with wooden or other suitable bulkheads at all times when pipe laying is not actually in progress.

Jointing of pipe or fittings shall be made only by persons thoroughly skilled in this work. All adjoining parts shall be thoroughly cleaned and inspected and the jointing done in strict accordance with the manufacturer's recommendations.

Testing:

Upon completion of the installations, each standpipe system shall be tested by the City/Town Fire Department in accordance with NFPA-14 – "Installation of Standpipe and Hose Systems"; and shall meet or exceed a minimum "Rated Working Pressure" of 150psi and tested to a minimum pressure of 200psi for two hours.

At the completion and acceptance of the test, the standpipe system shall be drained.

All visible leaks in the joints shall be stopped and any cracked or defective pipe, or fittings shall be removed and replaced.

**Method of Measurement:**

This work shall be measured for payment by the number of fire suppression standpipe systems removed and reset.

**Basis of Payment:**

This work will be paid for at the Contract unit price for "Reset Fire Suppression System", complete and accepted in place, which price shall include removing, modifying, and resetting the existing fire suppression system, furnishing, fabricating, transporting, installing, surface preparation, galvanizing, and all materials, equipment, tools and labor incidental thereto. Cost of clearing and/or removal of vegetation and/or debris and additional maintenance and protection of traffic required for standpipe installation and testing shall be included in the bid for this item.

<u>Pay Item</u>	<u>Pay Unit</u>
Reset Fire Suppression System	Each

**ITEM #1806226A – PRE-WARNING VEHICLE**

**Description:** Work under this item shall include furnishing, deploying and maintaining a Truck-Mounted Impact Attenuator equipped with a changeable message sign (CMS) for use as a Pre-Warning Vehicle (PWV) in a rolling road block operation on limited access highways. Impact attenuators shall only be truck-mounted. The message on the sign shall warn motorists of slow or stopped traffic conditions.

**Materials:** The Truck-Mounted Impact Attenuator shall meet the requirements of Article 18.06.02, except replace all instances of “flashing arrow,” “arrow sign,” and “arrow” with “CMS”.

The CMS shall meet the requirements of Article 11.31.02, with the following amendments:

- 1. Physical Characteristics of the CMS**
  - a) Mounting – The CMS shall be truck mounted only
  - b) Sign Display Dimensions – Width of 6 feet, height of 4 feet
- 2. Visual Characteristics of the CMS Display**
  - a) Sign Type – CMS shall have a LED display only
  - b) Color – CMS shall have black background with orange, yellow, or amber legend
  - c) Characters – Letter height shall be 13 inches; Single stroke
  - d) Visibility– CMS brightness must provide for visibility at 1/2 mile
  - e) Message – The message shall read as follows, or shall be as directed by the Engineer:
    - Frame 1: SLOWED TRAFFIC AHEAD
    - Frame 2: BE PREPARED TO STOP
    - Or
    - Frame 1: STOPPED TRAFFIC AHEAD
    - Frame 2: BE PREPARED TO STOP

**Construction Methods:** The PWV shall be initially positioned in the right shoulder ½ mile prior to the rolling road block operation.

If a traffic queue reaches the PWV’s initial location, the Contractor shall slowly reverse the PWV along the shoulder to position itself prior to the new back of queue.

The Contractor shall meet the requirements of Article 18.06.03.

**Method of Measurement:** This work will be measured for payment by the actual number of hours that the Pre-Warning Vehicle is used to alert motorists of slowed or stopped traffic ahead.

**Basis of Payment:** This work will be paid for at the Contract unit price per hour for “Pre-Warning Vehicle,” which shall include the furnishing and use of the pre-warning vehicle and a driver, attenuator reflector, flashing lights, changeable message sign, and all equipment, materials, tools, labor, disposal of damaged Truck-Mounted Impact Attenuator components and work incidental thereto.

Pay Item	Pay Unit
Pre-warning Vehicle	hr

**PERMITS AND/OR REQUIRED PROVISIONS:**

The following Permits and/or and Required Provisions follow this page are hereby made part of this Contract.

- **PERMITS AND/OR PERMIT APPLICATIONS**

Inland Wetland and Watercourses General Permit	Approved on June 27, 2018
Army Corps of Engineers Self Verification Permit Inland Wetland Category Determination Form	Approved on June 27, 2018
Storm Water Discharge Permit	pending approval during construction

- **Construction Contracts - Required Contract Provisions (FHWA Funded Contracts)**

**INTERDEPARTMENTAL  
MESSAGE**

**STATE OF CONNECTICUT**

<b>To</b>	NAME, TITLE Central Permit Processing Unit, 1 <sup>st</sup> Floor	DATE June 25, 2018
	AGENCY, ADDRESS Department of Energy and Environmental Protection, 79 Elm Street, Hartford, CT. 06106	
<b>From</b>	NAME, TITLE Kimberly C. Lesay, Transportation Assistant Planning Director	TELEPHONE 860-594-2931
	AGENCY, ADDRESS Department of Transportation, 2800 Berlin Turnpike, Newington, CT. 06131-7546	

Subject: **State Project No. 14-185**  
Bridge No. 00196  
Interstate 95 over US Route 1  
Town of Branford

Attached is one original copy of the Request for Permit Authorization for the General Permit for Water Resource Construction Activities associated with the above referenced project.

Any questions pertaining to this application may be directed to Mr. Andrew H. Davis, Transportation Supervising Planner of my staff, at (860) 594-2157.

Attachments

CT Dept of Energy & Environmental Protection  
Central Permit Processing Unit

JUN 27 2018

RECEIVED BY B.C.





**Connecticut Department of  
Energy & Environmental Protection**

CPPU USE ONLY

App #: \_\_\_\_\_  
 Doc #: \_\_\_\_\_  
 Check #: \_\_\_\_\_  
 \_\_\_\_\_  
 \_\_\_\_\_

# Permit Application Transmittal Form

Please complete this transmittal form in accordance with the instructions in order to ensure the proper handling of your application(s) and the associated fee(s). Print legibly or type.

## Part I: Applicant Information:

- \*If an applicant is a corporation, limited liability company, limited partnership, limited liability partnership, or a statutory trust, it must be registered with the Secretary of State. If applicable, applicant's name shall be stated **exactly** as it is registered with the Secretary of State.
- If an applicant is an individual, provide the legal name (include suffix) in the following format: First Name; Middle Initial; Last Name; Suffix (Jr, Sr., II, III, etc.).

Applicant: **Connecticut Department of Transportation**  
 Mailing Address: **2800 Berlin Turnpike**  
 City/Town: **Newington** State: **CT** Zip Code: **06131-7546**  
 Business Phone: **860-594-2931** ext.: \_\_\_\_\_  
 Contact Person: **Kimberly C. Lesay** Phone: **860-594-2931** ext. \_\_\_\_\_  
 E-Mail: **Kimberly.Lesay@ct.gov**

Applicant (check one):  individual  \*business entity  federal agency  state agency  municipality  tribal  
 \*If a business entity, list type (e.g., corporation, limited partnership, etc.): \_\_\_\_\_  
 Check if any co-applicants. If so, attach additional sheet(s) with the required information as supplied above.

Please provide the following information to be used for *billing purposes only*, if different:  
 Company/Individual Name: \_\_\_\_\_  
 Mailing Address: \_\_\_\_\_  
 City/Town: \_\_\_\_\_ State: \_\_\_\_\_ Zip Code: \_\_\_\_\_  
 Contact Person: \_\_\_\_\_ Phone: \_\_\_\_\_ ext. \_\_\_\_\_

## Part II: Project Information

Brief Description of Project: *(Example: Development of a 50 slip marina on Long Island Sound)*  
**Superstructure replacement of Bridge No. 00196, construction of new center pier, and lowering and widening of US Route 1 beneath the bridge.**  
 Location (City/Town): **Branford, CT**

Other Project Related Permits (*not* included with this form):

Permit Description	Issuing Authority	Submittal Date	Issuance Date	Denial Date	Permit #
Section 404 Self-Verification	USACOE	Concurrently			
Stormwater General Permit	CTDEEP	Pending			

**Part III: Individual Permit Application and Fee Information**

New, Mod. or Renew	Individual Permit Applications	Initial Fees	No. of Permits Applied For	Total Initial Fees	Original + Required Copies
	<b>AIR EMISSIONS</b>				
	New Source Review <input type="checkbox"/> Revision <input type="checkbox"/> minor mod	\$940.00			1 + 0
	Title V Operating Permits <input type="checkbox"/> Revision <input type="checkbox"/> minor mod <input type="checkbox"/> non-minor mod	none			1 + 0
	Title IV	none			1 + 0
	Clean Air Interstate Rule (CAIR)	none			1 + 0
	<b>WATER DISCHARGES</b>				
	To Groundwater	\$1300.00			1 + 1
	To Sanitary Sewer (POTW)	\$1300.00			1 + 1
	To Surface Water (NPDES)	\$1300.00			1 + 1
	<b>INLAND WATER RESOURCES-</b>				
	Dam Safety	none			1 + 2
	Flood Management Certification	none			1 + 1
	Inland Wetlands and Watercourses	none			1 + 5
	Inland 401 Water Quality Certification	none			
	FERC- Hydropower Projects- 401 Water Quality Certification	none			1 + 1
	Water Diversion	★			1 + 5
	<b>OFFICE OF LONG ISLAND SOUND PROGRAMS</b>				
	Certificate of Permission	\$375.00			1 + 2
	Coastal 401 Water Quality Certification	none			1 + 2
	Structures and Dredging/and Fill/Tidal Wetlands	\$660.00			1 + 2
	<b>WASTE MANAGEMENT</b>				
	Aerial Pesticide Application	★			1 + 2
	Aquatic Pesticide Application	\$200.00			1 + 0
	CGS Section 22a-454 Waste Facilities	★			1 + 1
	Disruption of a Solid Waste Disposal Area	\$0			1 + 1
	Hazardous Waste Treatment, Storage and Disposal Facilities	★			1 + 1
	Marine Terminal License	\$100.00			1 + 0
	Stewardship	\$4000.00			1 + 1
	Solid Waste Facilities	★			1 + 1
	Waste Transportation	★			1 + 0
		Subtotal ➡	0	0	
GENERAL PERMITS and AUTHORIZATIONS		Subtotals Page 3 & 4 ➡	0	0	
Enter subtotals from Part IV, pages 3 - 6 of this form		Subtotals Page 5 ➡	1	\$2,500	
		Subtotals Page 6 ➡	0	0	
		<b>TOTAL ➡</b>	<b>1</b>	<b>\$2,500</b>	
<input checked="" type="checkbox"/> Indicate whether municipal discount or state waiver applies. Less Applicable Discount ➡				<b>State Waiver, 100%</b>	
		<b>AMOUNT REMITTED ➡</b>		<b>0</b>	
Check # ➡	<input type="text"/>	Check or money order should be made payable to: "Department of Energy and Environmental Protection"			

★ See fee schedule on individual application.

**Part IV: General Permit Registrations and Requests for Other Authorizations  
Application and Fee Information**

<input checked="" type="checkbox"/> General Permits and Other Authorizations	Initial Fees	No. of Permits Applied For	Total Initial Fees	Original + Required Copies
<b>AIR EMISSIONS</b>				
<input type="checkbox"/> Limit Potential to Emit from Major Stationary Sources of Air Pollution	\$2760.00			1 + 0
<input type="checkbox"/> Diagnostic and Therapeutic X-Ray Devices (Medical X-Ray) Registration	\$190.00/Xray device			1 + 0
<input type="checkbox"/> Radioactive Materials and Industrial Device Registration (Ionizing Radiation)	\$200.00			1 + 0
<input type="checkbox"/> Emergency/Temporary Authorization	★★			★★
<input type="checkbox"/> License Revocation Request	\$0			★★
<input type="checkbox"/> Other, (please specify):				
<b>WATER DISCHARGES</b>				
<input type="checkbox"/> Boiler Blowdown Wastewater	Expired- wastewater discharge authorized under MISC GP			
<input type="checkbox"/> Categorical Industry User to a POTW Discharges > 10,000 gpd Discharges < 10,000 gpd	\$6250.00 \$3125.00			1 + 0
<input type="checkbox"/> Domestic Sewage	\$625.00			1 + 0
<input type="checkbox"/> Food Preparation Establishment Wastewater	No Registration			
<input type="checkbox"/> Food Processing Wastewater	\$500.00			1 + 0
<input type="checkbox"/> Groundwater Remediation Wastewater to a Sanitary Sewer	\$500.00			1 + 0
<input type="checkbox"/> Groundwater Remediation Wastewater to a Surface Water Registration Only	\$625.00			1 + 0
<input type="checkbox"/> Approval of Registration by DEEP	\$1250.00			
<input type="checkbox"/> Hydrostatic Pressure Testing Wastewater Registration Only	\$625.00			1 + 0
<input type="checkbox"/> Approval of Registration by DEEP (natural gas pipelines)	\$1250.00			
<input type="checkbox"/> Miscellaneous Discharges of Sewer Compatible Wastewater Registration Only	\$500.00			1 + 0
<input type="checkbox"/> Approval of Registration by DEEP	\$1000.00			
<input type="checkbox"/> Nitrogen Discharges	No Registration			
<input type="checkbox"/> Non-Contact Cooling and Heat Pump Water (Minor)	\$625.00			1 + 0
<input type="checkbox"/> Photographic Processing Wastewater (Minor)	Expired- wastewater discharge authorized under MISC GP			
<input type="checkbox"/> Point Source Discharges from Application of Pesticides	\$200.00			1 + 0
<input type="checkbox"/> Printing & Publishing Wastewater (Minor) Flow < 40 gpd	\$500.00 \$100.00			1 + 0
<input type="checkbox"/> Stormwater Associated with Commercial Activities	\$300.00			1 + 0
<input type="checkbox"/> Stormwater Associated with Industrial Activities <50 employees—see general permit for additional requirements >50 employees—see general permit for additional requirements	\$500.00 \$1000.00			1 + 0
<input type="checkbox"/> Stormwater & Dewatering Wastewaters-Construction Activities	★			1 + 0
<input type="checkbox"/> Stormwater from Small Municipal Separate Storm Sewer Systems (MS4)	\$250.00			1 + 0

★ See fee schedule on registration/application.

★★ Contact the specific permit program for this information.  
(Contact numbers are provided in the instructions)

**Part IV: General Permit Registrations and Requests for Other Authorizations (continued)**

WATER DISCHARGES (continued)				
<input type="checkbox"/> Subsurface Sewage Disposal Systems Serving Existing Facilities	★ ★			1 + 0
<input type="checkbox"/> Swimming Pool Wastewater - Public Pools and Contractors	\$500.00			1 + 0
<input type="checkbox"/> Tumbling or Cleaning of Parts Wastewater (Minor)	Expired- wastewater discharge authorized under MISC GP			
Vehicle Maintenance Wastewater				
<input type="checkbox"/> Registration Only	\$625.00			1 + 0
<input type="checkbox"/> Approval of Registration by DEEP	\$1250.00			
<input type="checkbox"/> Water Treatment Wastewater	\$625.00			1 + 0
<input type="checkbox"/> Emergency/Temporary Authorization - Discharge to POTW	\$1500.00			1 + 0
<input type="checkbox"/> Emergency/Temporary Authorization - Discharge to Surface Water	\$1500.00			1 + 0
<input type="checkbox"/> Emergency/Temporary Authorization - Discharge to Groundwater	\$1500.00			1 + 0
<input type="checkbox"/> Other, (please specify):				
Note: Carry subtotals over to Part III, page 2 of this form.		Subtotal	0	0

★ See fee schedule on registration/application.

★★ Contact the specific permit program for this information.  
(Contact numbers are provided in the instructions)

**Part IV: General Permit Registrations and Requests for Other Authorizations (continued)**

<input checked="" type="checkbox"/> General Permits and Other Authorizations	Initial Fees	No. of Permits Applied For	Total Initial Fee	Original + Required Copies
<b>AQUIFER PROTECTION PROGRAM</b>				
<input type="checkbox"/> Registration for Regulated Activities	\$625.00			1 + 0
<input type="checkbox"/> Permit Application to Add a Regulated Activity	\$1250.00			1 + 0
<input type="checkbox"/> Exemption Application from Registration	\$1250.00			1 + 0
<b>INLAND WATER RESOURCES</b>				
<input type="checkbox"/> Diversion of Remediation Groundwater	No Registration			
<input type="checkbox"/> Diversion of Water for Consumptive Use: Reauthorization Categories	\$2500.00			1 + 0
<input type="checkbox"/> Diversion of Water for Consumptive Use: Authorization Required	\$2500.00			1 + 4
<input type="checkbox"/> Diversion of Water for Consumptive Use: Filing Only	\$1500.00			1 + 1
<input type="checkbox"/> Programmatic General Permit	★			1 + 3
<input checked="" type="checkbox"/> Water Resource Construction Activities	★	1	\$2,500	1 + 0
<input type="checkbox"/> Emergency/Temporary Authorization	★★			★★
<input type="checkbox"/> Notice of High Hazard Dam or a Significant Hazard Dam	\$0			1 + 0
<input type="checkbox"/> Other, (please specify):				
<b>OFFICE OF LONG ISLAND SOUND PROGRAMS</b>				
<input type="checkbox"/> 4/40 Docks	\$700.00			1 + 1
<input type="checkbox"/> Beach Grading	\$100.00			1 + 1
<input type="checkbox"/> Buoys or Markers	No Registration			
<input type="checkbox"/> Coastal Remedial Activities Required by Order	\$700.00			1 + 1
<input type="checkbox"/> Dock Reconstruction	\$300.00			1 + 1
<input type="checkbox"/> Harbor Moorings	No Registration			
<input type="checkbox"/> Maintenance of Catch Basins and Tide Gates	No Registration			
<input type="checkbox"/> Marina and Mooring Field Reconfiguration	\$700.00			1 + 1
<input type="checkbox"/> Minor Seawall Repair	No Registration			
<input type="checkbox"/> Non-harbor Moorings	\$100.00			1 + 1
<input type="checkbox"/> Osprey Platforms and Perch Poles	none			1 + 1
<input type="checkbox"/> Pump-out Facilities (no fee for Clean Vessel Act grant recipients)	\$100.00			1 + 1
<input type="checkbox"/> Programmatic General Permit	★			1 + 1
<input type="checkbox"/> Removal of Derelict Structures	\$100.00			1 + 1
<input type="checkbox"/> Residential Flood Hazard Mitigation	\$100.00			1 + 1
<input type="checkbox"/> Swim Floats	\$100.00			1 + 1
<input type="checkbox"/> Emergency/Temporary Authorization	★★			★★
<input type="checkbox"/> Other, (please specify):				
<b>Note: Carry subtotals over to Part III, page 2 of this form.</b>		<b>Subtotal</b> ➡	<b>1</b>	<b>\$2,500</b>

★ See fee schedule on registration/application.

★★ Contact the specific permit program for this information.  
(Contact numbers are provided in the instructions)

**Part IV: General Permit Registrations and Requests for Other Authorizations (continued)**

<input checked="" type="checkbox"/> General Permits and Other Authorizations	Initial Fees	No. of Permits Applied For	Total Initial Fee	Original + Required Copies
<b>WASTE MANAGEMENT</b>				
<input type="checkbox"/> Addition of Grass Clippings at Registered Leaf Composting Facilities	\$500.00			1 + 0
<input type="checkbox"/> Beneficial Use Determination	★			1 + 0
Certain Recycling Facilities:				
<input type="checkbox"/> Drop-site Recycling Facility	\$200.00			1 + 0
<input type="checkbox"/> Limited Processing Recycling Facility	\$500.00			1 + 0
<input type="checkbox"/> Recyclables Transfer Facility	\$500.00			1 + 0
<input type="checkbox"/> Single Item Recycling Facility	\$500.00			1 + 0
<input type="checkbox"/> Collection and Storage of Post Consumer Paint	\$0			1 + 0
Contaminated Soil and/or Staging Management (Staging/Transfer)				
<input type="checkbox"/> New Registrations	\$250.00			1 + 0
<input type="checkbox"/> New Approval of Registrations	\$1500.00			1 + 0
<input type="checkbox"/> Renewal of Registrations	\$250.00			1 + 0
<input type="checkbox"/> Renewal of Approval of Registrations	\$750.00			1 + 0
<input type="checkbox"/> Connecticut Solid Waste Demonstration Project	\$1000.00			1 + 0
<input type="checkbox"/> Disassembling Used Electronics	\$2000.00			1 + 0
<input type="checkbox"/> Leaf Composting Facility	none			1 + 1
<input type="checkbox"/> Municipal Transfer Station	\$800.00			1 + 1
<input type="checkbox"/> One Day Collection of Certain Wastes and Household Hazardous Waste	\$1000.00			1 + 0
<input type="checkbox"/> Sheet leaf Composting Notification	\$0			★★
Special Waste Authorization				
<input type="checkbox"/> Landfill or RRF Disposal	\$660.00			1 + 0
<input type="checkbox"/> Asbestos Disposal	\$300.00			
<input type="checkbox"/> homeowner	\$0			
<input type="checkbox"/> Storage and Processing of Asphalt Roofing Shingle Waste	\$2500.00			1 + 0
<input type="checkbox"/> Storage and Processing of Scrap Tires for Beneficial Use	\$1250.00			1 + 0
<input type="checkbox"/> Emergency/Temporary Authorization	★★			★★
<input type="checkbox"/> Other, (please specify):				
<b>REMEDIATION</b>				
<input type="checkbox"/> In Situ Groundwater Remediation: Enhance Aerobic Biodegradation	★			1 + 2
<input type="checkbox"/> In Situ Groundwater Remediation: Chemical Oxidation	\$500.00			1 + 0
<input type="checkbox"/> Emergency/Temporary Authorization	★			★★
Note: Carry subtotals over to Part III, page 2 of this form.		Subtotal →	0	0

★ See fee schedule on registration/application.

★★ Contact the specific permit program for this information.

(Contact numbers are provided in the instructions)

**Affirmative Action, Equal Employment Opportunity and Americans with Disabilities**

The Connecticut Department of Energy and Environmental Protection is an Affirmative Action/Equal Opportunity Employer that is committed to complying with the requirements of the Americans with Disabilities Act (ADA). Please contact us at (860) 418-5910 or [deep.accommodations@ct.gov](mailto:deep.accommodations@ct.gov) if you: have a disability and need a communication aid or service; have limited proficiency in English and may need information in another language; or if you wish to file an ADA or Title VI discrimination complaint.



**STATE OF CONNECTICUT**  
DEPARTMENT OF TRANSPORTATION



2800 BERLIN TURNPIKE, P.O. BOX 317546  
NEWINGTON, CONNECTICUT 06131-7546  
Phone: (860) 594-2931

June 25, 2018

**TO:** Branford Planning and Zoning Commission  
1019 Main Street, PO Box 150  
Branford, CT 06405

**FROM:** Kimberly C. Lesay  
Transportation Assistant Planning Director  
Bureau of Policy and Planning

**SUBJECT:** Notification of Submittal of Application to the State of Connecticut, Department of Energy and Environmental Protection's (DEEP) for a General Permit for Water Resource Construction Activities

**PROJECT:** State Project No. 14-185  
Bridge No. 00196  
Interstate 95 over US Route 1  
Town of Branford

Enclosed is a copy of our Request for Authorization under the State of Connecticut Department of Energy and Environmental Protection's General Permit for Water Resources Construction Activities. If your agency wishes to comment on the enclosed application, comments must be submitted to the State Department of Energy and Environmental Protection.

Comments should be directed to:

Land and Water Resources Division  
Department of Energy and Environmental Protection  
79 Elm Street  
Hartford, CT 06106-5127

If we can provide additional information, please contact Mr. Andrew H. Davis at 860-594-2157.



**STATE OF CONNECTICUT**  
DEPARTMENT OF TRANSPORTATION



2800 BERLIN TURNPIKE, P.O. BOX 317546  
NEWINGTON, CONNECTICUT 06131-7546  
Phone: (860) 594-2931

June 25, 2018

**TO:** Branford Conservation/Environmental Commission  
1019 Main Street, PO Box 150  
Branford, CT 06405

**FROM:** Kimberly C. Lesay *Kimberly Lesay*  
Transportation Assistant Planning Director  
Bureau of Policy and Planning

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**STATE OF CONNECTICUT**  
**DEPARTMENT OF TRANSPORTATION**



2800 BERLIN TURNPIKE, P.O. BOX 317546  
NEWINGTON, CONNECTICUT 06131-7546  
Phone: (860) 594-2931

June 25, 2018

**TO:** Branford Inland Wetlands and Natural Resources Commission  
1019 Main Street, PO Box 150  
Branford, CT 06405

**FROM:** Kimberly C. Lesay  
Transportation Assistant Planning Director  
Bureau of Policy and Planning

**SUBJECT:** Notification of Submittal of Application to the State of Connecticut, Department of Energy and Environmental Protection's (DEEP) for a General Permit for Water Resource Construction Activities

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79 Elm Street  
Hartford, CT 06106-5127

If we can provide additional information, please contact Mr. Andrew H. Davis at 860-594-2157.



## Statewide Inland Wetlands & Watercourses Activity Reporting Form

*Please complete and mail this form in accordance with the instructions on pages 2 and 3 to:  
DEEP Land & Water Resources Division, Inland Wetlands Management Program, 79 Elm Street, 3rd Floor, Hartford, CT 06106  
Incomplete or incomprehensible forms will be mailed back to the municipal inland wetlands agency.*

### PART I: Must Be Completed By The Inland Wetlands Agency

- DATE ACTION WAS TAKEN: year: [Click Here for Year](#) month: [Click Here for Month](#)
- CHOOSE ACTION TAKEN (see instructions for codes): [Click Here to Choose a Code](#)
- WAS A PUBLIC HEARING HELD (check one)? yes  no
- NAME OF AGENCY OFFICIAL VERIFYING AND COMPLETING THIS FORM:  
(type name) \_\_\_\_\_ (signature) \_\_\_\_\_

### PART II: To Be Completed By The Inland Wetlands Agency Or The Applicant

- TOWN IN WHICH THE ACTION IS OCCURRING (type name): Branford  
does this project cross municipal boundaries (check one)? yes  no   
if yes, list the other town(s) in which the action is occurring (type name(s)): \_\_\_\_\_, \_\_\_\_\_
- LOCATION (click on hyperlinks for information): [USGS quad map name](#): Branford or [quad number](#): 96  
[subregional drainage basin number](#): 511
- NAME OF APPLICANT, VIOLATOR OR PETITIONER (type name): Connecticut Department of Transportation
- NAME & ADDRESS / LOCATION OF PROJECT SITE (type information): Bridge No. 00196: I-95 over US Route 1  
briefly describe the action/project/activity (check and type information): temporary  permanent  description: The replacement of the project bridge superstructure. Construction of center pier, lowering & widening of US Rte. 1.
- ACTIVITY PURPOSE CODE (see instructions for codes): N
- ACTIVITY TYPE CODE(S) (see instructions for codes): 1, 14, NA, NA
- WETLAND / WATERCOURSE AREA ALTERED (type acres or linear feet as indicated):  
wetlands: 0.04 acres open water body: 0.00 acres stream: 0.00 linear feet
- UPLAND AREA ALTERED (type acres as indicated): 0.00 acres
- AREA OF WETLANDS / WATERCOURSES RESTORED, ENHANCED OR CREATED (type acres as indicated): 0.00 acres

DATE RECEIVED:

### PART III: To Be Completed By The DEEP

DATE RETURNED TO DEEP:

FORM COMPLETED: YES NO

FORM CORRECTED / COMPLETED: YES NO



Connecticut Department of  
 Energy & Environmental Protection  
 Bureau of Water Protection & Land Reuse  
 Inland Water Resources Division

# Request for Authorization Form for the General Permit for Water Resource Construction Activities

Please complete this form in accordance with the general permit (DEEP-IWRD-GP-013) to ensure the proper handling of your request. Print or type unless otherwise noted. You must submit the fee along with this completed form.

CPPU USE ONLY
App #: _____
Doc #: _____
Check #: _____
<b>Program: GP IWRD Construction Activities</b>

## Part I: Request and Fee Type

Check the appropriate box identifying the request type.

<input type="checkbox"/> <b>\$5000</b> [#1757] for each <b>Request for Authorization</b> for Section 3(a)(1), (a)(2), (a)(3), (a)(4), (a)(5), (a)(6), or (a)(7) activities under the subject general permit, unless you qualify as one of the following:  <input type="checkbox"/> \$2500 for any municipality  <input type="checkbox"/> \$2500 for electronic filing*	<input checked="" type="checkbox"/> <b>\$2500</b> [#1758] for each <b>Request for Authorization</b> for Section 3(a)(8) or 3(a)(9) activities under the subject general permit, unless you qualify as one of the following:  <input type="checkbox"/> \$1250 for any municipality  <input type="checkbox"/> \$1250 for electronic filing*
<p><i>*In order to file electronically, <b>ALL</b> supporting documents under Part VI of this application must be submitted in an electronic format on a CD, along with this original completed application in hard copy.</i></p>	
<p>The request will not be processed without the fee. The fee shall be non-refundable and shall be paid by check or money order to the Department of Energy and Environmental Protection.</p>	
<p>Town where site is located: <u>Branford, CT</u></p>	
<p><b>Brief Description of Project:</b> Superstructure replacement of Bridge No. 00196, construction of new center pier, construction of a sidewalk, and lowering and widening of US Route 1 beneath the bridge.</p>	

**Part II: Requestor Information**

- If a requester is a corporation, limited liability company, limited partnership, limited liability partnership, or a statutory trust, it must be registered with the Secretary of State. If applicable, requester's name shall be stated **exactly** as it is registered with the Secretary of State. Please note, for those entities registered with the Secretary of State, the registered name will be the name used by DEEP. This information can be accessed at the Secretary of State's database (CONCORD). ([www.concord-sots.ct.gov/CONCORD/index.jsp](http://www.concord-sots.ct.gov/CONCORD/index.jsp))
- If a requester is an individual, provide the legal name (include suffix) in the following format: First Name; Middle Initial; Last Name; Suffix (Jr, Sr., II, III, etc.).
- If there are any changes or corrections to your company/facility or individual mailing or billing address or contact information, please complete and submit the Request to Change Company/Individual Information to the address indicated on the form. If there is a change in name of the entity holding a DEEP license or a change in ownership, contact the Office of Planning and Program Development (OPPD) at 860-424-3003. For any other changes you must contact the specific program from which you hold a current DEEP license.

**1. Requester Name:** Connecticut Department of Transportation

Mailing Address: 2800 Berlin Turnpike

City/Town: Newington State: CT Zip Code: 06131-7546

Business Phone: 860-594-2931 ext.:

Contact Person: Kimberly C. Lesay Phone: 860-594-2931 ext.

E-mail: Kimberly.Lesay@ct.gov

\*By providing this e-mail address you are agreeing to receive official correspondence from the department, at this electronic address, concerning the subject request. Please remember to check your security settings to be sure you can receive e-mails from "ct.gov" addresses. Also, please notify the department if your e-mail address changes.

a) Requester Type (check one):

individual       federal agency       state agency       municipality       tribal

\*business entity (\*If a business entity complete i through iii):

i) check type:  corporation       limited liability company       limited partnership  
 limited liability partnership       statutory trust       Other: \_\_\_\_\_

ii) provide Secretary of the State business ID #: \_\_\_\_\_ This information can be accessed at database (CONCORD). ([www.concord-sots.ct.gov/CONCORD/index.jsp](http://www.concord-sots.ct.gov/CONCORD/index.jsp))

iii)  Check here if your business is **not** registered with the Secretary of State's office.

Check here if any co-registrants. If so, attach additional sheet(s) with the required information as requested above.

b) Requester's interest in property at which the proposed activity is to be located:

site owner       option holder       lessee       easement holder       operator

other (specify): \_\_\_\_\_

**Part II: Requestor Information (continued)**

**2. Billing contact, if different than the requester.**

Name:

Mailing Address:

City/Town:

State:

Zip Code:

Business Phone:

ext.

Contact Person:

Title:

Email:

**3. Primary contact for departmental correspondence and inquiries, if different than the requester.**

Name:

Mailing Address:

City/Town:

State:

Zip Code:

Business Phone:

ext.

Contact Person:

Title:

Email:

\*By providing this e-mail address you are agreeing to receive official correspondence from the department, at this electronic address, concerning the subject request. Please remember to check your security settings to be sure you can receive e-mails from "ct.gov" addresses. Also, please notify the department if your e-mail address changes.

**4. Attorney or other representative, if applicable:**

Firm Name:

Mailing Address:

City/Town:

State:

Zip Code:

Business Phone:

ext.

Attorney:

Email:

**5. Site Owner, if different than the requester.**

Name:

Mailing Address:

City/Town:

State:

Zip Code:

Business Phone:

ext.

Contact Person:

Title:

Email:

## Part II: Requestor Information (continued)

6. **Engineer(s) or other consultant(s) employed or retained to assist in preparing the request or in designing or constructing the activity.**

Name: **CME Associates, Inc.**

Mailing Address: **101 East River Drive, 1<sup>st</sup> Floor**

City/Town: **East Hartford**

State: **CT**

Zip Code: **06108**

Business Phone: **860-290-4100**

ext. **1148**

Contact Person: **Naomi Hodges**

Title: **Environmental Scientist**

Email: **nhodges@cmeengineering.com**

Service Provided: **Liaison Engineering Services, Environmental Services**

Check here if additional sheets are necessary, and label and attach them to this sheet.

## Part III: Site Information

### 1. SITE NAME AND LOCATION

Name of Site : **Bridge No. 00196**

Street Address or Location Description: **Interstate 95 over US Route 1**

City/Town: **Branford**

State: **CT**

Zip Code: **06405**

Tax Assessor's Reference: Map

Block

Lot

Latitude and longitude of the exact location of the proposed activity in degrees, minutes, and seconds or in decimal degrees: Latitude: **41.294074** Longitude: **-72.783417**

Method of determination (check one):

GPS  USGS Map  Other (please specify): **CTECO**

If a USGS Map was used, provide the quadrangle name:

2. **INDIAN LANDS:** Is or will the facility be located on federally recognized Indian lands?  Yes  No

3. **COASTAL BOUNDARY:** Is the activity which is the subject of this registration located within the coastal boundary as delineated on DEEP approved coastal boundary maps?  Yes  No

If yes, and this registration is for a new authorization, or a modification of an existing authorization where the physical footprint of the subject activity is modified, you must submit a [Coastal Consistency Review Form](#) (DEEP-APP-004) with your registration as Attachment C.

Information on the coastal boundary is available at [www.cteco.uconn.edu/map\\_catalog.asp](http://www.cteco.uconn.edu/map_catalog.asp) (Select the town and then select coastal boundary. If the town is not within the coastal boundary you will not be able to select the coastal boundary map.) or the local town hall or on the "Coastal Boundary Map" available at DEEP Maps and Publications (860-424-3555).

**Part III: Site Information (continued)**

**4. ENDANGERED OR THREATENED SPECIES:** According to the most current "State and Federal Listed Species and Natural Communities Map", is the project site located within an area identified as a habitat for endangered, threatened or special concern species?     Yes     No    Date of Map: **Dec. 2017**

If yes, complete and submit a [Request for NDDB State Listed Species Review Form](#) (DEEP-APP-007) to the address specified on the form. **Please note NDDB review generally takes 4 to 6 weeks and may require additional documentation from the registrant.**

A **copy** of the completed [Request for NDDB State Listed Species Review Form](#) and the CT NDDB response **must** be submitted with this completed registration as Attachment D.

For more information visit the DEEP website at [www.ct.gov/deep/nddbrequest](http://www.ct.gov/deep/nddbrequest) or call the NDDB at 860-424-3011.

**5. AQUIFER PROTECTION AREAS:** Is the site located within a mapped Level A or Level B [Aquifer Protection Area](#), as defined in CGS section 22a-354a through 22a-354bb?

Yes     No    If **yes**, check one:     Level A    or     Level B

If **Level A**, are any of the [regulated activities](#), as defined in RCSA section 22a-354i-1(34), conducted on this site?     Yes     No

If **yes**, and your business is **not** already registered with the Aquifer Protection Program, contact the [local aquifer protection agent](#) or DEEP to take appropriate actions.

For more information on the Aquifer Protection Area Program visit the DEEP website at [www.ct.gov/deep/aquiferprotection](http://www.ct.gov/deep/aquiferprotection) or contact the program at 860-424-3020.

**6. CONSERVATION OR PRESERVATION RESTRICTION:** Is the property subject to a conservation or preservation restriction?     Yes     No

If Yes, proof of written notice of this registration to the holder of such restriction or a letter from the holder of such restriction verifying that this registration is in compliance with the terms of the restriction, must be submitted as Attachment E.

**Part IV: Construction Activity Details**

1. Proposed Date of Initiation of Activity: Spring 2019

2. Anticipated Date of Completion: Fall 2020

3. Name of the wetland or watercourse involved with or adjacent to the subject activity: unnamed wetlands associated with drainageways.

4. Is the subject activity within a watercourse or floodplain?     Yes     No

5. Will the subject activity be within a FEMA floodway?     Yes     No

6. If the project requires a Flood Management Certification for the subject activity, provide the Flood Management Certification Number: n/a

**Part IV: Construction Activity Details (continued)**

7. Disturbance to wetlands, watercourses and flood plains:

Wetlands (acres):

excavation: temp= 0.004 fill: perm= 0.045 total disturbance: 0.049

Floodplain (cubic yards):

excavation: n/a fill: n/a net: n/a

Watercourse (linear feet): n/a

8. Describe the present and intended use(s) of the property at which the subject activity will be conducted and the reason for conducting or maintaining the activity.

**The present and intended use for the project property is as roadway. Bridge No. 00196 currently carries I-95 over Route 1 in Branford, CT. Bridge No. 00196 was originally constructed in 1958. The purpose of this project is to address deficiencies identified in inspection reports. The deck is rated poor and the bridge is in need of rehabilitation/replacement.**

9. Describe all natural and manmade features impacted by the subject activity, including wetlands, watercourses, fish and wildlife habitat, floodplains, and structures and appurtenances thereto, and the impact of the subject activity on such features.

**Please see attached**

Check here if additional sheets are necessary, and label and attach them to this sheet.



Part IV #9 Describe all natural and manmade features impacted by the subject activity, including wetlands, watercourses, fish and wildlife habitat, floodplains, and structures and appurtenances thereto, and the impact of the subject activity on such features.

#### Existing Conditions

*Manmade Features:* The project consists of Bridge No. 00196. The structure is a three-span, simply supported, steel beam bridge, which carries I-95 over US Route 1 in the town of Branford. Bridge No. 00196 was originally constructed in 1958 and rehabilitated in 1990. The bridge is functionally obsolete and deck was rated poor with significant deterioration and areas of map cracking with efflorescence, hollow sounding concrete, and spalls. There are commercial shopping plazas located along Route 1 to the north and south of the structure. There is a ConnDOT commuter lot at the southwest corner, opposite the end of the northbound on/off ramps.

*Natural conditions:* A drainage swale southwest of the bridge near the commuter parking lot was delineated as a wetland as it meets regulatory standards. The source of flows to the channel is stormwater from I-95. A wetland is present beyond the limits of project survey area to the east where an unnamed tributary of the Branford River flows northward under I-95 and is culverted below commercially developed areas north of I-95. Vegetation within this disturbed wetland includes primarily Common Reed (*Phragmites australis*), *Juncus* spp. (rush), and *Carax* spp. (sedges).

#### Proposed Activities

*Subject Activity:* The proposed rehabilitation for Bridge No. 00196 consists of the full superstructure replacement with two Prefabricated Bridge Unit spans supported by a new reinforced concrete pier and the existing abutments. The pier footing will extend beyond the limits of the new center pier to accommodate future widening of I-95. The two existing piers will be removed down to 1 ft. below final grade. The deteriorated concrete in the abutments and wingwalls will be patched and new bridge seats will be installed on the abutments. The embankments in front of both abutments will be permanently cut and supported by new soil nail walls. This will provide the necessary horizontal underclearance to accommodate two through lanes and a left turn lane on US Route 1 in each direction. The Route 1 vertical profile will be lowered to improve the minimum vertical underclearance and existing underground utilities will be relocated as necessary. Five foot wide sidewalks along the west and east side of Route 1 beneath the bridge will be constructed to connect to the existing sidewalks along Route 1 at the north and south project limits. New traffic signals, IMS and under-bridge lighting system will also be installed.

*Proposed Impacts:* Approximately 1965 square feet (0.045 acres) of permanent wetland impacts are anticipated for the construction of a new sidewalk on the western side of US Route 1. Fill is proposed to be added in the drainage swale and graded at a 2:1 slope to support the new sidewalk. There is one catch basin at the southwest corner of the project site which discharges directly into the drainage swale. A depressed area will still be available to collect runoff from the catch basin. Temporary impacts include the areas that will be disturbed when placing the sedimentation and erosion control system for the sidewalk construction work. The project impacts include 162 square feet (0.004 acres) of temporary impacts to wetlands. Project disturbance is minimized by the installation of sedimentation and erosion control barriers and by revegetating disturbed areas following the completion of the project. The project has been designed in conformance with 2002 E&S and 2004 Stormwater Quality Manual. The project also conforms to Form 817; Section 1.10.

## Part V: Supporting Documents

Check the applicable box below for each attachment being submitted with this request. When submitting any supporting documents, please label the documents as indicated in this part (e.g., Attachment A, etc.) and be sure to include the requester's name as indicated on this request. ***In order to file electronically, ALL supporting documents must be submitted in an electronic format on a CD with this original completed application in hard copy.***

- Attachment A: Location Map: A depiction, on an 8.5" x 11" copy of the relevant portion of the most recent version of the United States Geologic Survey topographic map (Scale 1:24,000), of the exact location of the property at which such activity will be conducted.
- Attachment B: Site plan pursuant Section 4(c) (2) (l) of the subject general permit.
- Attachment C: Coastal Consistency Review Form (DEEP-APP-004), if applicable.
- Attachment D: Copy of the completed *Request for NDDDB State Listed Species Review Form* (DEEP-APP-007) and the NDDDB response, if applicable.
- Attachment E: Conservation or Preservation Restriction Information, if applicable.
- Attachment F: A copy of the Category 2 approval letter from the Army Corps of Engineers, or a copy of the Appendix 1A: Category 1 Certification Form filed with the US Army Corps of Engineers, if applicable.
- Attachment G: Drainage Maintenance Plan, Trail Maintenance Plan, Boat Launch Maintenance Plan, or Beach Maintenance Plan for Inland Beaches as defined in Section 2 of the subject general permit, if applicable.
- Attachment H: Other information provided by requester (list): Photos

**Part VI: Requester Certification**

The requester *and* the individual(s) responsible for actually preparing the request must sign this part. A request will be considered incomplete unless all required signatures are provided. If the requester is the preparer, please mark N/A in the spaces provided for the preparer.


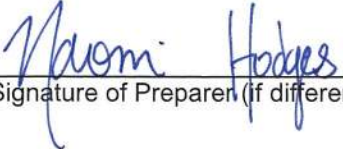
"I have personally examined and am familiar with the information submitted in this document and all attachments thereto, and I certify that based on reasonable investigation, including my inquiry of the individuals responsible for obtaining the information, the submitted information is true, accurate and complete to the best of my knowledge and belief.

I certify that this general permit request for authorization is on complete and accurate forms as prescribed by the commissioner without alteration of the text.

I understand that the subject activity is authorized only on or after the date the commissioner issues a written approval of registration with respect to such activity.

I certify that a complete copy of this request for authorization, including all documents attached thereto, was sent by regular or certified mail or was hand delivered to the municipal wetlands agency, zoning commission, planning commission or combined planning and zoning commission, and conservation commission of each municipality which is or may be affected by the subject activity.

I understand that a false statement in the submitted information may be punishable as a criminal offense, in accordance with section 22a-6 of the General Statutes, pursuant to section 53a-157b of the General Statutes, and in accordance with any other applicable statute."

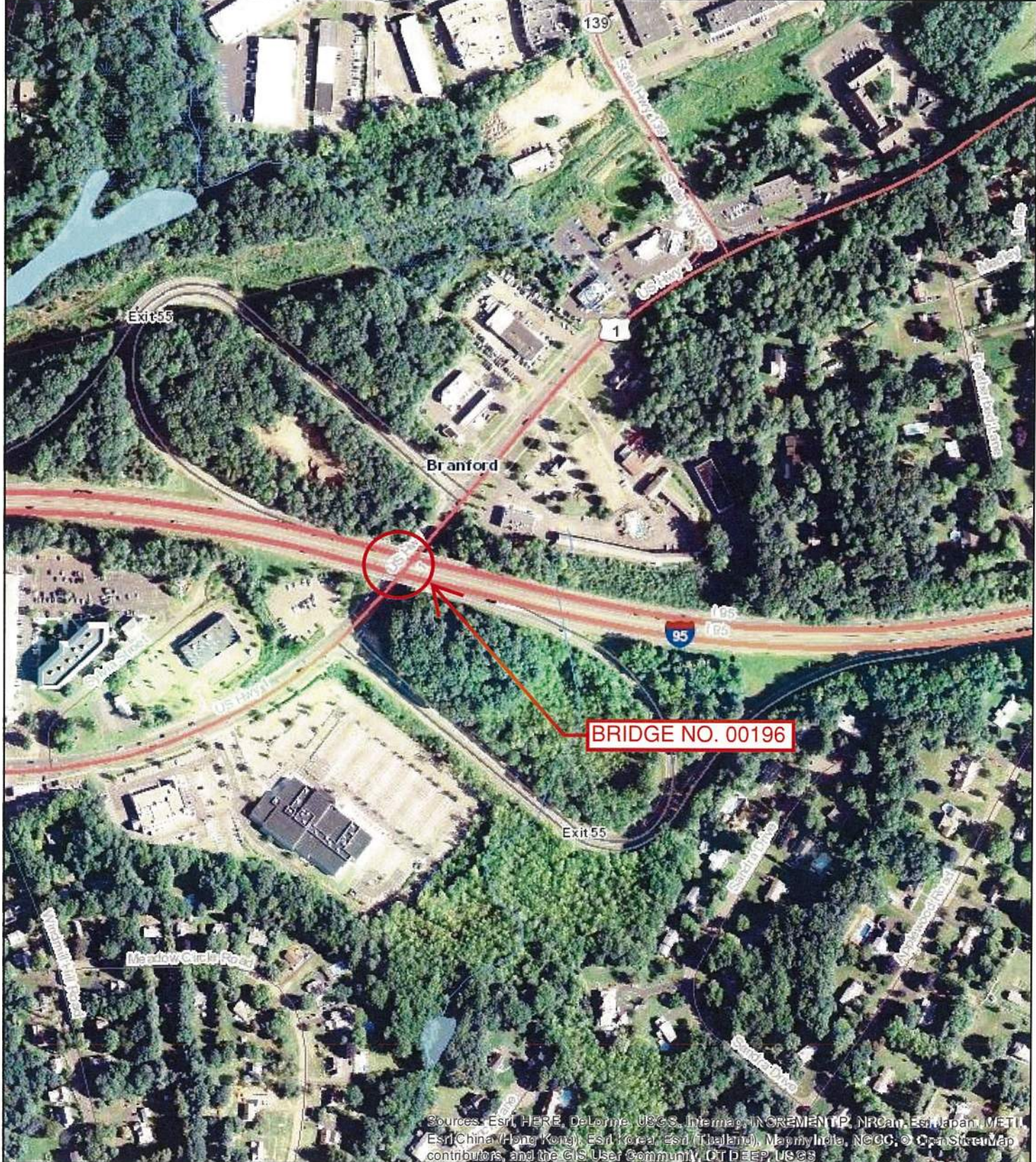
	<u>6-25-2018</u>
Signature of Requester	Date
<b>Thomas J. Maziarz</b>	<b>Bureau Chief, Policy and Planning</b>
Name of Requester (print or type)	Title (if applicable)
	<b>6/15/2018</b>
Signature of Preparer (if different than above)	Date
<b>Naomi Hodges</b>	<b>Environmental Scientist</b>
Name of Preparer (print or type)	Title (if applicable)
<input type="checkbox"/> Check here if additional signatures are required. If so, please reproduce this sheet and attach signed copies to this sheet. You must include signatures of any person preparing any report or parts thereof required in this registration (i.e., professional engineers, surveyors, soil scientists, consultants, etc.)	

Note: Please submit this completed Request for Authorization, Fee, and all Supporting Documents to:

CENTRAL PERMIT PROCESSING UNIT  
 DEPARTMENT OF ENERGY AND ENVIRONMENTAL PROTECTION  
 79 ELM STREET  
 HARTFORD, CT 06106-5127

*You must submit a complete copy of this completed request for authorization, including supporting documents, to the municipal wetlands agency, zoning commission, planning commission or combined planning and zoning commission, and conservation commission of each municipality which is or may be affected by the subject activity.*

Attachment A  
Location Map (1 Sheet)



Sources: Esri, HERE, DeLorme, USGS, Intermap, INCREMENT P, NRCan, Esri Japan, METI, Esri China (Hong Kong), Swisstopo, Esri Korea, Esri (Thailand), MapmyIndia, NCCG, © OpenStreetMap contributors, and the GIS User Community, © DEEP, USGS



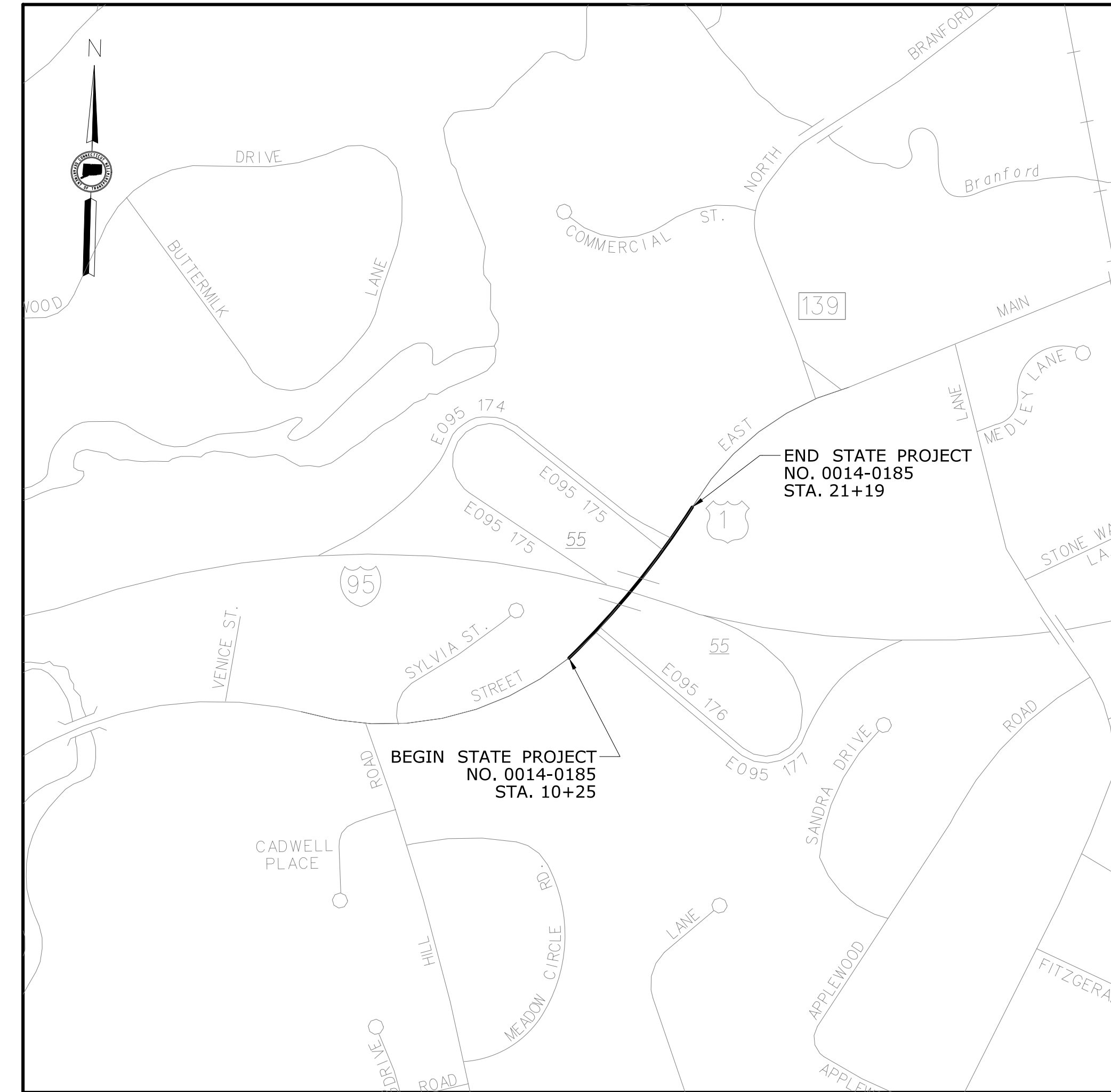
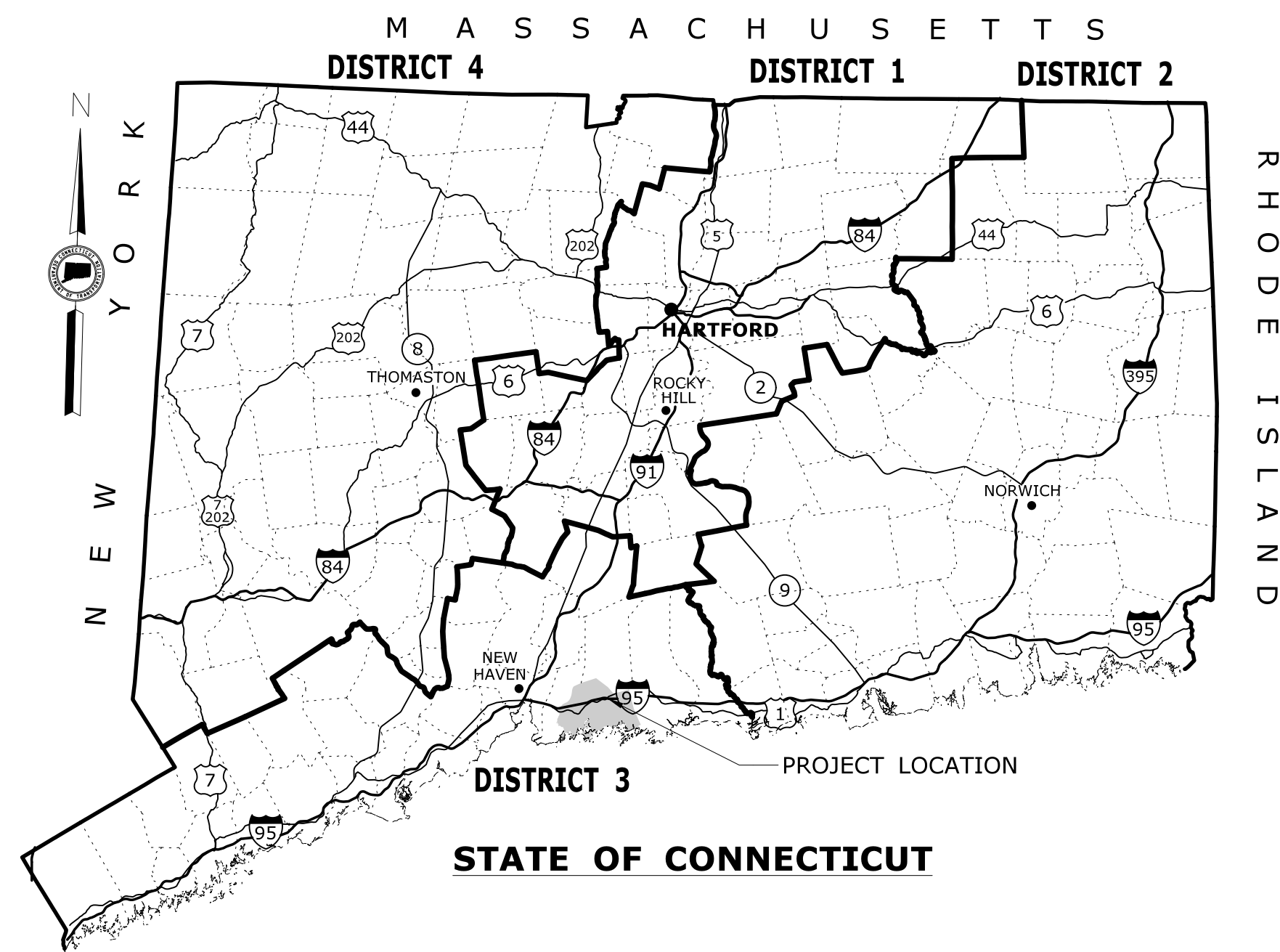
**CTECO AERIAL  
 MAP**  
 BRANFORD,  
 CONNECTICUT

1 INCH = 500 FEET



Attachment B  
Site Plans (4 Sheets)

# ENVIRONMENTAL PERMIT PLANS STATE PROJECT 0014-0185 REHABILITATION OF BRIDGE NO. 00196 INTERSTATE 95 OVER U.S. ROUTE 1 TOWN OF BRANFORD



**LOCATION PLAN**  
NOT TO SCALE

**GENERAL NOTES:**

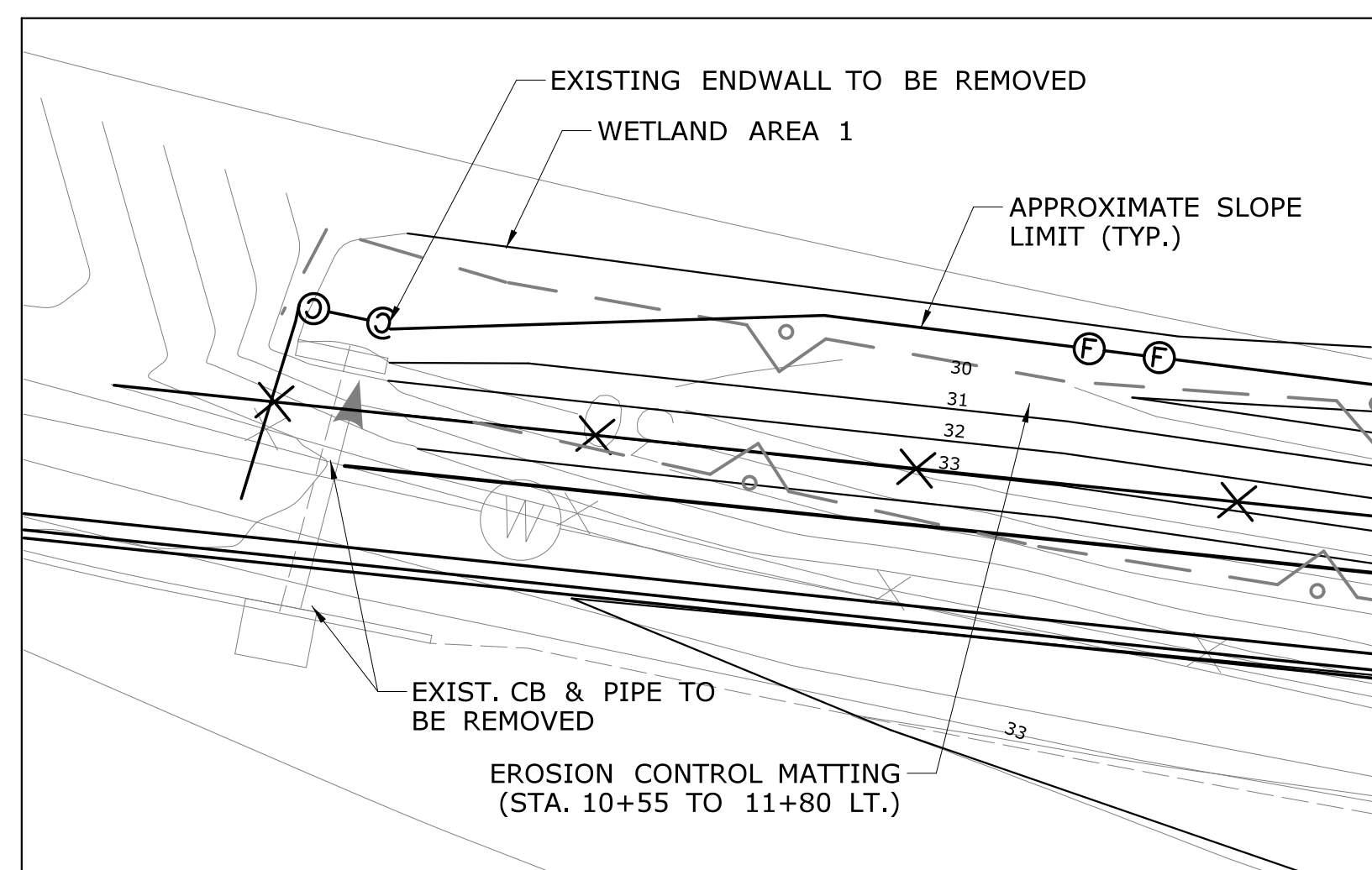
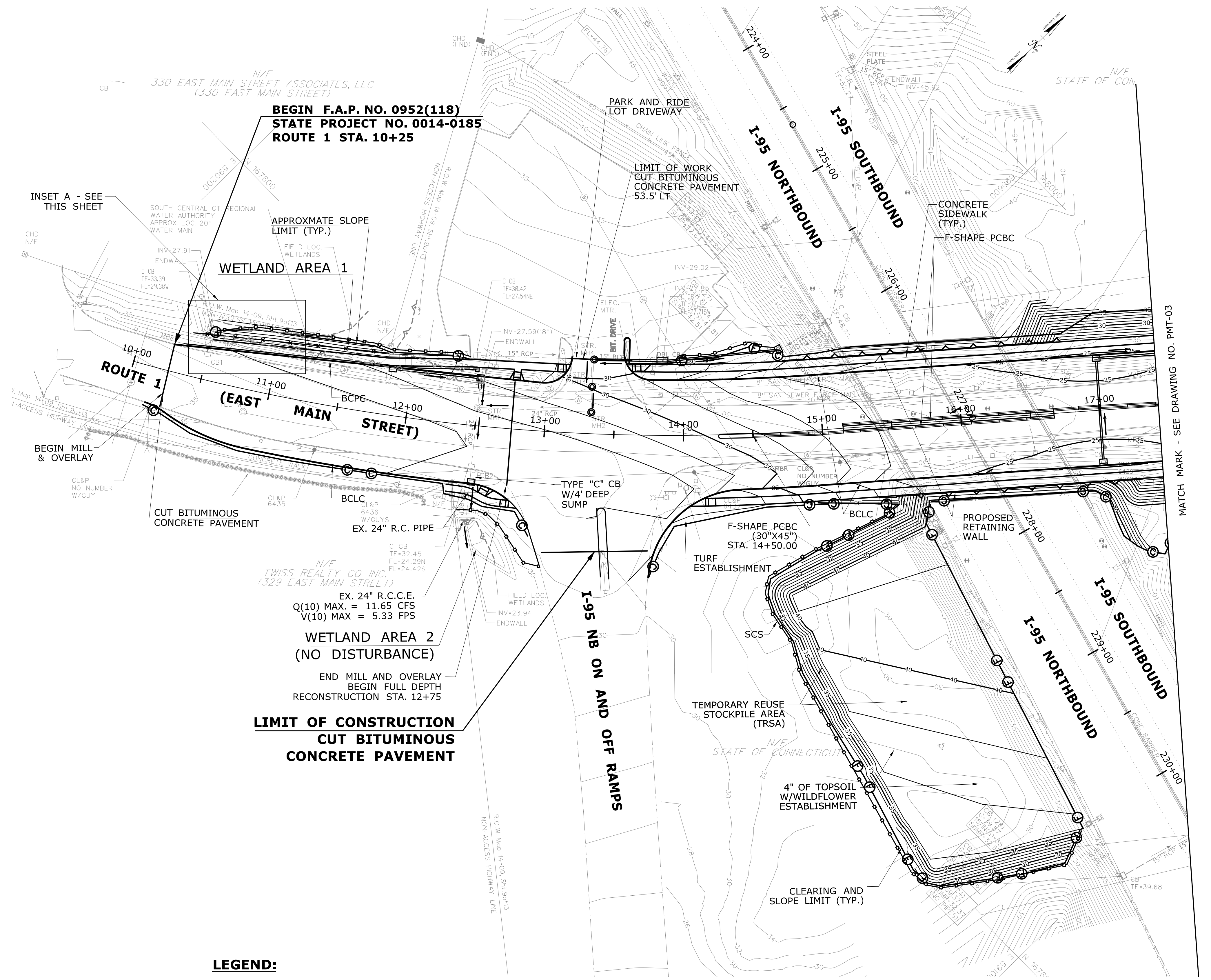
1. THESE PLANS ARE INTENDED FOR ENVIRONMENTAL PERMITTING PURPOSES. THESE PLANS HOLD AUTHORITY FOR ALL ACTIVITIES CONCERNING THE REGULATED AREA. FOR DETAILED PLANIMETRIC INFORMATION AND PAYMENT REFER TO THE APPLICABLE CONTRACT DOCUMENTS.
2. THE DEPARTMENT OF TRANSPORTATION WILL ONLY SUBMIT REVISIONS TO DEEP AND ACOE FOR CHANGES TO THE DESIGN THAT WILL AFFECT REGULATED AREAS.
3. FOR A DESCRIPTION OF THE WATERCOURSES, WETLAND 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 88.
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 BEST MANAGEMENT PRACTICES (BMPSs) AND SEDIMENT 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 & 03	GENERAL SITE PLAN
PMT-04	WETLAND IMPACT PLAN

DESIGNED BY:  
AMMANN & WHITNEY  
2500 WESTCHESTER AVENUE  
SUITE 305  
PURCHASE, NY 10577

**PLAN DATE: JUNE 12, 2018**

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: <b>J. TYROS</b>	 <b>STATE OF CONNECTICUT</b> <b>DEPARTMENT OF TRANSPORTATION</b>	 <b>AMMANN &amp; WHITNEY</b> 2500 WESTCHESTER AVENUE SUITE 305 PURCHASE, NEW YORK	PROJECT TITLE:	TOWN:	PROJECT NO.:			
Plotted Date: 6/13/2018	CHECKED BY: <b>S. SUEHR</b>			SCALE AS NOTED	REHABILITATION OF BRIDGE NO. 00196 - INTERSTATE 95 OVER U.S. ROUTE 1	BRANFORD	14-185		
REV. DATE REVISION DESCRIPTION SHEET NO.				DRAWING TITLE:	SHEET NO.	PMT-01			
				TITLE SHEET	01.01				



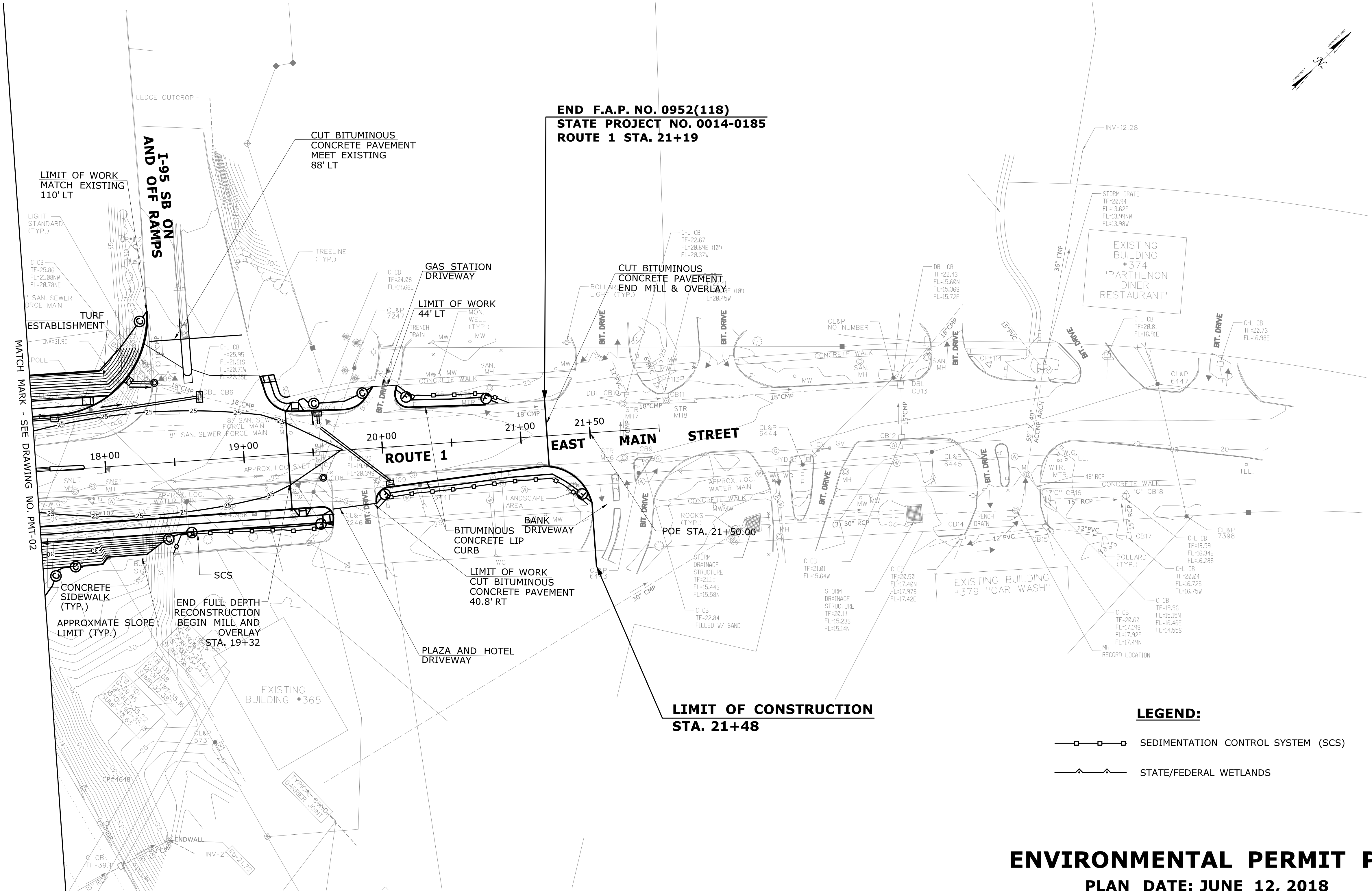
**INSET A**  
SCALE: 1" = 10'

- LEGEND:**
- SEDIMENTATION CONTROL SYSTEM (SCS)
  - - - - - STATE/FEDERAL WETLANDS

**ENVIRONMENTAL PERMIT PLANS**  
PLAN DATE: JUNE 12, 2018

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: O. BELGUET CHECKED BY: S. SUEHR SCALE IN FEET 0 40 80 SCALE 1"=40'	<b>STATE OF CONNECTICUT</b> DEPARTMENT OF TRANSPORTATION File name: ...VHW_MSH_0014_0185_PMT_PLN-01.DGN.dgn	SIGNATURE/BLOCK: <b>AMMANN &amp; WHITNEY</b> 2500 WESTCHESTER AVENUE SUITE 305 PURCHASE, NEW YORK	PROJECT TITLE: <b>REHABILITATION OF BRIDGE NO. 00196 - INTERSTATE 95 OVER U.S. ROUTE 1</b>	TOWN: <b>BRANFORD</b>	PROJECT NO. <b>14-185</b> DRAWING NO. <b>PMT-02</b> SHEET NO. <b>01.02</b>	
REV.	DATE	REVISION DESCRIPTION	SHEET NO.	Plotted Date: 6/13/2018				





**END F.A.P. NO. 0952(118)  
STATE PROJECT NO. 0014-0185  
ROUTE 1 STA. 21+19**

- LEGEND:**
- SEDIMENTATION CONTROL SYSTEM (SCS)
  - ▲— STATE/FEDERAL WETLANDS

**ENVIRONMENTAL PERMIT PLANS**  
**PLAN DATE: JUNE 12, 2018**

REV.	DATE	REVISION DESCRIPTION	SHEET NO.

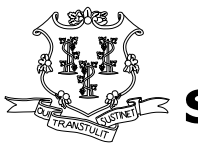
THE INFORMATION, INCLUDING ESTIMATED QUANTITIES OF WORK SHOWN ON THESE SHEETS IS BASED ON LIMITED INVESTIGATIONS BY THE STATE AND IS IN NO WAY WARRANTED TO INDICATE THE CONDITIONS OF ACTUAL QUANTITIES OF WORK WHICH WILL BE REQUIRED.

Plotted Date: 6/13/2018

DESIGNER/DRAFTER:  
**O. BELGUET**

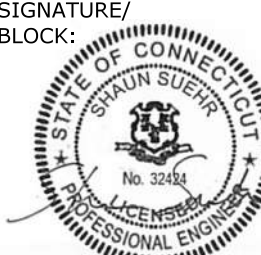
CHECKED BY:  
**S. SUEHR**

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


**STATE OF CONNECTICUT**  
**DEPARTMENT OF TRANSPORTATION**

File name: ...VHW\_MSH\_0014\_0185\_PMT\_PLN-02.DGN.dgn

SIGNATURE/BLOCK:


**AMMANN & WHITNEY**  
 2500 WESTCHESTER AVENUE  
 SUITE 305  
 PURCHASE, NEW YORK

PROJECT TITLE:  
**REHABILITATION OF BRIDGE NO. 00196 - INTERSTATE 95 OVER U.S. ROUTE 1**

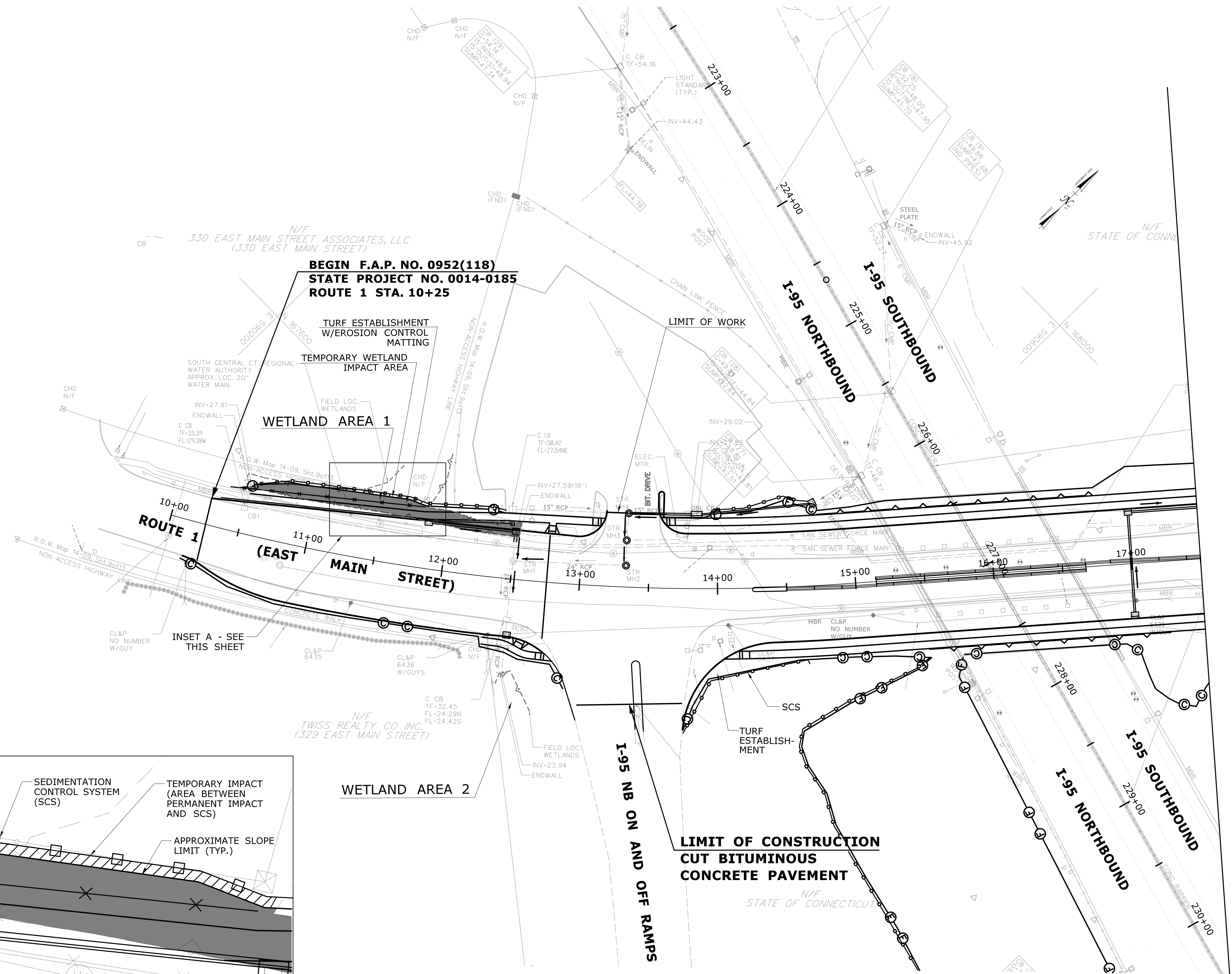
TOWN: **BRANFORD**

DRAWING TITLE:  
**GENERAL SITE PLAN**

PROJECT NO. **14-185**

DRAWING NO. **PMT-03**

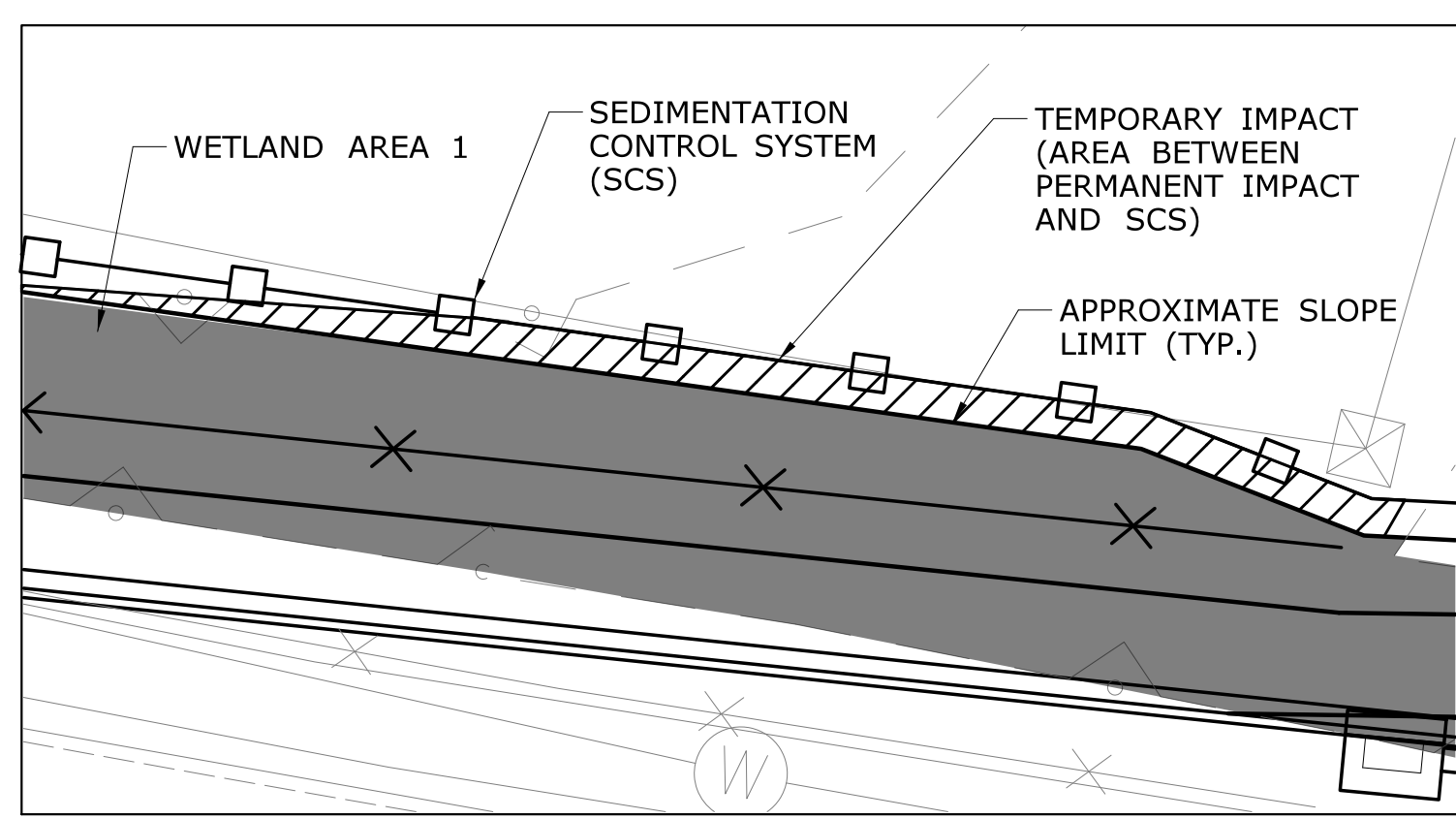
SHEET NO. **01.03**



WETLAND IMPACT TABLE				
AREA #	PERMANENT		TEMPORARY	
	AREA (SF)	AREA (AC)	AREA (SF)	AREA (AC)
1	1965	0.045	162	0.004
2	0	0	0	0
<b>TOTAL</b>	<b>1965</b>	<b>0.045</b>	<b>162</b>	<b>0.004</b>

- NOTE:**
1. THE CONTRACTOR SHALL NOT WORK WITHIN THE LIMITS OF THE WETLANDS AND WATERCOURSES WITH THE EXCEPTION OF THOSE AREAS DELINEATED AS TEMPORARY OR PERMANENT IMPACTS TO THE WETLANDS AND WATERCOURSE. ALL DISTURBED AREAS SHALL BE RESTORED.
  2. WOOD MULCH SHALL NOT BE PLACED IN THE WETLAND AREA.

- LEGEND:**
- THE DEPARTMENT OF TRANSPORTATION WILL ONLY SUBMIT REVISIONS TO THE DEEP FOR CHANGES TO THE DESIGN THAT WILL EFFECT THE NOTED REGULATED AREAS.
- SEDIMENTATION CONTROL SYSTEM (SCS)
  - - - - STATE/FEDERAL WETLANDS
  - PERMANENT IMPACT
  - ▨ TEMPORARY IMPACT



**INSET A**  
SCALE: 1" = 10'

**ENVIRONMENTAL PERMIT PLANS**  
PLAN DATE: JUNE 12, 2018

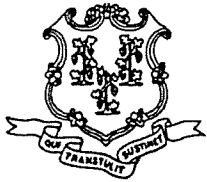
REV. DATE REVISION DESCRIPTION SHEET NO. Plotted Date: 6/14/2018	DESIGNER/DRAFTER: <b>O. BELGUET</b>	<b>STATE OF CONNECTICUT</b> DEPARTMENT OF TRANSPORTATION	SIGNATURE/BLOCK: <b>AMMANN &amp; WHITNEY</b> 2500 WESTCHESTER AVENUE SUITE 305 PURCHASE, NEW YORK	PROJECT TITLE: <b>REHABILITATION OF BRIDGE NO. 00196 - INTERSTATE 95 OVER U.S. ROUTE 1</b>	TOWN: <b>BRANFORD</b>	PROJECT NO. <b>14-185</b>
	CHECKED BY: <b>S. SUEHR</b>				SCALE IN FEET SCALE 1"=40'	DRAWING TITLE: <b>WETLAND IMPACT PLAN</b>

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.

FILENAME: ...VHW\_MSH\_0014\_0185\_PMT\_PLN-03.DGN

**Attachment F**

Army Corps of Engineers Self-Verification Certification Application (7 Sheets)



STATE OF CONNECTICUT  
DEPARTMENT OF TRANSPORTATION



2800 BERLIN TURNPIKE, P.O. BOX 317546  
NEWINGTON, CONNECTICUT 06131-7546  
Phone: (860) 594-2931

June 25, 2018

Ms. Susan Lee  
U.S. Army Corps of Engineers  
New England District  
696 Virginia Road  
Concord, MA 01742-2751

Subject: **State Project No. 14-185**  
Bridge No. 00196  
Interstate 95 over US Route 1  
Town of Branford

Dear Ms. Lee:

Enclosed please find one copy of the USACE Appendix E: Self-Verification Notification Form for GP 19 with attachments for your files. A copy has also been submitted to the Connecticut Department of Energy and Environmental Protection. The project has been submitted to the United States Fish & Wildlife Service by DOT's Office of Environmental Planning under the Final 4(d) Rule using the Northern Long-Eared Bat 4(d) Rule Streamlined Consultation Form on behalf of FHWA. Any questions pertaining to this application may be directed to Mr. Andrew H. Davis, Transportation Supervising Planner of my staff, at 860-594-2157.

Very truly yours,

A handwritten signature in cursive script that reads "Kimberly C. Lesay".

Kimberly C. Lesay  
Transportation Assistant Planning Director  
Bureau of Policy and Planning

Attachments

cc: Nathan Margason – USEPA



**US Army Corps  
of Engineers**<sup>®</sup>  
New England District

**Appendix E: Self-Verification Notification Form**

This form is required for all **non-tidal projects in Connecticut**, but **not** required if work is done within boundaries of Mashantucket Pequot or Mohegan Tribal Lands. **Before** work commences, complete **all** fields (write “none” if applicable); attach project plans (not required for projects involving the installation of construction mats only); and any state or local approval(s); and send to:

Permits & Enforcement Branch B		CT DEEP
U.S. Army Corps of Engineers		Inland Water Resources Division
696 Virginia Road	<i>and</i>	79 Elm Street
Concord, MA 01742-2751		Hartford, CT 06106-5127
<i>or cenac-r@usace.army.mil</i>		

\*\*\*\*\*

State or local Permit Number: TBD  
 Date of State or local Permit: TBD  
 State/local Project Manager: TBD

Permittee: Connecticut Department of Transportation  
 Address, City, State & Zip: 2800 Berlin Tpk. Newington, CT 06131  
 Phone(s) and Email: (860) 594-2931 Kimberly.Lesay@ct.gov

Contractor: To be determined by Low Bid process  
 Address, City, State & Zip: n/a  
 Phone(s) and Email: n/a

Consultant/Engineer/Designer: CME Associates, Inc.  
 Address, City, State & Zip: 101 East River Drive, 1st Floor East Hartford, CT 06108  
 Phone(s) and Email: (860) 290-4100

Wetland/Soil Scientist Consultant: Richard Canavan  
 Address, City, State & Zip: 101 East River Drive, 1st Floor East Hartford, CT 06108  
 Phone(s) and Email: (860) 290-4100

Project Location (provide detailed description & locus map): Interstate 95 over US Route 1 in Branford, Connecticut. Project location map is attached.  
 Address, City, State & Zip: I-95 Branford, CT 06405  
 Latitude/Longitude Coordinates: 41.294074, -72.783417  
 Waterway Name: n/a

Project Purpose (include all aspects of the project including those not within Corps jurisdiction): The purpose of this project is to address items identified in inspection. The deck is rated poor. Large spalls with exposed rebar, map & transverse cracking requiring replacement.  
 Work Description: The project involves the full superstructure replacement of the Bridge No. 00196, construction of a new center pier, and lowering and widening of US Route 1 beneath the bridge. The project also involves minor wetland impacts for the extension of the Route 1 pedestrian sidewalks.

**Work will be done under the following GP(s)** (check all that have associated impacts):

\_\_\_\_\_ **GP. 2 - Repair or maintenance of authorized or grandfathered structures/fills**  
Area of total wetland impacts: temporary \_\_\_\_\_ SF permanent \_\_\_\_\_ SF  
Area of total waterway impacts: temporary \_\_\_\_\_ SF permanent \_\_\_\_\_ SF

\_\_\_\_\_ **GP. 5 - Boat ramps/marine railways**  
Area of total wetland impacts: temporary \_\_\_\_\_ SF permanent \_\_\_\_\_ SF  
Area of total waterway impacts: temporary \_\_\_\_\_ SF permanent \_\_\_\_\_ SF

\_\_\_\_\_ **GP. 6 - Utility line activities (include calculations for each single & complete crossing – attach additional sheet if necessary)**  
Area of total wetland impacts: temporary \_\_\_\_\_ SF permanent \_\_\_\_\_ SF  
Area of total waterway impacts: temporary \_\_\_\_\_ SF permanent \_\_\_\_\_ SF

\_\_\_\_\_ **GP. 9 - Shoreline and bank stabilization projects**  
Area of total wetland impacts: temporary \_\_\_\_\_ SF permanent \_\_\_\_\_ SF  
Area of total waterway impacts: temporary \_\_\_\_\_ SF permanent \_\_\_\_\_ SF

\_\_\_\_\_ **GP. 10 - Aquatic habitat restoration, establishment and enhancement activities**  
Area of total wetland impacts: temporary \_\_\_\_\_ SF permanent \_\_\_\_\_ SF  
Area of total waterway impacts: temporary \_\_\_\_\_ SF permanent \_\_\_\_\_ SF

\_\_\_\_\_ **GP. 11 - Fish & wildlife harvesting, enhancement and attraction devices and activities**  
Area of total wetland impacts: temporary \_\_\_\_\_ SF permanent \_\_\_\_\_ SF  
Area of total waterway impacts: temporary \_\_\_\_\_ SF permanent \_\_\_\_\_ SF

\_\_\_\_\_ **GP. 12 - Oil Spill and Hazardous material cleanup**  
Area of total wetland impacts: temporary \_\_\_\_\_ SF permanent \_\_\_\_\_ SF  
Area of total waterway impacts: temporary \_\_\_\_\_ SF permanent \_\_\_\_\_ SF

\_\_\_\_\_ **GP. 13 - Cleanup of hazardous and toxic waste**  
Area of total wetland impacts: temporary \_\_\_\_\_ SF permanent \_\_\_\_\_ SF  
Area of total waterway impacts: temporary \_\_\_\_\_ SF permanent \_\_\_\_\_ SF

\_\_\_\_\_ **GP. 14 - Scientific measurements devices**  
Area of total wetland impacts: temporary \_\_\_\_\_ SF permanent \_\_\_\_\_ SF  
Area of total waterway impacts: temporary \_\_\_\_\_ SF permanent \_\_\_\_\_ SF

\_\_\_\_\_ **GP. 15 - Survey activities**  
Area of total wetland impacts: temporary \_\_\_\_\_ SF permanent \_\_\_\_\_ SF  
Area of total waterway impacts: temporary \_\_\_\_\_ SF permanent \_\_\_\_\_ SF

\_\_\_\_\_ **GP. 17 - New/expanded developments & recreational facilities**  
Area of total wetland impacts: temporary \_\_\_\_\_ SF permanent \_\_\_\_\_ SF  
Area of total waterway impacts: temporary \_\_\_\_\_ SF permanent \_\_\_\_\_ SF

X  **GP. 18 - Linear transportation projects- wetland crossings only (include calculations for each single & complete crossing - attach additional sheet if necessary)**

Area of total wetland impacts: temporary  162  SF permanent  1965  SF  
Area of total waterway impacts: temporary  0  SF permanent  0  SF

**GP. 19 - Stream, river & brook crossings – not including wetland crossings (include calculations for each single & complete crossing – attach additional sheet if necessary)**

Area of total wetland impacts: temporary   SF permanent   SF  
Area of total waterway impacts: temporary   SF permanent   SF

**GP. 21 - Temporary fill not associated with any other GP activities**

Area of total wetland impacts: temporary   SF permanent   SF  
Area of total waterway impacts: temporary   SF permanent   SF

**Does your project include any secondary effects?** Yes   No  X

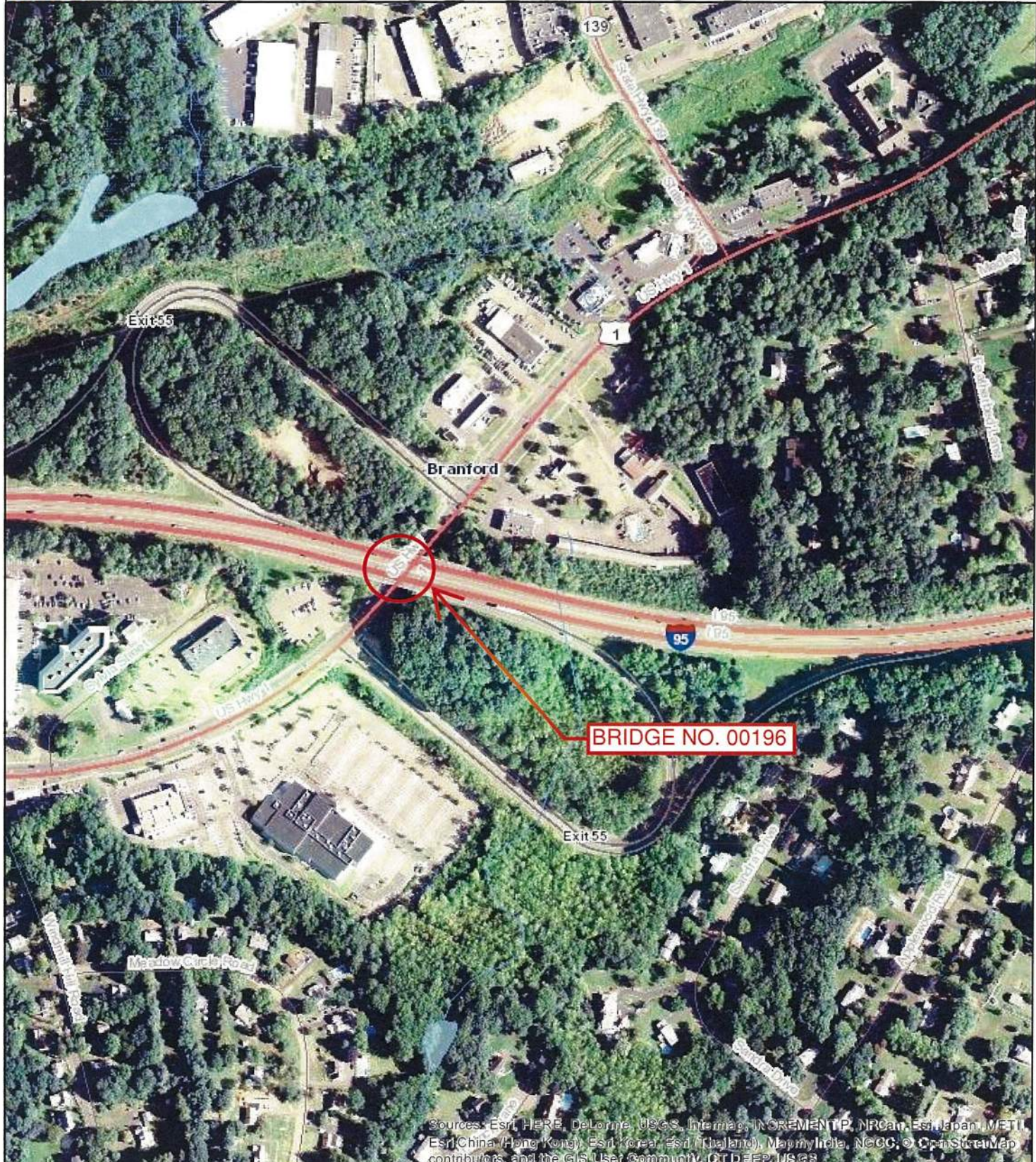
(Secondary effects include, but are not limited to non-tidal waters or wetlands drained, flooded, fragmented, or mechanically cleared resulting from a single and complete project. See Appendix F - Definitions.) If YES, describe here:

**Proposed Work Dates:** Start:  Spring 2019  Finish:  Fall 2020

**Your name/signature below, as permittee, confirms that your project meets the self-verification criteria and that you accept and agree to comply with the applicable terms and conditions in the Connecticut General Permits.**

Thomas J. Maguire   
Signature of Permittee

6-25-2018   
Date



Sources: Esri, HERE, DeLorme, USGS, Intermap, INCREMENTIP, NRCAn, Esri Japan, METI, Esri China (Hong Kong), Esri Korea, Esri (Thailand), MapmyIndia, NCCO, © OpenStreetMap contributors, and the GIS User Community, CT DEEP, USGS



**CTECO AERIAL  
 MAP**  
 BRANFORD,  
 CONNECTICUT

1 INCH = 500 FEET







# STATE OF CONNECTICUT

## DEPARTMENT OF TRANSPORTATION

2800 BERLIN TURNPIKE, P.O. BOX 317546  
NEWINGTON, CONNECTICUT 06131-7546



### Determination of Exemption for Historic Properties

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**Author:** Mark McMillan **Date:** December 17, 2013

---

**Project:** State No.: 14-TBD1 (170-3250 PE)  
F.A.P. No.: TBD  
Project Title: Rehabilitation of Bridge #00196  
Bridges: I-95 over U.S. Route 1  
Town: Branford

---

**Category of Exemption:** Appendix B "*Screened Undertakings...*"

---

#### *Project Description*

The project proposes to use federal and state funds to perform a rehabilitation of Bridge #00196, which carries I-95 over U.S. Route 1 in Branford (Image 1). Recent inspections by CTDOT's Bridge Safety and Evaluation Unit have identified deterioration of the bridge deck and substructure that require attention. These deficiencies have resulted in Bridge #00196 being placed on the State Bridge Program for structures requiring major rehabilitation or replacement. The project is currently in its concept phase and a Rehabilitation Study Report (RSR) is being prepared. Full replacement of the existing bridge with a single span structure is recommended, but other rehabilitation strategies such as patching or superstructure replacement are also being considered. Final design is scheduled for 2016.

#### *Technical Review of Project*

Bridge #00196 was built in 1958 as part of Interstate 95. It has not undergone any significant alterations since its original construction. The bridge is composed of three spans of steel beam/stringer superstructure that supports a cast-in-place concrete deck. The substructure is comprised of reinforced concrete piers (Image 2). The statewide bridge inventory database maintained by CTDOT categorizes the bridge as Not Eligible for the National Register of Historic Places. As part of the Dwight D. Eisenhower National System of Interstate and Defense Highways, it exempted from Section 106 review.<sup>1</sup>

---

<sup>1</sup> Advisory Council on Historic Preservation, *Exemption Regarding Historic Preservation Review Process for Effects to the Interstate Highway System*, Federal Register, Vol. 70, No. 45, (3/10/2005).

Qualified staff from the Office of Environmental Planning (OEP) has screened this project to identify historic resources within the area of potential effect that may be impacted by this undertaking. The bridge is situated between two large circular off-ramps from I-95. Beyond this area is a development characterized by large commercial “big box” stores, a commuter parking lot, gas stations, and restaurants. The majority of the buildings were constructed after I-95 opened in 1958. None of the structures – individually or collectively – are eligible for the National Register.

The nearest resources listed on the National Register are various houses that are individually properties.<sup>2</sup> All of these are over a half-mile south of the bridge and separated from the project area by the aforementioned commercial developments as well as mid-20<sup>th</sup> century residential neighborhoods. None of these properties will be foreseeably affected by the proposed work.

The sediments surrounding the bridge are composed of Udorthents-Urban Land Complex. Based on predictive models, these types of soils have a low potential for containing any intact archaeological resources. The nearest known archaeological sites are over one-quarter mile outside the project’s area of potential effect. The extent of previous disturbance caused by the construction of I-95 and its associated off-ramps leaves little to no possibility of impacting intact archaeological resources that would be eligible for the National Register.

*Determination*

The subject bridge is categorized as *Not Eligible for the National Register of Historic Places* in CTDOT’s statewide bridge inventory database. Upon examination of the bridge, OEP found no information that would contradict this determination. As an element of the Interstate Highway System, work on this bridge is exempt from Section 106 review under the ACHP Exemption and under Appendix B “*Screened Undertakings Not Requiring Connecticut CTSHPO Review*” of the Section 106 Programmatic Agreement. The undertaking fits the criteria of both “Interstate Related Projects” and “Bridge/Culvert Related Projects”. No further consultation with the SHPO is necessary. A copy of this finding will be included in the quarterly report of Minor Transportation Projects that is submitted to the SHPO.



Mark McMillan  
National Register Specialist  
Office of Environmental Planning  
Connecticut Department of Transportation

---

<sup>2</sup> Solomon Tyler House (NRIS #88002636); John Tyler House (NRIS #88002635); Zaccheus Baldwin House (NRIS #8802631); Timothy Baldwin House (NRIS #8802633) and 161 Damascus Road (NRIS #88002632).

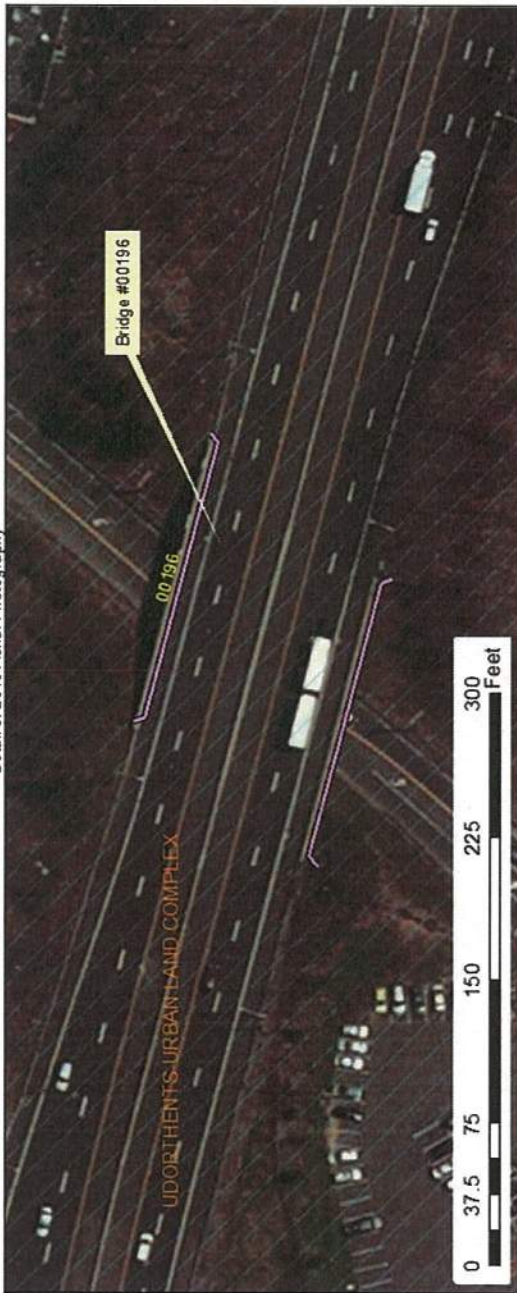


Image 1: Bridge #00196. Image courtesy of Bing Maps.

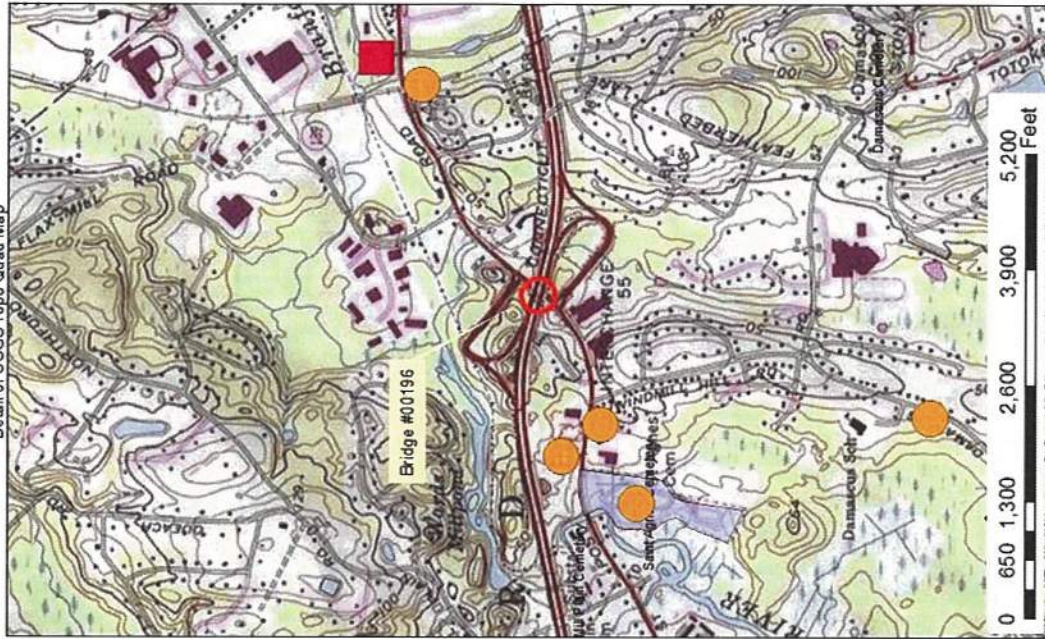


Image 2: Underside of deck and substructure of Bridge #00196, viewed from East Main Street. Note the concrete deterioration and exposed reinforcing bars of the deck (red arrows).

Detail of 2010 Aerial Photography



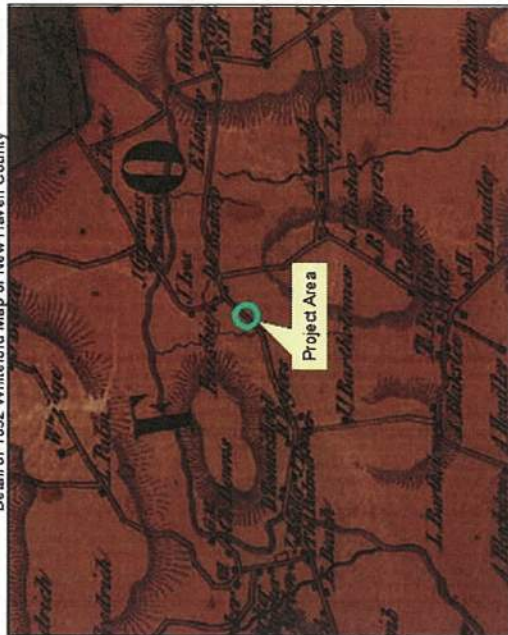
Detail of USGS Topo Quad Map



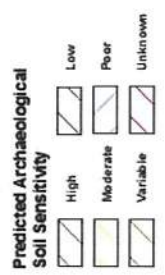
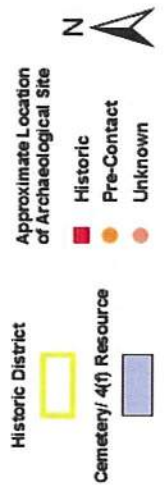
Detail of 1811 Warren Map of Connecticut with 1930 Griswold Overlay



Detail of 1852 Whiteford Map of New Haven County



December 2, 2013



State Project No. 14-TBD1, 170-3250 PE  
 F.I.D.#: TBD  
 Rehabilitation of Bridge #00196  
 I-95 over Route 1  
 Branford

Office of Environmental Planning  
 Environmental Review - Historical and  
 Archaeological Resources  
 This product was created using TeleAtlas Information  
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## **Salter, Michael J**

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**From:** michelle.herrell@dot.gov  
**Sent:** Thursday, January 02, 2014 8:36 AM  
**To:** McMillan, Mark J.  
**Cc:** Eloise.Powell@dot.gov  
**Subject:** NO Tribal Consultation Required FAPN TBD/SPN 0014-TBD1, Bridge Rehabilitation # 00196, I-95 over US 1, Branford

Hi Mark,

I have carefully reviewed the CTDOT's proposed project which involves the rehabilitation or replacement of Bridge #00196 that carries I-95 over US Route 1 in Branford. The bridge has deterioration to the bridge deck and substructure, and has been placed on the CT Bridge Program for structures requiring major rehabilitation or replacement. The existing bridge would either be rehabilitated through patching or superstructure replacement, or the existing bridge would be replaced. As discussed in your letter dated December 17, 2013, the soil types surrounding the bridge have a low potential for containing any intact archaeological resources, and due to the extent of the previous disturbance from the construction of I-95 and associated ramps, there is little to no possibility for impacting intact archaeological resources that would be eligible for the National Register of Historic Places with this project. Since the project is located on I-95, it is typically exempt from Section 106 Review due to the ACHP exemption of being an interstate-related project. In addition, the project also meets the criteria of a "Bridge/Culvert Related Project" found in Appendix B "Screened Undertakings Not Requiring Connecticut SHPO Review" of the Section 106 Programmatic Agreement.

As per the THPO Section 106 Agreements with FHWA-CT Division, dated January 4, 2012 and May 14, 2013, this project would generally fall within the category of "resurfacing or repair of existing ramps within the previously disturbed right-of-way", with no historic properties affected.

With this email, and taking all these items into consideration, the FHWA-CT Division has determined that tribal consultation would not be required for this project.

Michelle Herrell  
Environmental Protection Specialist

Federal Highway Administration | Connecticut Division Office  
628-2 Hebron Avenue, Suite 303 | Glastonbury, CT 06033  
P: (860) 494-7577 | F: (860) 659-6724  
[michelle.herrell@dot.gov](mailto:michelle.herrell@dot.gov)

## Northern Long-Eared Bat 4(d) Rule Streamlined Consultation Form

Federal agencies should use this form for the optional streamlined consultation framework for the northern long-eared bat (NLEB). This framework allows federal agencies to rely upon the U.S. Fish and Wildlife Service's (USFWS) January 5, 2016, intra-Service Programmatic Biological Opinion (BO) on the final 4(d) rule for the NLEB for section 7(a)(2) compliance by: (1) notifying the USFWS that an action agency will use the streamlined framework; (2) describing the project with sufficient detail to support the required determination; and (3) enabling the USFWS to track effects and determine if reinitiation of consultation is required per 50 CFR 402.16.

This form is not necessary if an agency determines that a proposed action will have no effect to the NLEB or if the USFWS has concurred in writing with an agency's determination that a proposed action may affect, but is not likely to adversely affect the NLEB (i.e., the standard informal consultation process). Actions that may cause prohibited incidental take require separate formal consultation. Providing this information does not address section 7(a)(2) compliance for any other listed species.

<b>Information to Determine 4(d) Rule Compliance:</b>	<b>YES</b>	<b>NO</b>
1. Does the project occur wholly outside of the WNS Zone <sup>1</sup> ?	<input type="checkbox"/>	<input checked="" type="checkbox"/>
2. Have you contacted the appropriate agency <sup>2</sup> to determine if your project is near known hibernacula or maternity roost trees?	<input checked="" type="checkbox"/>	<input type="checkbox"/>
3. Could the project disturb hibernating NLEBs in a known hibernaculum?	<input type="checkbox"/>	<input checked="" type="checkbox"/>
4. Could the project alter the entrance or interior environment of a known hibernaculum?	<input type="checkbox"/>	<input checked="" type="checkbox"/>
5. Does the project remove any trees within 0.25 miles of a known hibernaculum at any time of year?	<input type="checkbox"/>	<input checked="" type="checkbox"/>
6. Would the project cut or destroy known occupied maternity roost trees, or any other trees within a 150-foot radius from the maternity roost tree from June 1 through July 31.	<input type="checkbox"/>	<input checked="" type="checkbox"/>

You are eligible to use this form if you have answered yes to question #1 **or** yes to question #2 **and** no to questions 3, 4, 5 and 6. The remainder of the form will be used by the USFWS to track our assumptions in the BO.

**Agency:** FHWA – Connecticut Division

**Applicant<sup>3</sup>** (Name, Email, Phone No.):  
 Connecticut Department of Transportation  
 Amanda M. Saul, Office of Environmental Planning  
[DOT.NLEB@ct.gov](mailto:DOT.NLEB@ct.gov), (860)594-2939

**Project Name:** CTDOT0014-0185

**Project Location** (include coordinates if known): I-95 over Route 1, Town of Branford: 41.2951, -72.7833

**Basic Project Description** (provide narrative below or attach additional information):

Full superstructure replacement of Bridge 00196 with associated widening, I-95 over Route 1 in the Town of Branford.

<sup>1</sup> <http://www.fws.gov/midwest/endangered/mammals/nleb/pdf/WNSZone.pdf>

<sup>2</sup> See <http://www.fws.gov/midwest/endangered/mammals/nleb/nhisites.html>

<sup>3</sup> If applicable - only needed for federal actions with applicants (e.g., for a permit, etc.) who are party to the consultation.

<b>General Project Information</b>	<b>YES</b>	<b>NO</b>
Does the project occur within 0.25 miles of a known hibernaculum?	<input type="checkbox"/>	<input checked="" type="checkbox"/>
Does the project occur within 150 feet of a known maternity roost tree?	<input type="checkbox"/>	<input checked="" type="checkbox"/>
Does the project include forest conversion <sup>4</sup> ? (if yes, report acreage below)	<input type="checkbox"/>	<input checked="" type="checkbox"/>
Estimated total acres of forest conversion	0.19	
If known, estimated acres <sup>5</sup> of forest conversion from April 1 to October 31		
If known, estimated acres of forest conversion from June 1 to July 31 <sup>6</sup>		
Does the project include timber harvest? (if yes, report acreage below)	<input type="checkbox"/>	<input checked="" type="checkbox"/>
Estimated total acres of timber harvest		
If known, estimated acres of timber harvest from April 1 to October 31		
If known, estimated acres of timber harvest from June 1 to July 31		
Does the project include prescribed fire? (if yes, report acreage below)	<input type="checkbox"/>	<input checked="" type="checkbox"/>
Estimated total acres of prescribed fire		
If known, estimated acres of prescribed fire from April 1 to October 31		
If known, estimated acres of prescribed fire from June 1 to July 31		
Does the project install new wind turbines? (if yes, report capacity in MW below)	<input type="checkbox"/>	<input checked="" type="checkbox"/>
Estimated wind capacity (MW)		

Agency Determination:

By signing this form, the action agency determines that this project may affect the NLEB, but that any resulting incidental take of the NLEB is not prohibited by the final 4(d) rule.

If the USFWS does not respond within 30 days from submittal of this form, the action agency may presume that its determination is informed by the best available information and that its project responsibilities under 7(a)(2) with respect to the NLEB are fulfilled through the USFWS January 5, 2016, Programmatic BO. The action agency will update this determination annually for multi-year activities.

The action agency understands that the USFWS presumes that all activities are implemented as described herein. The action agency will promptly report any departures from the described activities to the appropriate USFWS Field Office. The action agency will provide the appropriate USFWS Field Office with the results of any surveys conducted for the NLEB. Involved parties will promptly notify the appropriate USFWS Field Office upon finding a dead, injured, or sick NLEB.

Digitally signed by Amanda M. Saul  
 DN: cn=Amanda M. Saul, o=Connecticut  
 Department of Transportation, ou=Office of  
 Environmental Planning,  
 email=amanda.saul@ct.gov, c=US  
 Date: 2D18.D3.D9 1D:05:13 -05'DD'

**Amanda M. Saul**

Signature: \_\_\_\_\_

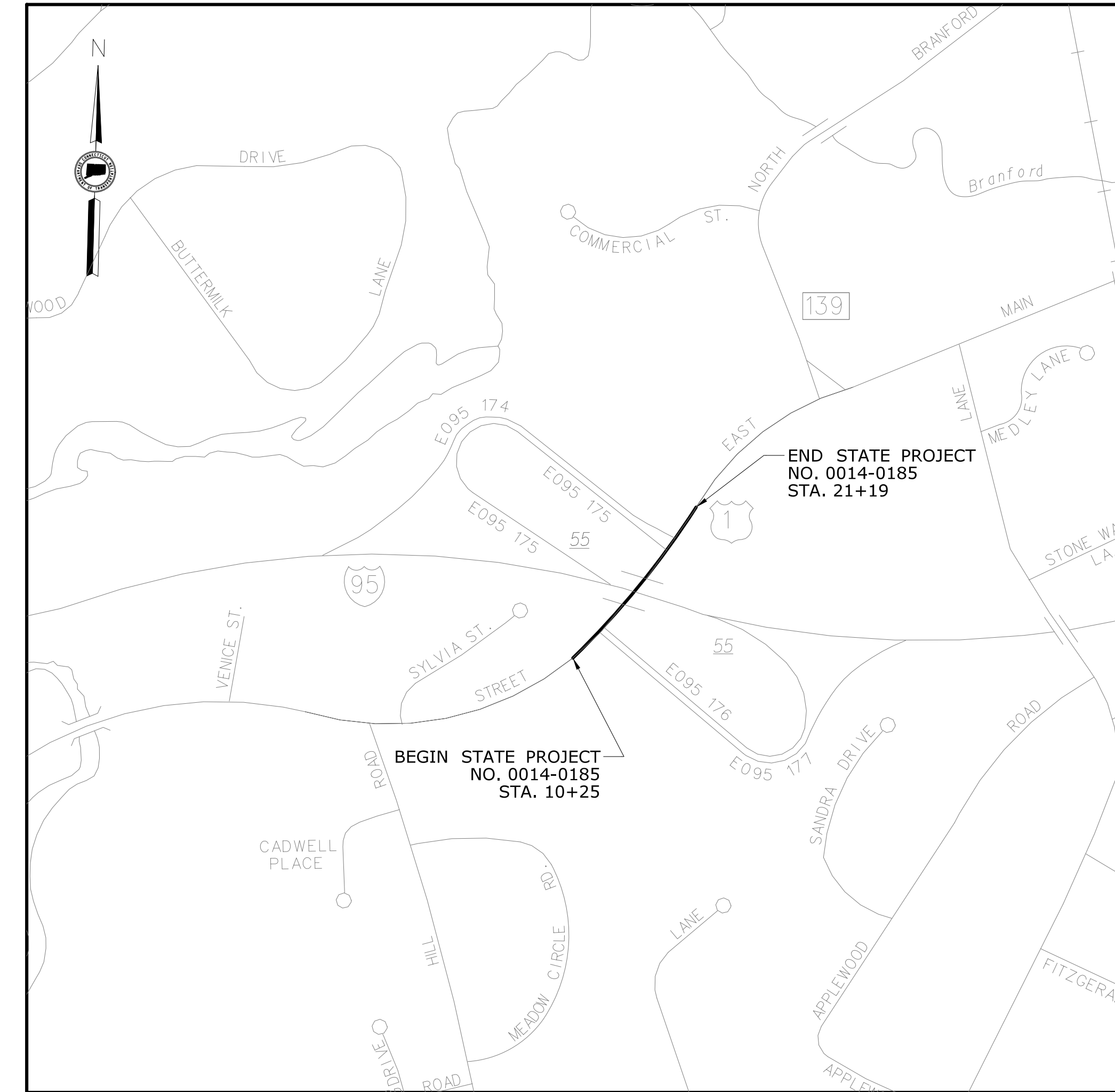
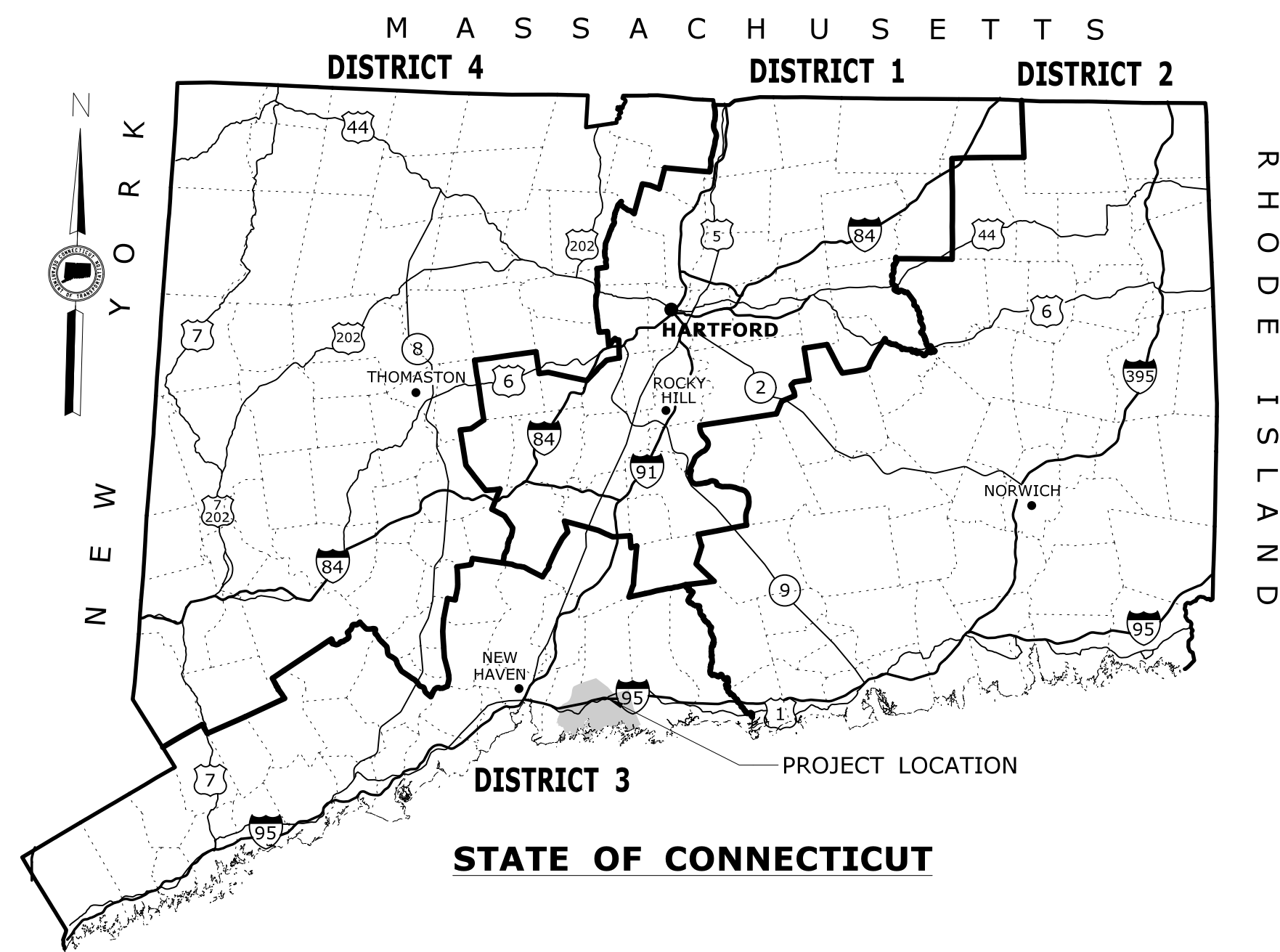
Date Submitted: 3/9/2018

<sup>4</sup> Any activity that temporarily or permanently removes suitable forested habitat, including, but not limited to, tree removal from development, energy production and transmission, mining, agriculture, etc. (see page 48 of the BO).

<sup>5</sup> If the project removes less than 10 trees and the acreage is unknown, report the acreage as less than 0.1 acre.

<sup>6</sup> If the activity includes tree clearing in June and July, also include those acreage in April to October.

# ENVIRONMENTAL PERMIT PLANS STATE PROJECT 0014-0185 REHABILITATION OF BRIDGE NO. 00196 INTERSTATE 95 OVER U.S. ROUTE 1 TOWN OF BRANFORD



**LOCATION PLAN**  
NOT TO SCALE

**GENERAL NOTES:**

1. THESE PLANS ARE INTENDED 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 ACOE FOR CHANGES TO THE DESIGN THAT WILL AFFECT REGULATED AREAS.
3. FOR A DESCRIPTION OF THE WATERCOURSES, WETLAND 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 88.
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 BEST MANAGEMENT PRACTICES (BMPSs) AND SEDIMENT AND EROSION CONTROL MEASURES IN ACCORDANCE WITH THE 2002 EROSION & SEDIMENTATION CONTROL GUIDELINES AND THE 2004 STORMWATER QUALITY MANUAL.

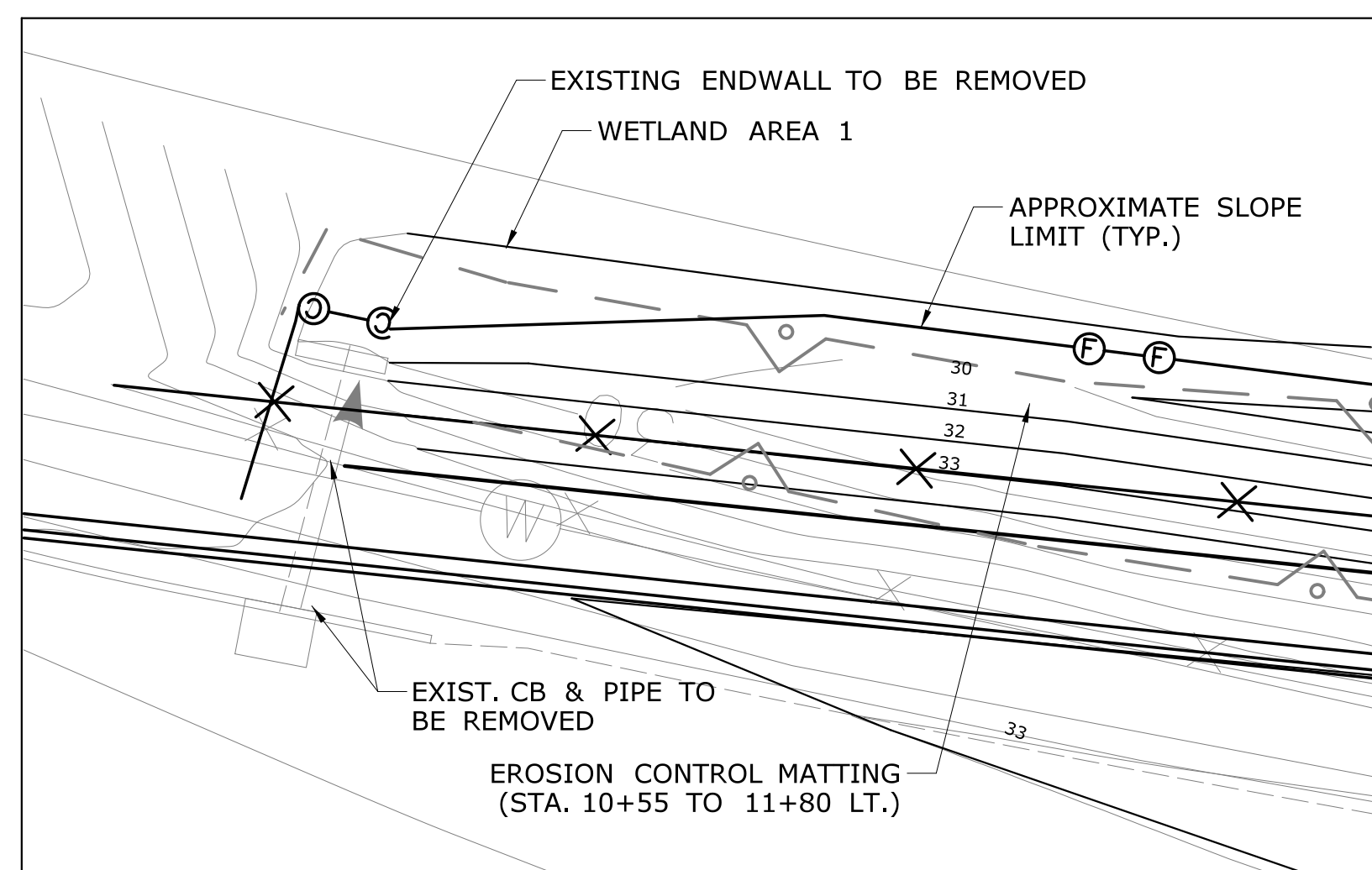
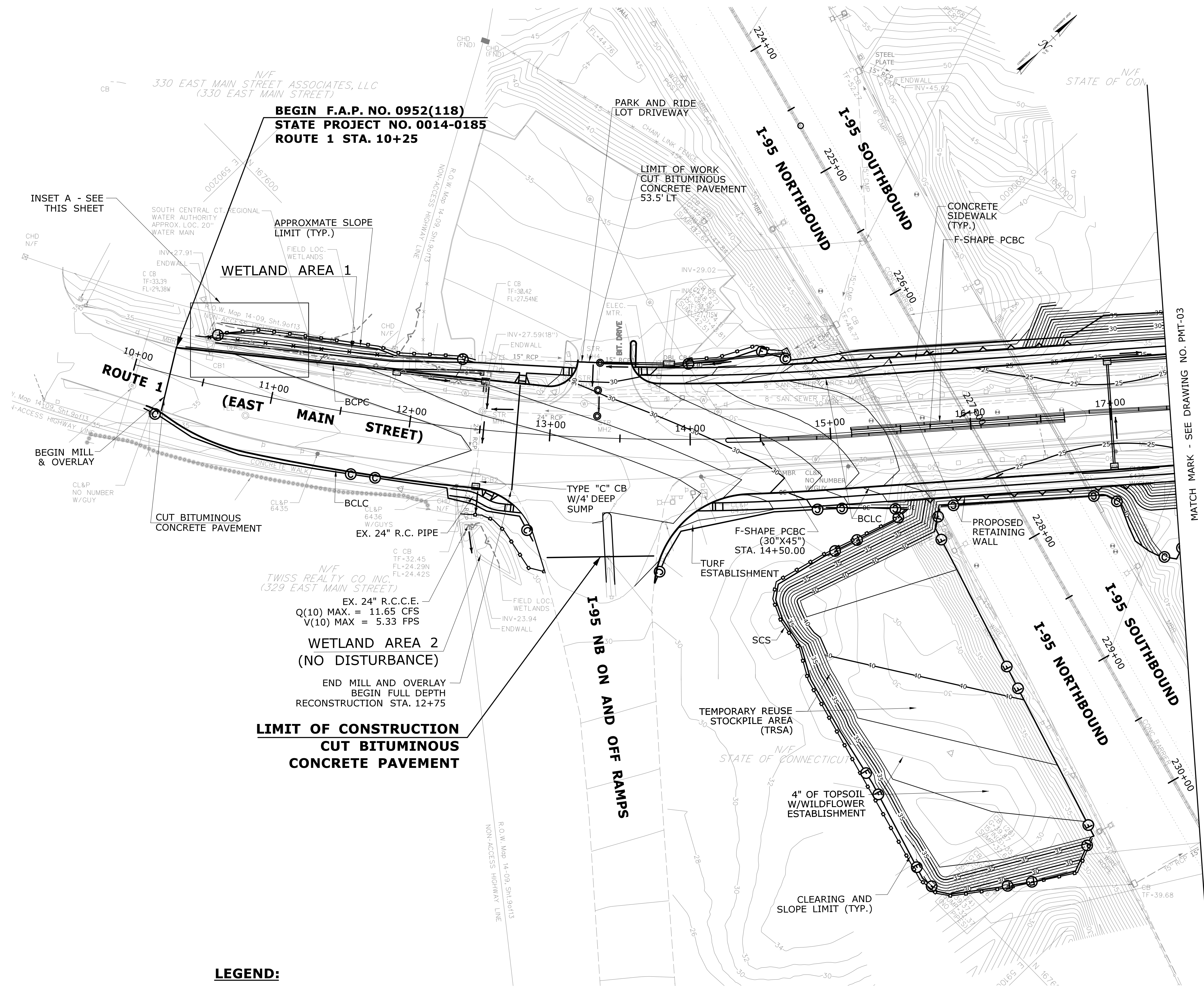
LIST OF DRAWINGS	
DRAWING NO.	DRAWING TITLE
PMT-01	TITLE SHEET
PMT-02 & 03	GENERAL SITE PLAN
PMT-04	WETLAND IMPACT PLAN

DESIGNED BY:  
AMMANN & WHITNEY  
2500 WESTCHESTER AVENUE  
SUITE 305  
PURCHASE, NY 10577

**PLAN DATE: JUNE 12, 2018**

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: <b>J. TYROS</b>	 <b>STATE OF CONNECTICUT</b> <b>DEPARTMENT OF TRANSPORTATION</b>	 <b>AMMANN &amp; WHITNEY</b> 2500 WESTCHESTER AVENUE SUITE 305 PURCHASE, NEW YORK	PROJECT TITLE:	REHABILITATION OF BRIDGE NO. 00196 - INTERSTATE 95 OVER U.S. ROUTE 1	TOWN:	BRANFORD	PROJECT NO.:	14-185
Plotted Date: 6/13/2018	CHECKED BY: <b>S. SUEHR</b>			SCALE AS NOTED	SIGNATURE/BLOCK:	DRAWING TITLE:	TITLE SHEET	DRAWING NO.:	PMT-01
REV. DATE REVISION DESCRIPTION SHEET NO.	Filename: ...VHW_MSH_0014_0185_PMT_TSH.dgn								



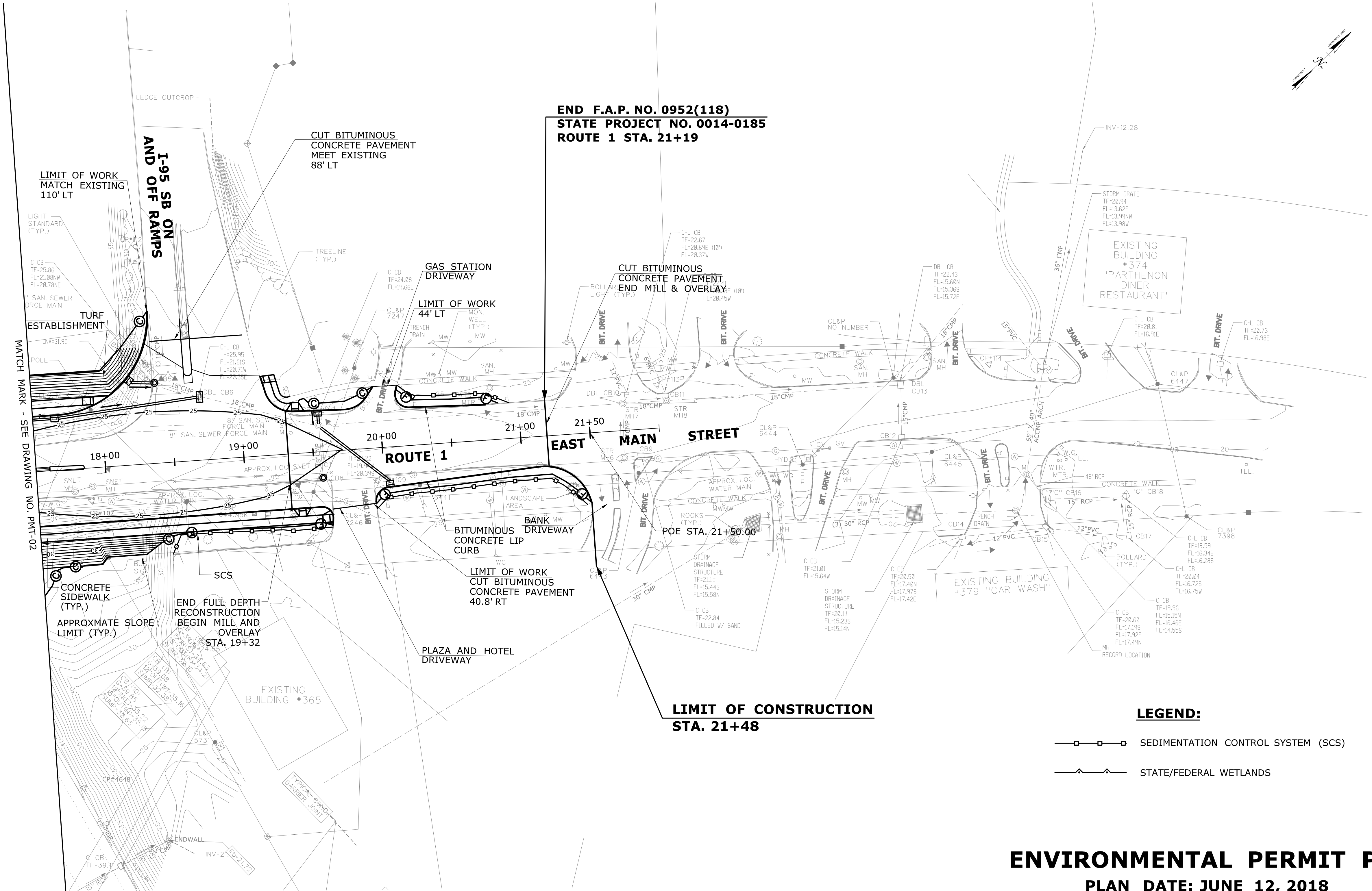


**INSET A**  
SCALE: 1" = 10'

- LEGEND:**
- SEDIMENTATION CONTROL SYSTEM (SCS)
  - - - - - STATE/FEDERAL WETLANDS

**ENVIRONMENTAL PERMIT PLANS**  
PLAN DATE: JUNE 12, 2018

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: O. BELGUET CHECKED BY: S. SUEHR SCALE IN FEET 0 40 80 SCALE 1"=40'	<b>STATE OF CONNECTICUT</b> DEPARTMENT OF TRANSPORTATION File name: ...VHW_MSH_0014_0185_PMT_PLN-01.DGN.dgn	SIGNATURE/BLOCK: <b>AMMANN &amp; WHITNEY</b> 2500 WESTCHESTER AVENUE SUITE 305 PURCHASE, NEW YORK	PROJECT TITLE: <b>REHABILITATION OF BRIDGE NO. 00196 - INTERSTATE 95 OVER U.S. ROUTE 1</b>	TOWN: <b>BRANFORD</b>	PROJECT NO. <b>14-185</b> DRAWING NO. <b>PMT-02</b> SHEET NO. <b>01.02</b>	
REV.	DATE	REVISION DESCRIPTION	SHEET NO.	Plotted Date: 6/13/2018				



**ENVIRONMENTAL PERMIT PLANS**  
**PLAN DATE: JUNE 12, 2018**

REV.	DATE	REVISION DESCRIPTION	SHEET NO.

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

Plotted Date: 6/13/2018

DESIGNER/DRAFTER:  
**O. BELGUET**

CHECKED BY:  
**S. SUEHR**

SCALE IN FEET  
  
 SCALE 1"=40'

**STATE OF CONNECTICUT**  
**DEPARTMENT OF TRANSPORTATION**

File name: ...VHW\_MSH\_0014\_0185\_PMT\_PLN-02.DGN.dgn

SIGNATURE/BLOCK:

**AMMANN & WHITNEY**  
 2500 WESTCHESTER AVENUE  
 SUITE 305  
 PURCHASE, NEW YORK

PROJECT TITLE:  
**REHABILITATION OF BRIDGE NO. 00196 - INTERSTATE 95 OVER U.S. ROUTE 1**

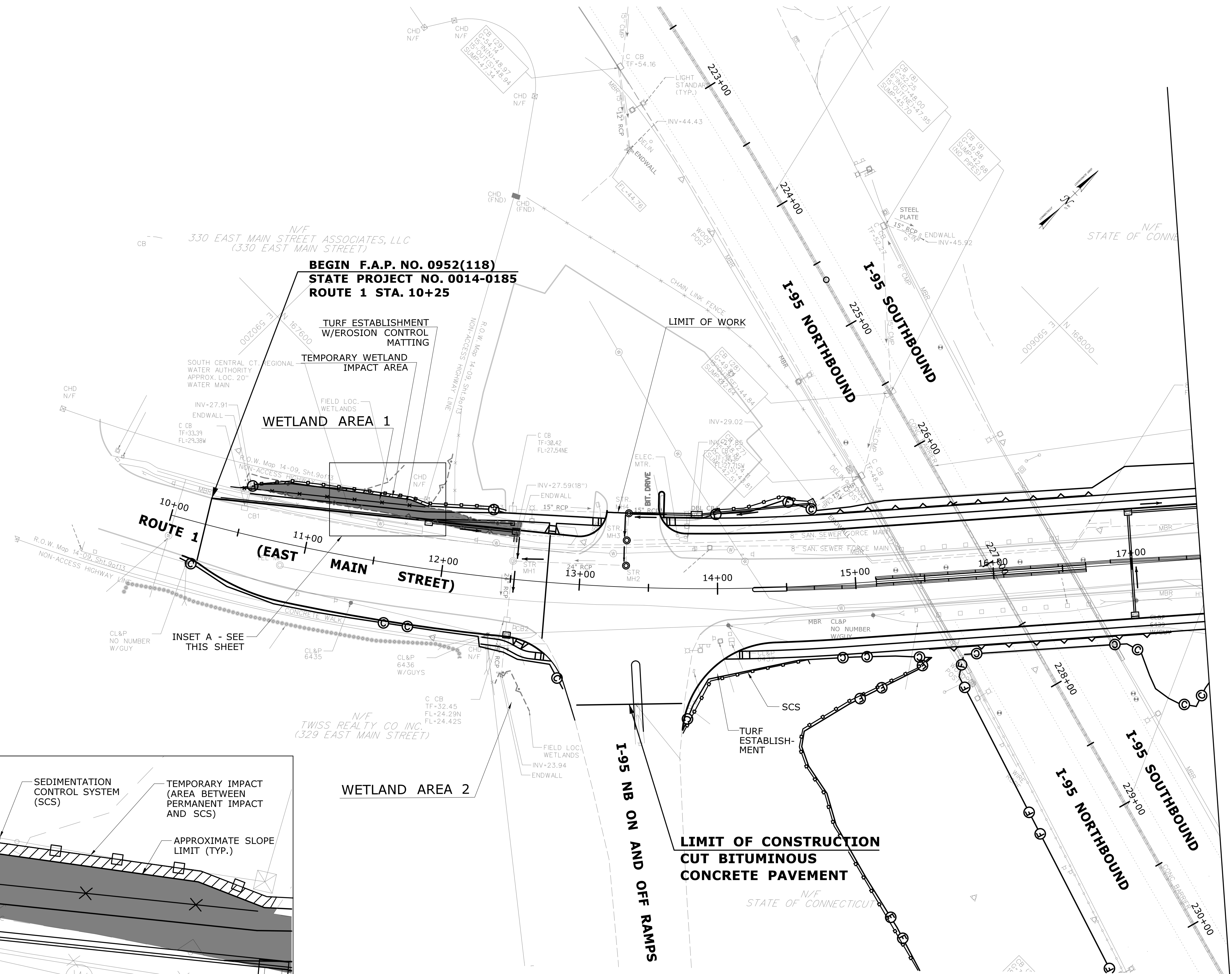
TOWN:  
**BRANFORD**

DRAWING TITLE:  
**GENERAL SITE PLAN**

PROJECT NO.  
**14-185**

DRAWING NO.  
**PMT-03**

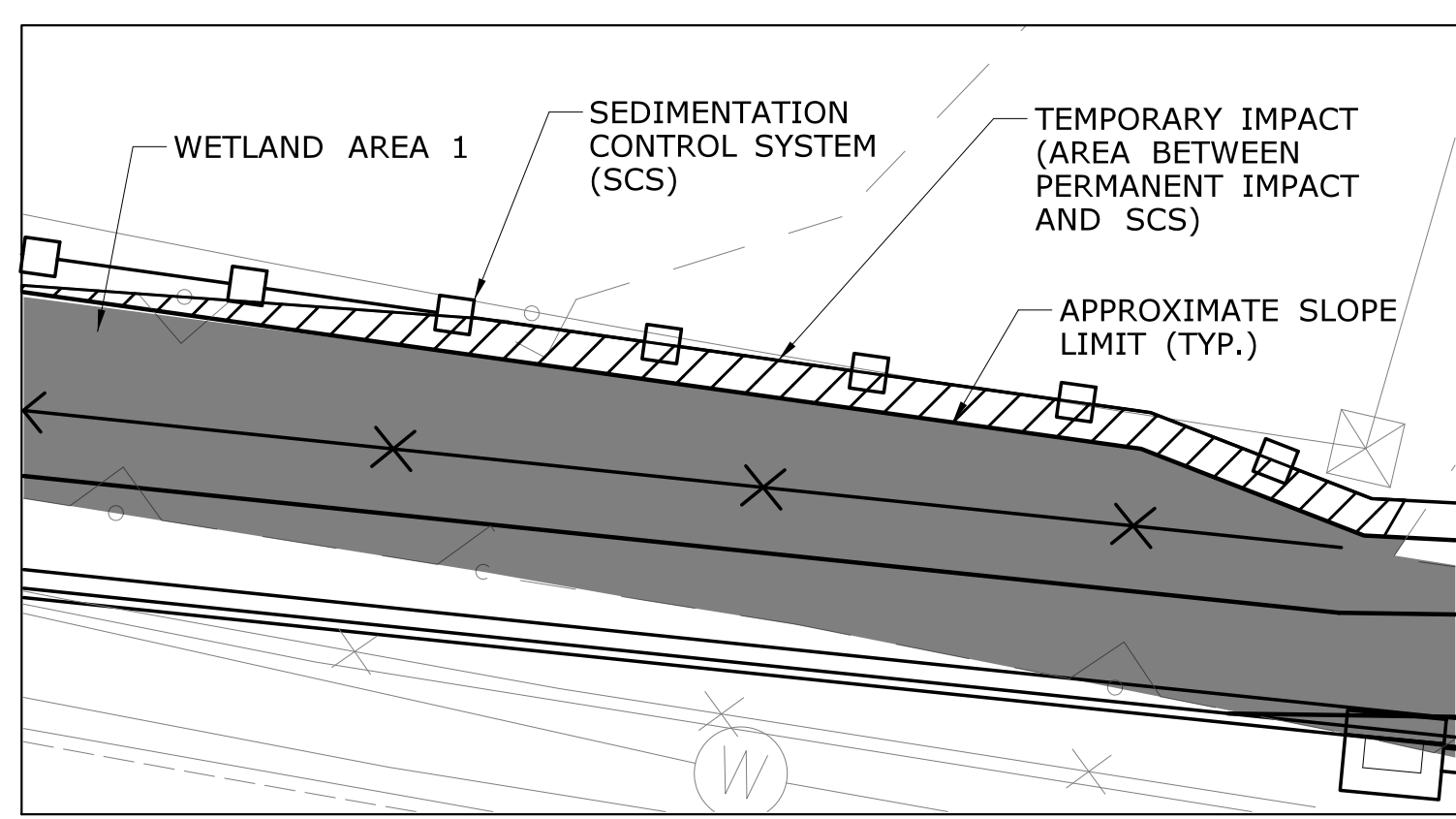
SHEET NO.  
**01.03**



WETLAND IMPACT TABLE				
AREA #	PERMANENT		TEMPORARY	
	AREA (SF)	AREA (AC)	AREA (SF)	AREA (AC)
1	1965	0.045	162	0.004
2	0	0	0	0
<b>TOTAL</b>	<b>1965</b>	<b>0.045</b>	<b>162</b>	<b>0.004</b>

- NOTE:**
1. THE CONTRACTOR SHALL NOT WORK WITHIN THE LIMITS OF THE WETLANDS AND WATERCOURSES WITH THE EXCEPTION OF THOSE AREAS DELINEATED AS TEMPORARY OR PERMANENT IMPACTS TO THE WETLANDS AND WATERCOURSE. ALL DISTURBED AREAS SHALL BE RESTORED.
  2. WOOD MULCH SHALL NOT BE PLACED IN THE WETLAND AREA.

- LEGEND:**
- THE DEPARTMENT OF TRANSPORTATION WILL ONLY SUBMIT REVISIONS TO THE DEEP FOR CHANGES TO THE DESIGN THAT WILL EFFECT THE NOTED REGULATED AREAS.
- SEDIMENTATION CONTROL SYSTEM (SCS)
  - - - - STATE/FEDERAL WETLANDS
  - PERMANENT IMPACT
  - ▨ TEMPORARY IMPACT



**INSET A**  
SCALE: 1" = 10'

**ENVIRONMENTAL PERMIT PLANS**  
PLAN DATE: JUNE 12, 2018

<p>REV. DATE REVISION DESCRIPTION SHEET NO. Plotted Date: 6/14/2018</p>	<p>DESIGNER/DRAFTER: <b>O. BELGUET</b></p> <p>CHECKED BY: <b>S. SUEHR</b></p> <p>SCALE IN FEET 0 40 80 SCALE 1"=40'</p>	<p><b>STATE OF CONNECTICUT</b> <b>DEPARTMENT OF TRANSPORTATION</b></p> <p>Filename: ...VHW_MSH_0014_0185_PMT_PLN-03.DGN.dgn</p>	<p>SIGNATURE/BLOCK:</p> <p><b>AMMANN &amp; WHITNEY</b> 2500 WESTCHESTER AVENUE SUITE 305 PURCHASE, NEW YORK</p>	<p>PROJECT TITLE:</p> <p><b>REHABILITATION OF BRIDGE NO. 00196 - INTERSTATE 95 OVER U.S. ROUTE 1</b></p>	<p>TOWN:</p> <p><b>BRANFORD</b></p> <p>DRAWING TITLE:</p> <p><b>WETLAND IMPACT PLAN</b></p>	<p>PROJECT NO. <b>14-185</b></p> <p>DRAWING NO. <b>PMT-04</b></p> <p>SHEET NO. <b>01.04</b></p>
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Attachment H  
Site Photos (6 Sheets)

PHOTOGRAPHS



1. North Elevation (Note: View is looking Southbound on Route 1)



2. South Elevation (Note: View is looking Northbound on Route 1)



3. Southbound Lanes Looking East at East Approach



4. Southbound Lanes Looking West across Bridge



9. West Pier (Pier 1) East Elevation  
(Note: Hollow Areas and Spalling on underside of deck in Span 2, Bay 1)



10. Looking South along West Abutment  
(Note: Spall on Abutment Face and Elastomeric Bearings supporting Beams)



16. Lateral Clearances West Pier (Pier 1) South end  
(Note: Fire Suppression Standpipe Mounted to Pier)



17. Lateral Clearances West Pier (Pier 1) North end  
(Note: This is location of minimum horizontal clearance)





Wetland located within the project area





# STATE OF CONNECTICUT

## DEPARTMENT OF TRANSPORTATION

2800 BERLIN TURNPIKE, P.O. BOX 317546  
NEWINGTON, CONNECTICUT 06131-7546  
Phone: (860) 594-2931



June 25, 2018

Ms. Susan Lee  
U.S. Army Corps of Engineers  
New England District  
696 Virginia Road  
Concord, MA 01742-2751

Subject: **State Project No. 14-185**  
Bridge No. 00196  
Interstate 95 over US Route 1  
Town of Branford

Dear Ms. Lee:

Enclosed please find one copy of the USACE Appendix E: Self-Verification Notification Form for GP 19 with attachments for your files. A copy has also been submitted to the Connecticut Department of Energy and Environmental Protection. The project has been submitted to the United States Fish & Wildlife Service by DOT's Office of Environmental Planning under the Final 4(d) Rule using the Northern Long-Eared Bat 4(d) Rule Streamlined Consultation Form on behalf of FHWA. Any questions pertaining to this application may be directed to Mr. Andrew H. Davis, Transportation Supervising Planner of my staff, at 860-594-2157.

Very truly yours,

A handwritten signature in blue ink that reads "Kimberly C. Lesay".

Kimberly C. Lesay  
Transportation Assistant Planning Director  
Bureau of Policy and Planning

Attachments

cc: Nathan Margason – USEPA



**US Army Corps  
of Engineers**<sup>®</sup>  
New England District

**Appendix E: Self-Verification Notification Form**

This form is required for all **non-tidal projects in Connecticut**, but **not** required if work is done within boundaries of Mashantucket Pequot or Mohegan Tribal Lands. **Before** work commences, complete **all** fields (write "none" if applicable); attach project plans (not required for projects involving the installation of construction mats only); and any state or local approval(s); and send to:

Permits & Enforcement Branch B		CT DEEP
U.S. Army Corps of Engineers		Inland Water Resources Division
696 Virginia Road	<i>and</i>	79 Elm Street
Concord, MA 01742-2751		Hartford, CT 06106-5127
<i>or cenae-r@usace.army.mil</i>		

\*\*\*\*\*

State or local Permit Number: TBD  
 Date of State or local Permit: TBD  
 State/local Project Manager: TBD

Permittee: Connecticut Department of Transportation  
 Address, City, State & Zip: 2800 Berlin Tpk. Newington, CT 06131  
 Phone(s) and Email: (860) 594-2931 Kimberly.Lesay@ct.gov

Contractor: To be determined by Low Bid process  
 Address, City, State & Zip: n/a  
 Phone(s) and Email: n/a

Consultant/Engineer/Designer: CME Associates, Inc.  
 Address, City, State & Zip: 101 East River Drive, 1st Floor East Hartford, CT 06108  
 Phone(s) and Email: (860) 290-4100

Wetland/Soil Scientist Consultant: Richard Canavan  
 Address, City, State & Zip: 101 East River Drive, 1st Floor East Hartford, CT 06108  
 Phone(s) and Email: (860) 290-4100

Project Location (provide detailed description & locus map): Interstate 95 over US Route 1 in Branford, Connecticut. Project location map is attached.  
 Address, City, State & Zip: I-95 Branford, CT 06405  
 Latitude/Longitude Coordinates: 41.294074, -72.783417  
 Waterway Name: n/a

Project Purpose (include all aspects of the project including those not within Corps jurisdiction):  
The purpose of this project is to address items identified in inspection. The deck is rated poor. Large spalls with exposed rebar, map & transverse cracking requiring replacement.  
 Work Description: The project involves the full superstructure replacement of the Bridge No. 00196, construction of a new center pier, and lowering and widening of US Route 1 beneath the bridge. The project also involves minor wetland impacts for the extension of the Route 1 pedestrian sidewalks.

Work will be done under the following GP(s) (check all that have associated impacts):

       **GP. 2 - Repair or maintenance of authorized or grandfathered structures/fills**

Area of total wetland impacts: temporary \_\_\_\_\_ SF permanent \_\_\_\_\_ SF

Area of total waterway impacts: temporary \_\_\_\_\_ SF permanent \_\_\_\_\_ SF

       **GP. 5 - Boat ramps/marine railways**

Area of total wetland impacts: temporary \_\_\_\_\_ SF permanent \_\_\_\_\_ SF

Area of total waterway impacts: temporary \_\_\_\_\_ SF permanent \_\_\_\_\_ SF

       **GP. 6 - Utility line activities (include calculations for each single & complete crossing  
– attach additional sheet if necessary)**

Area of total wetland impacts: temporary \_\_\_\_\_ SF permanent \_\_\_\_\_ SF

Area of total waterway impacts: temporary \_\_\_\_\_ SF permanent \_\_\_\_\_ SF

       **GP. 9 - Shoreline and bank stabilization projects**

Area of total wetland impacts: temporary \_\_\_\_\_ SF permanent \_\_\_\_\_ SF

Area of total waterway impacts: temporary \_\_\_\_\_ SF permanent \_\_\_\_\_ SF

       **GP. 10 - Aquatic habitat restoration, establishment and enhancement activities**

Area of total wetland impacts: temporary \_\_\_\_\_ SF permanent \_\_\_\_\_ SF

Area of total waterway impacts: temporary \_\_\_\_\_ SF permanent \_\_\_\_\_ SF

       **GP. 11 - Fish & wildlife harvesting, enhancement and attraction devices and activities**

Area of total wetland impacts: temporary \_\_\_\_\_ SF permanent \_\_\_\_\_ SF

Area of total waterway impacts: temporary \_\_\_\_\_ SF permanent \_\_\_\_\_ SF

       **GP. 12 - Oil Spill and Hazardous material cleanup**

Area of total wetland impacts: temporary \_\_\_\_\_ SF permanent \_\_\_\_\_ SF

Area of total waterway impacts: temporary \_\_\_\_\_ SF permanent \_\_\_\_\_ SF

       **GP. 13 - Cleanup of hazardous and toxic waste**

Area of total wetland impacts: temporary \_\_\_\_\_ SF permanent \_\_\_\_\_ SF

Area of total waterway impacts: temporary \_\_\_\_\_ SF permanent \_\_\_\_\_ SF

       **GP. 14 - Scientific measurements devices**

Area of total wetland impacts: temporary \_\_\_\_\_ SF permanent \_\_\_\_\_ SF

Area of total waterway impacts: temporary \_\_\_\_\_ SF permanent \_\_\_\_\_ SF

       **GP. 15 - Survey activities**

Area of total wetland impacts: temporary \_\_\_\_\_ SF permanent \_\_\_\_\_ SF

Area of total waterway impacts: temporary \_\_\_\_\_ SF permanent \_\_\_\_\_ SF

       **GP. 17 - New/expanded developments & recreational facilities**

Area of total wetland impacts: temporary \_\_\_\_\_ SF permanent \_\_\_\_\_ SF

Area of total waterway impacts: temporary \_\_\_\_\_ SF permanent \_\_\_\_\_ SF

X  **GP. 18 - Linear transportation projects- wetland crossings only (include calculations for each single & complete crossing - attach additional sheet if necessary)**

Area of total wetland impacts: temporary  162  SF permanent  1965  SF  
Area of total waterway impacts: temporary  0  SF permanent  0  SF

**GP. 19 - Stream, river & brook crossings – not including wetland crossings (include calculations for each single & complete crossing – attach additional sheet if necessary)**

Area of total wetland impacts: temporary \_\_\_\_\_ SF permanent \_\_\_\_\_ SF  
Area of total waterway impacts: temporary \_\_\_\_\_ SF permanent \_\_\_\_\_ SF

**GP. 21 - Temporary fill not associated with any other GP activities**

Area of total wetland impacts: temporary \_\_\_\_\_ SF permanent \_\_\_\_\_ SF  
Area of total waterway impacts: temporary \_\_\_\_\_ SF permanent \_\_\_\_\_ SF

**Does your project include any secondary effects?** Yes \_\_\_\_\_ No  X

(Secondary effects include, but are not limited to non-tidal waters or wetlands drained, flooded, fragmented, or mechanically cleared resulting from a single and complete project. See Appendix F - Definitions.) If YES, describe here: \_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

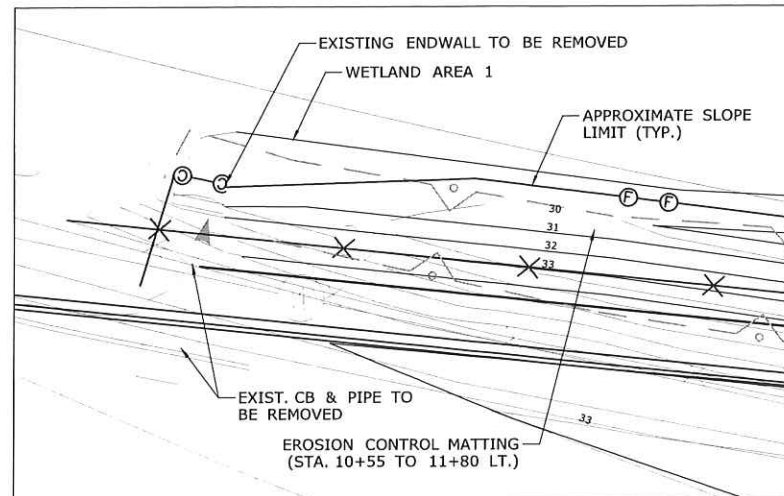
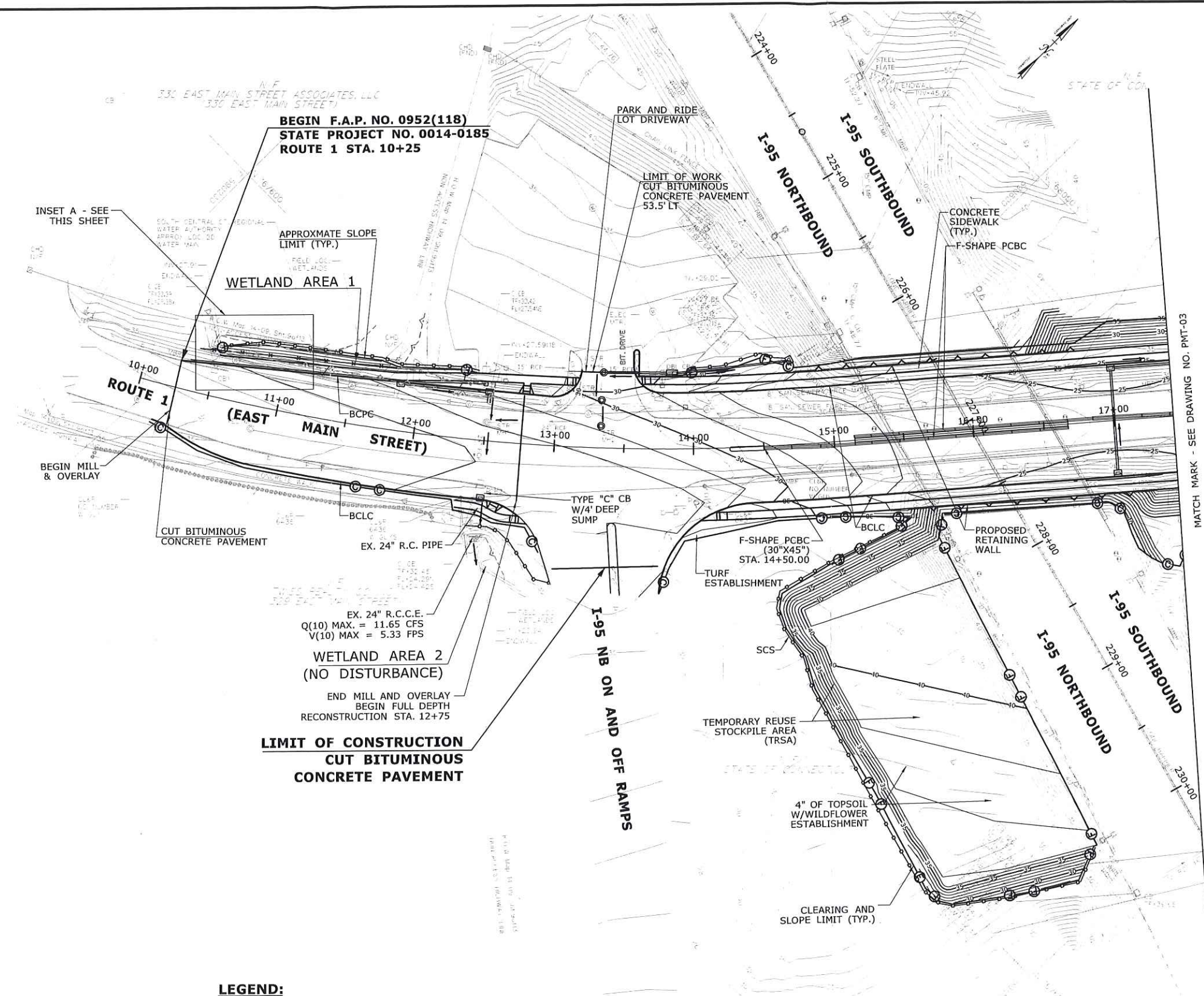
**Proposed Work Dates:** Start:  Spring 2019  Finish:  Fall 2020

**Your name/signature below, as permittee, confirms that your project meets the self-verification criteria and that you accept and agree to comply with the applicable terms and conditions in the Connecticut General Permits.**

Thomas J. Maguire   
Signature of Permittee

6-25-2018   
Date





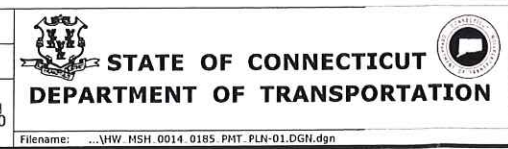
**INSET A**  
SCALE: 1" = 10'

- LEGEND:**
- SEDIMENTATION CONTROL SYSTEM (SCS)
  - - - - - STATE/FEDERAL WETLANDS

**ENVIRONMENTAL PERMIT PLANS**  
PLAN DATE: JUNE 12, 2018

REV.	DATE	REVISION DESCRIPTION	SHEET NO.	Plotted Date: 6/13/2018

DESIGNER/DRAFTER:  
O. BELGUET  
CHECKED BY:  
S. SUEHR  
SCALE IN FEET  
0 40 80  
SCALE 1"=40'



SIGNATURE/BLOCK:  
AMMANN & WHITNEY  
2500 WESTCHESTER AVENUE  
SUITE 305  
PURCHASE, NEW YORK

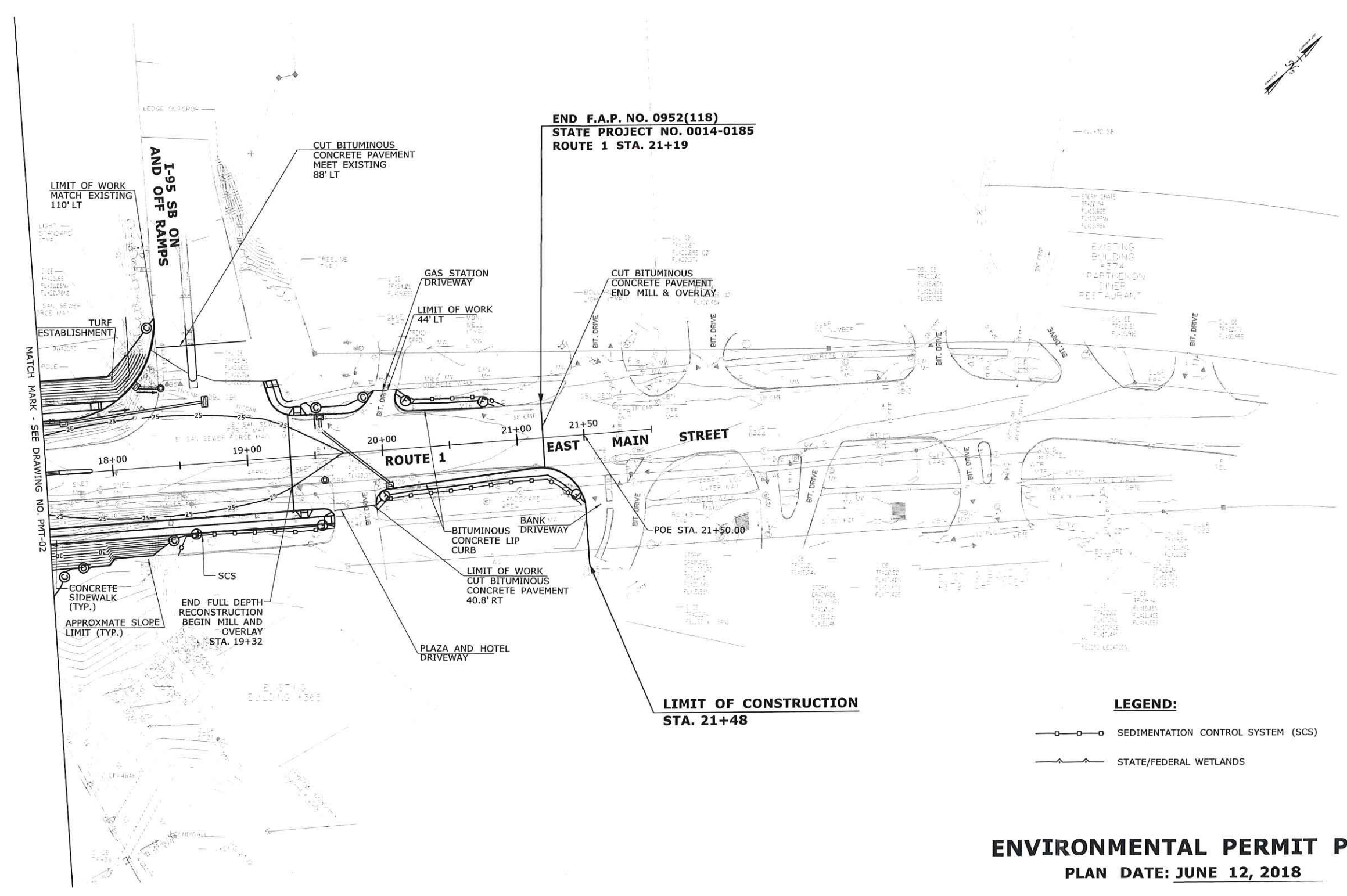
PROJECT TITLE:  
**REHABILITATION OF BRIDGE NO. 00196 - INTERSTATE 95 OVER U.S. ROUTE 1**

TOWN: **BRANFORD**  
DRAWING TITLE:  
**GENERAL SITE PLAN**

PROJECT NO. **14-185**  
DRAWING NO. **PMT-02**  
SHEET NO. **01.02**

MATCH MARK - SEE DRAWING NO. PMT-03





END F.A.P. NO. 0952(118)  
 STATE PROJECT NO. 0014-0185  
 ROUTE 1 STA. 21+19

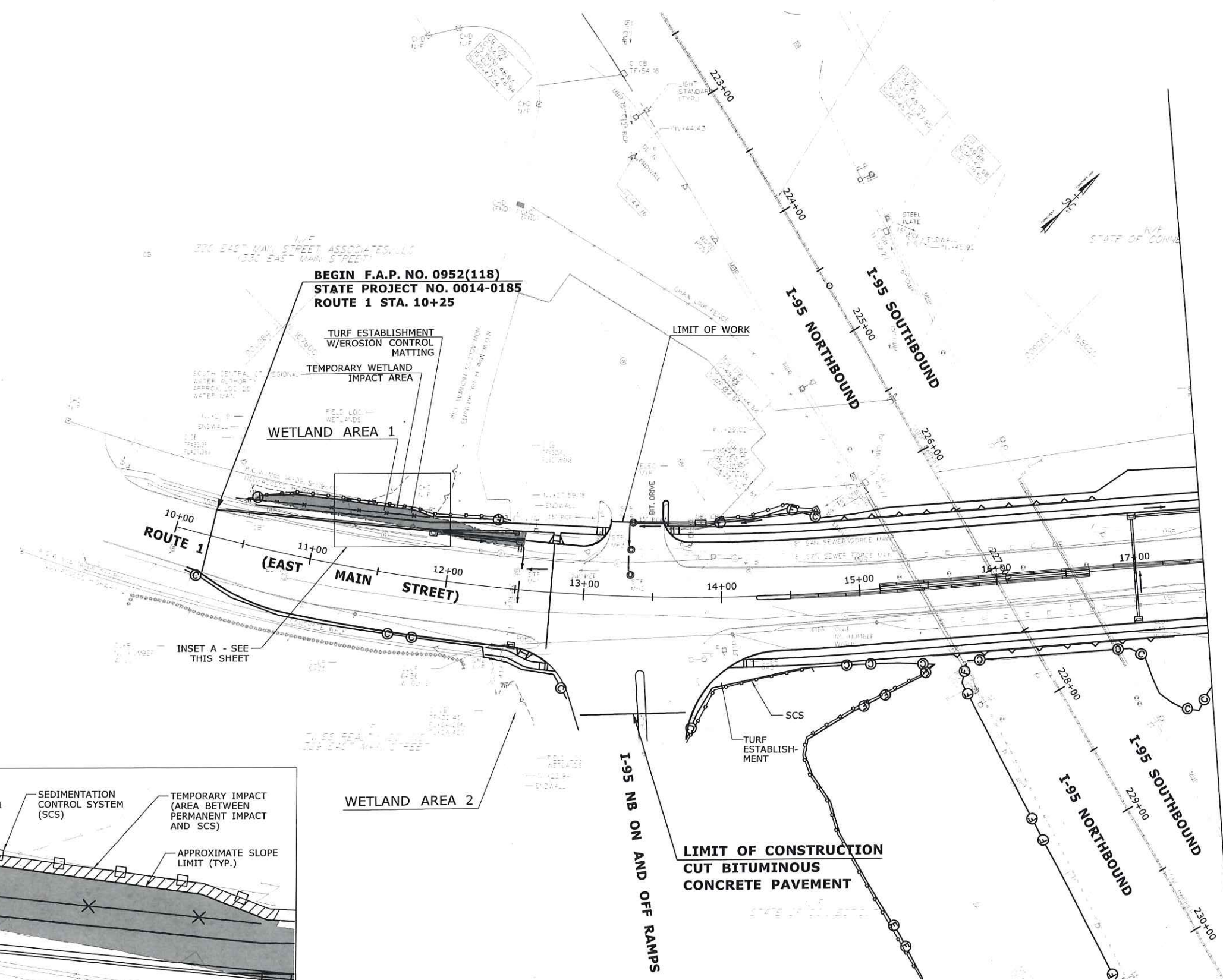
**LIMIT OF CONSTRUCTION  
 STA. 21+48**

**LEGEND:**

- SEDIMENTATION CONTROL SYSTEM (SCS)
- ▲—▲— STATE/FEDERAL WETLANDS

**ENVIRONMENTAL PERMIT PLANS**  
 PLAN DATE: JUNE 12, 2018

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: <b>O. BELGUET</b> CHECKED BY: <b>S. SUEHR</b>	<p>STATE OF CONNECTICUT          DEPARTMENT OF TRANSPORTATION</p>	<p>AMMANN &amp; WHITNEY          2500 WESTCHESTER AVENUE          SUITE 305          PURCHASE, NEW YORK</p>	PROJECT TITLE: <b>REHABILITATION OF BRIDGE          NO. 00196 - INTERSTATE 95          OVER U.S. ROUTE 1</b>	TOWN: <b>BRANFORD</b>	PROJECT NO. <b>14-185</b>
SCALE IN FEET 0 40 80 SCALE 1"=40'	DRAWING TITLE: <b>GENERAL SITE PLAN</b>	DRAWING NO. <b>PMT-03</b>					
REV. DATE REVISION DESCRIPTION SHEET NO. Plotted Date: 6/13/2018			FILENAME: ...VHW_MSH_0014_0185_PMT_PLN-02.DGN.dgn			SHEET NO. <b>01.03</b>	



WETLAND IMPACT TABLE				
AREA #	PERMANENT		TEMPORARY	
	AREA (SF)	AREA (AC)	AREA (SF)	AREA (AC)
1	1965	0.045	162	0.004
2	0	0	0	0
<b>TOTAL</b>	<b>1965</b>	<b>0.045</b>	<b>162</b>	<b>0.004</b>

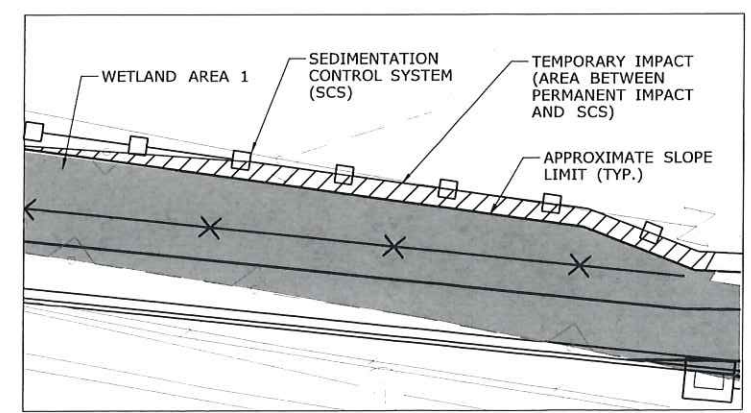
**NOTE:**

1. THE CONTRACTOR SHALL NOT WORK WITHIN THE LIMITS OF THE WETLANDS AND WATERCOURSES WITH THE EXCEPTION OF THOSE AREAS DELINEATED AS TEMPORARY OR PERMANENT IMPACTS TO THE WETLANDS AND WATERCOURSE. ALL DISTURBED AREAS SHALL BE RESTORED.
2. WOOD MULCH SHALL NOT BE PLACED IN THE WETLAND AREA.

**LEGEND:**

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

- SEDIMENTATION CONTROL SYSTEM (SCS)
- - - STATE/FEDERAL WETLANDS
- PERMANENT IMPACT
- ▨ TEMPORARY IMPACT



**INSET A**  
SCALE: 1" = 10'

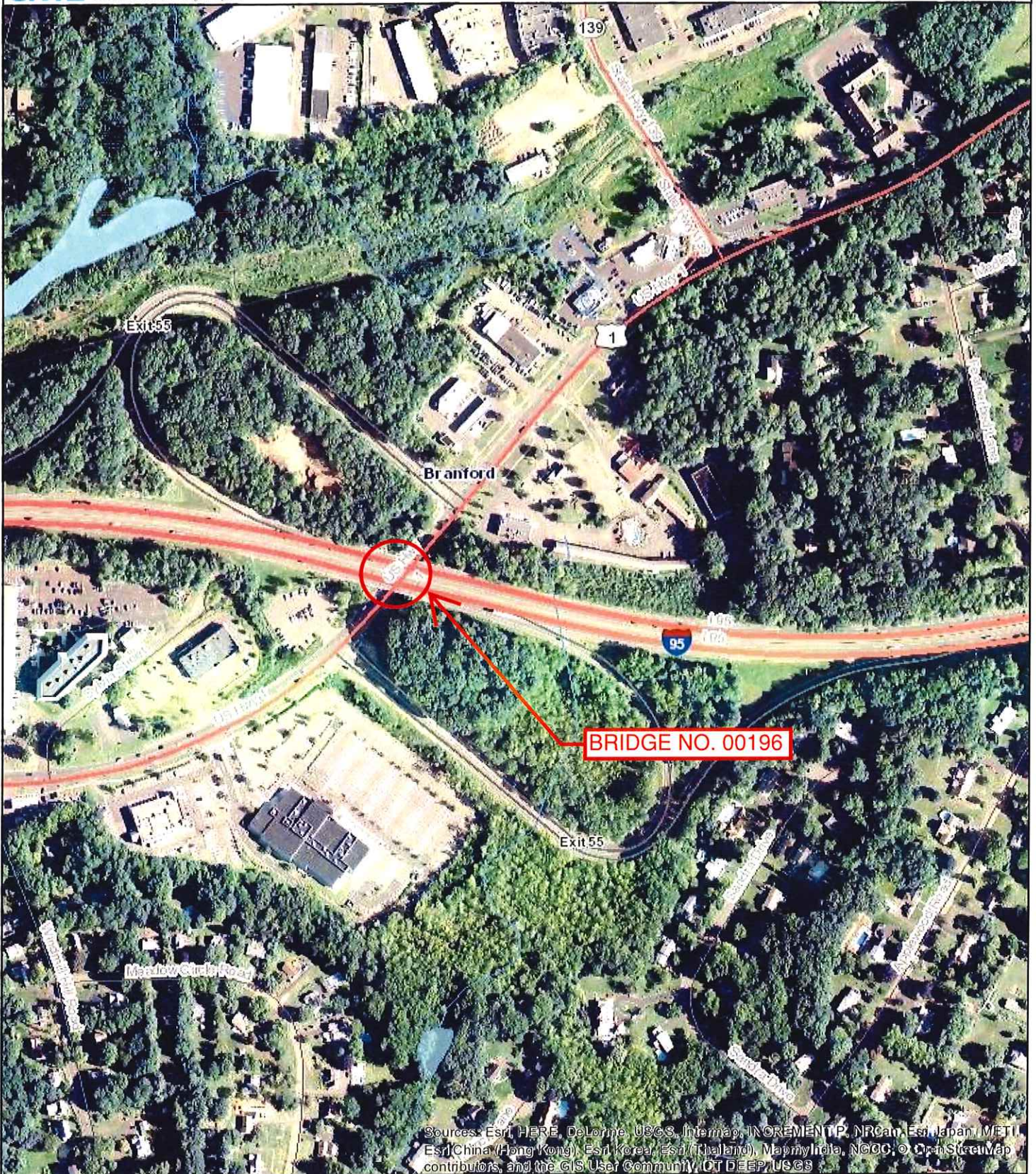
**ENVIRONMENTAL PERMIT PLANS**  
PLAN DATE: JUNE 12, 2018

REV. DATE REVISION DESCRIPTION SHEET NO. Plotted Date: 6/14/2018	DESIGNER/DRAFTER: O. BELGUET CHECKED BY: S. SUEHR	<p>STATE OF CONNECTICUT DEPARTMENT OF TRANSPORTATION</p>	<p>AMMANN &amp; WHITNEY 2500 WESTCHESTER AVENUE SUITE 305 PURCHASE, NEW YORK</p>	PROJECT TITLE: <b>REHABILITATION OF BRIDGE NO. 00196 - INTERSTATE 95 OVER U.S. ROUTE 1</b>	TOWN: <b>BRANFORD</b>	PROJECT NO. <b>14-185</b>
	SCALE IN FEET 0 40 80 SCALE 1"=40'				SIGNATURE/BLOCK: 	DRAWING TITLE: <b>WETLAND IMPACT PLAN</b>



Engineers  
Designers  
Consultants  
Planners  
Scientists  
101 East River Drive, 3 Floor • East Hartford, CT 06108  
T.860.290.4100 • www.cmeengineering.com

**PROJECT NO. 14-185**  
**BRIDGE NO. 00196 IN BRANFORD, CT**  
**INTERSTATE 95 OVER US ROUTE 1**



Sources: Esri, HERE, DeLorme, USGS, Intermap, INCREMENT P, NRCan, Esri Japan, METI, Esri China (Hong Kong), Esri Korea, Esri (Thailand), MapmyIndia, NGCC, © OpenStreetMap contributors, and the GIS User Community, © DEEP, USGS



**CTECO AERIAL  
MAP  
BRANFORD,  
CONNECTICUT**

**1 INCH = 500 FEET**





# STATE OF CONNECTICUT

## DEPARTMENT OF TRANSPORTATION

2800 BERLIN TURNPIKE, P.O. BOX 317546  
NEWINGTON, CONNECTICUT 06131-7546



### Determination of Exemption for Historic Properties

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**Author:** Mark McMillan **Date:** December 17, 2013

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**Project:** State No.: 14-TBD1 (170-3250 PE)  
F.A.P. No.: TBD  
Project Title: Rehabilitation of Bridge #00196  
Bridges: I-95 over U.S. Route 1  
Town: Branford

---

**Category of Exemption:** Appendix B "Screened Undertakings..."

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#### *Project Description*

The project proposes to use federal and state funds to perform a rehabilitation of Bridge #00196, which carries I-95 over U.S. Route 1 in Branford (Image 1). Recent inspections by CTDOT's Bridge Safety and Evaluation Unit have identified deterioration of the bridge deck and substructure that require attention. These deficiencies have resulted in Bridge #00196 being placed on the State Bridge Program for structures requiring major rehabilitation or replacement. The project is currently in its concept phase and a Rehabilitation Study Report (RSR) is being prepared. Full replacement of the existing bridge with a single span structure is recommended, but other rehabilitation strategies such as patching or superstructure replacement are also being considered. Final design is scheduled for 2016.

#### *Technical Review of Project*

Bridge #00196 was built in 1958 as part of Interstate 95. It has not undergone any significant alterations since its original construction. The bridge is composed of three spans of steel beam/stringer superstructure that supports a cast-in-place concrete deck. The substructure is comprised of reinforced concrete piers (Image 2). The statewide bridge inventory database maintained by CTDOT categorizes the bridge as Not Eligible for the National Register of Historic Places. As part of the Dwight D. Eisenhower National System of Interstate and Defense Highways, it is exempted from Section 106 review.<sup>1</sup>

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<sup>1</sup> Advisory Council on Historic Preservation, *Exemption Regarding Historic Preservation Review Process for Effects to the Interstate Highway System*, Federal Register, Vol. 70, No. 45, (3/10/2005).

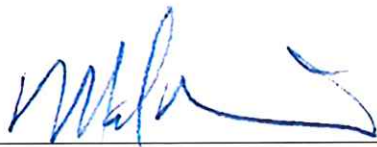
Qualified staff from the Office of Environmental Planning (OEP) has screened this project to identify historic resources within the area of potential effect that may be impacted by this undertaking. The bridge is situated between two large circular off-ramps from I-95. Beyond this area is a development characterized by large commercial “big box” stores, a commuter parking lot, gas stations, and restaurants. The majority of the buildings were constructed after I-95 opened in 1958. None of the structures – individually or collectively – are eligible for the National Register.

The nearest resources listed on the National Register are various houses that are individually properties.<sup>2</sup> All of these are over a half-mile south of the bridge and separated from the project area by the aforementioned commercial developments as well as mid-20<sup>th</sup> century residential neighborhoods. None of these properties will be foreseeably affected by the proposed work.

The sediments surrounding the bridge are composed of Udorthents-Urban Land Complex. Based on predictive models, these types of soils have a low potential for containing any intact archaeological resources. The nearest known archaeological sites are over one-quarter mile outside the project’s area of potential effect. The extent of previous disturbance caused by the construction of I-95 and its associated off-ramps leaves little to no possibility of impacting intact archaeological resources that would be eligible for the National Register.

#### *Determination*

The subject bridge is categorized as *Not Eligible for the National Register of Historic Places* in CTDOT’s statewide bridge inventory database. Upon examination of the bridge, OEP found no information that would contradict this determination. As an element of the Interstate Highway System, work on this bridge is exempt from Section 106 review under the ACHP Exemption and under Appendix B “*Screened Undertakings Not Requiring Connecticut CTSHPO Review*” of the Section 106 Programmatic Agreement. The undertaking fits the criteria of both “Interstate Related Projects” and “Bridge/Culvert Related Projects”. No further consultation with the SHPO is necessary. A copy of this finding will be included in the quarterly report of Minor Transportation Projects that is submitted to the SHPO.



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Mark McMillan  
National Register Specialist  
Office of Environmental Planning  
Connecticut Department of Transportation

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<sup>2</sup> Solomon Tyler House (NRIS #88002636); John Tyler House (NRIS #88002635); Zaccheus Baldwin House (NRIS #8802631); Timothy Baldwin House (NRIS #8802633) and 161 Damascus Road (NRIS #88002632).

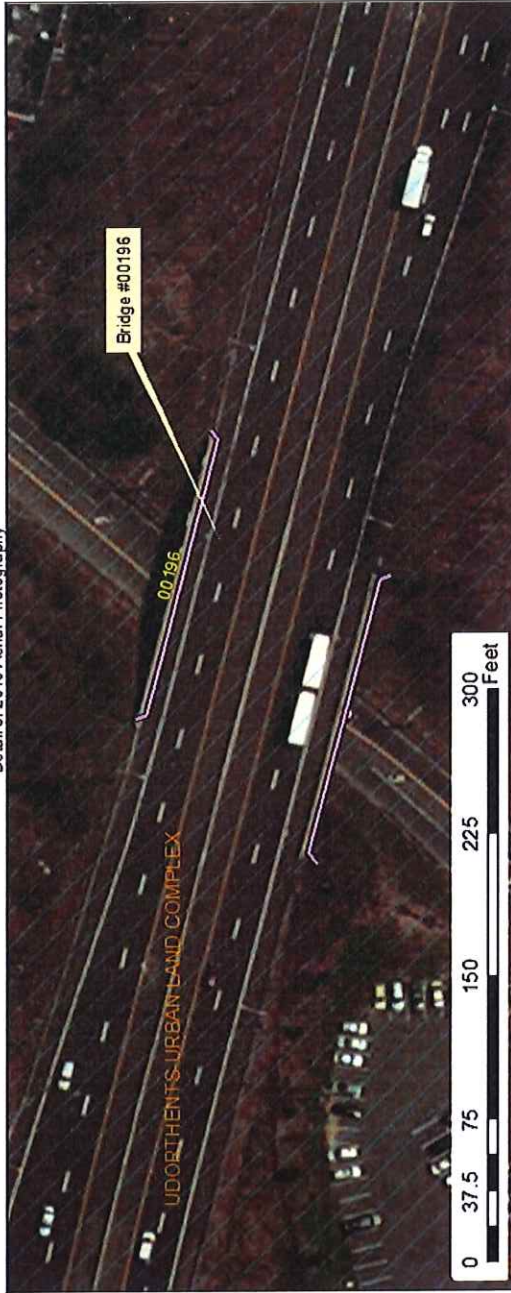


**Image 1:** Bridge #00196. *Image courtesy of Bing Maps.*



**Image 2:** Underside of deck and substructure of Bridge #00196, viewed from East Main Street. Note the concrete deterioration and exposed reinforcing bars of the deck (red arrows).

Detail of 2010 Aerial Photography



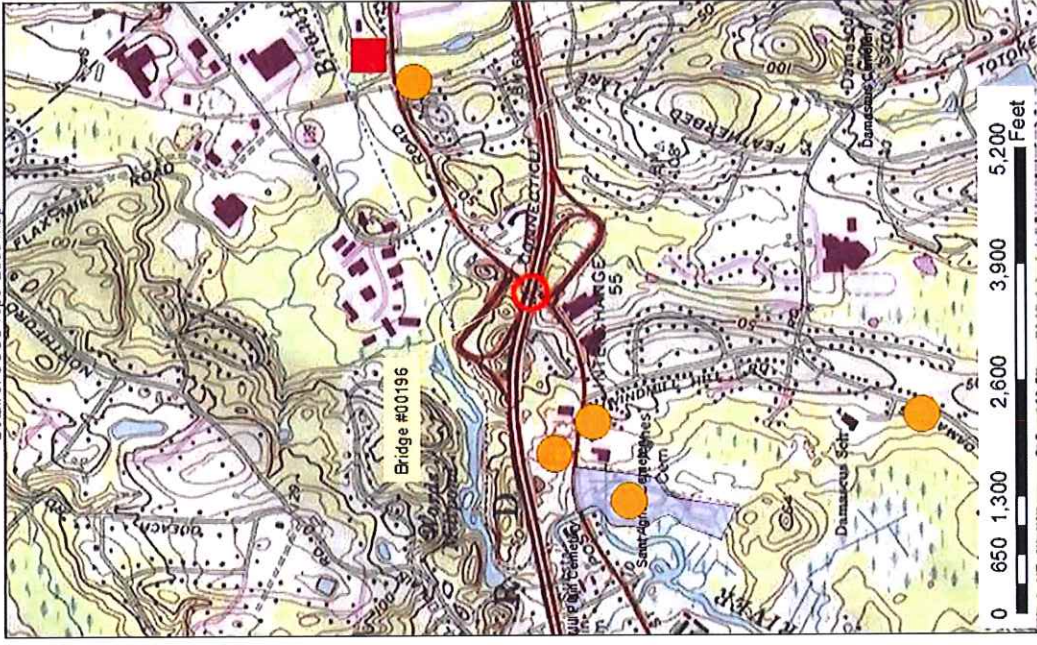
Detail of 1852 Whiteford Map of New Haven County



Detail of 1811 Warren Map of Connecticut with 1930 Griswold Overlay



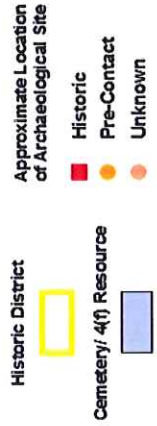
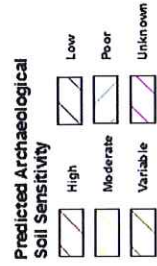
Detail of USGS Topo Quad Map



**Office of Environmental Planning  
Environmental Review - Historical and  
Archaeological Resources**

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State Project No. 14-TBD1, 170-3250 PE  
F.I.D.#: TBD  
Rehabilitation of Bridge #00196  
I-95 over Route 1  
Branford



December 2, 2013

## Salter, Michael J

---

**From:** michelle.herrell@dot.gov  
**Sent:** Thursday, January 02, 2014 8:36 AM  
**To:** McMillan, Mark J.  
**Cc:** Eloise.Powell@dot.gov  
**Subject:** NO Tribal Consultation Required FAPN TBD/SPN 0014-TBD1, Bridge Rehabilitation # 00196, I-95 over US 1, Branford

Hi Mark,

I have carefully reviewed the CTDOT's proposed project which involves the rehabilitation or replacement of Bridge #00196 that carries I-95 over US Route 1 in Branford. The bridge has deterioration to the bridge deck and substructure, and has been placed on the CT Bridge Program for structures requiring major rehabilitation or replacement. The existing bridge would either be rehabilitated through patching or superstructure replacement, or the existing bridge would be replaced. As discussed in your letter dated December 17, 2013, the soil types surrounding the bridge have a low potential for containing any intact archaeological resources, and due to the extent of the previous disturbance from the construction of I-95 and associated ramps, there is little to no possibility for impacting intact archaeological resources that would be eligible for the National Register of Historic Places with this project. Since the project is located on I-95, it is typically exempt from Section 106 Review due to the ACHP exemption of being an interstate-related project. In addition, the project also meets the criteria of a "Bridge/Culvert Related Project" found in Appendix B "Screened Undertakings Not Requiring Connecticut SHPO Review" of the Section 106 Programmatic Agreement.

As per the THPO Section 106 Agreements with FHWA-CT Division, dated January 4, 2012 and May 14, 2013, this project would generally fall within the category of "resurfacing or repair of existing ramps within the previously disturbed right-of-way", with no historic properties affected.

With this email, and taking all these items into consideration, the FHWA-CT Division has determined that tribal consultation would not be required for this project.

Michelle Herrell  
Environmental Protection Specialist

Federal Highway Administration | Connecticut Division Office  
628-2 Hebron Avenue, Suite 303 | Glastonbury, CT 06033  
P: (860) 494-7577 | F: (860) 659-6724  
[michelle.herrell@dot.gov](mailto:michelle.herrell@dot.gov)



## Northern Long-Eared Bat 4(d) Rule Streamlined Consultation Form

Federal agencies should use this form for the optional streamlined consultation framework for the northern long-eared bat (NLEB). This framework allows federal agencies to rely upon the U.S. Fish and Wildlife Service's (USFWS) January 5, 2016, intra-Service Programmatic Biological Opinion (BO) on the final 4(d) rule for the NLEB for section 7(a)(2) compliance by: (1) notifying the USFWS that an action agency will use the streamlined framework; (2) describing the project with sufficient detail to support the required determination; and (3) enabling the USFWS to track effects and determine if reinitiation of consultation is required per 50 CFR 402.16.

This form is not necessary if an agency determines that a proposed action will have no effect to the NLEB or if the USFWS has concurred in writing with an agency's determination that a proposed action may affect, but is not likely to adversely affect the NLEB (i.e., the standard informal consultation process). Actions that may cause prohibited incidental take require separate formal consultation. Providing this information does not address section 7(a)(2) compliance for any other listed species.

### Information to Determine 4(d) Rule Compliance:

	YES	NO
1. Does the project occur wholly outside of the WNS Zone <sup>1</sup> ?	<input type="checkbox"/>	<input checked="" type="checkbox"/>
2. Have you contacted the appropriate agency <sup>2</sup> to determine if your project is near known hibernacula or maternity roost trees?	<input checked="" type="checkbox"/>	<input type="checkbox"/>
3. Could the project disturb hibernating NLEBs in a known hibernaculum?	<input type="checkbox"/>	<input checked="" type="checkbox"/>
4. Could the project alter the entrance or interior environment of a known hibernaculum?	<input type="checkbox"/>	<input checked="" type="checkbox"/>
5. Does the project remove any trees within 0.25 miles of a known hibernaculum at any time of year?	<input type="checkbox"/>	<input checked="" type="checkbox"/>
6. Would the project cut or destroy known occupied maternity roost trees, or any other trees within a 150-foot radius from the maternity roost tree from June 1 through July 31.	<input type="checkbox"/>	<input checked="" type="checkbox"/>

You are eligible to use this form if you have answered yes to question #1 **or** yes to question #2 **and** no to questions 3, 4, 5 and 6. The remainder of the form will be used by the USFWS to track our assumptions in the BO.

**Agency:** FHWA – Connecticut Division

**Applicant<sup>3</sup>** (Name, Email, Phone No.):

Connecticut Department of Transportation  
 Amanda M. Saul, Office of Environmental Planning  
[DOT.NLEB@ct.gov](mailto:DOT.NLEB@ct.gov), (860)594-2939

**Project Name:** CTDOT0014-0185

**Project Location** (include coordinates if known): I-95 over Route 1, Town of Branford: 41.2951, -72.7833

**Basic Project Description** (provide narrative below or attach additional information):

Full superstructure replacement of Bridge 00196 with associated widening, I-95 over Route 1 in the Town of Branford.

<sup>1</sup> <http://www.fws.gov/midwest/endangered/mammals/nleb/pdf/WNSZone.pdf>

<sup>2</sup> See <http://www.fws.gov/midwest/endangered/mammals/nleb/nhisites.html>

<sup>3</sup> If applicable - only needed for federal actions with applicants (e.g., for a permit, etc.) who are party to the consultation.

<b>General Project Information</b>	<b>YES</b>	<b>NO</b>
Does the project occur within 0.25 miles of a known hibernaculum?	<input type="checkbox"/>	<input checked="" type="checkbox"/>
Does the project occur within 150 feet of a known maternity roost tree?	<input type="checkbox"/>	<input checked="" type="checkbox"/>
Does the project include forest conversion <sup>4</sup> ? (if yes, report acreage below)	<input type="checkbox"/>	<input checked="" type="checkbox"/>
Estimated total acres of forest conversion	0.19	
If known, estimated acres <sup>5</sup> of forest conversion from April 1 to October 31		
If known, estimated acres of forest conversion from June 1 to July 31 <sup>6</sup>		
Does the project include timber harvest? (if yes, report acreage below)	<input type="checkbox"/>	<input checked="" type="checkbox"/>
Estimated total acres of timber harvest		
If known, estimated acres of timber harvest from April 1 to October 31		
If known, estimated acres of timber harvest from June 1 to July 31		
Does the project include prescribed fire? (if yes, report acreage below)	<input type="checkbox"/>	<input checked="" type="checkbox"/>
Estimated total acres of prescribed fire		
If known, estimated acres of prescribed fire from April 1 to October 31		
If known, estimated acres of prescribed fire from June 1 to July 31		
Does the project install new wind turbines? (if yes, report capacity in MW below)	<input type="checkbox"/>	<input checked="" type="checkbox"/>
Estimated wind capacity (MW)		

Agency Determination:

By signing this form, the action agency determines that this project may affect the NLEB, but that any resulting incidental take of the NLEB is not prohibited by the final 4(d) rule.

If the USFWS does not respond within 30 days from submittal of this form, the action agency may presume that its determination is informed by the best available information and that its project responsibilities under 7(a)(2) with respect to the NLEB are fulfilled through the USFWS January 5, 2016, Programmatic BO. The action agency will update this determination annually for multi-year activities.

The action agency understands that the USFWS presumes that all activities are implemented as described herein. The action agency will promptly report any departures from the described activities to the appropriate USFWS Field Office. The action agency will provide the appropriate USFWS Field Office with the results of any surveys conducted for the NLEB. Involved parties will promptly notify the appropriate USFWS Field Office upon finding a dead, injured, or sick NLEB.

**Amanda M. Saul**

Digitally signed by Amanda M. Saul  
 DN: cn=Amanda M. Saul, o=Connecticut  
 Department of Transportation, ou=Office of  
 Environmental Planning,  
 email=amanda.saul@ct.gov, c=US  
 Date: 2018.03.09 10:05:13 -05'00'

Signature: \_\_\_\_\_

Date Submitted: 3/9/2018

<sup>4</sup> Any activity that temporarily or permanently removes suitable forested habitat, including, but not limited to, tree removal from development, energy production and transmission, mining, agriculture, etc. (see page 48 of the BO).

<sup>5</sup> If the project removes less than 10 trees and the acreage is unknown, report the acreage as less than 0.1 acre.

<sup>6</sup> If the activity includes tree clearing in June and July, also include those acreage in April to October.

**Applicant: General Public, State of Connecticut**

**Effective Date: August 19, 2016**

**Expiration Date: August 19, 2021**

**DEPARTMENT OF THE ARMY  
GENERAL PERMITS FOR THE  
STATE OF CONNECTICUT  
&  
LANDS LOCATED WITHIN THE  
BOUNDARIES OF AN INDIAN RESERVATION<sup>1</sup>**

The New England District of the U.S. Army Corps of Engineers (Corps) hereby issues twenty-one (21) General Permits (GPs), listed below, for activities subject to Corps jurisdiction in waters of the United States (U.S.), including navigable waters, within boundaries of the State of Connecticut and lands located within the boundaries of an Indian reservation. These GPs are issued in accordance with Corps regulations at 33 CFR 320 - 332 [see 33 CFR 325.5(c)(1)], and authorizes activity-specific categories of work that are similar in nature and cause no more than minimal individual and cumulative adverse environmental impacts. These GPs will provide protection to the aquatic environment and the public interest while effectively authorizing activities that have no more than minimal individual and cumulative adverse environmental effects.

**GENERAL CRITERIA**

In order for activities to qualify for these GPs, they must meet the terms and eligibility criteria and stipulations listed in Appendix A – General Permits as well as the Appendix B General Conditions.

Projects may qualify for the following:

- Self-Verification (inland) - Self -Verification Notification Form (SVNF) is required
- Self-Verification (coastal) - SVNF NOT required. Corps relies on CT DEEP, OLISP submittals.
- Pre-Construction Notification (PCN) -
  - Inland - Application to and written approval from the Corps is required.
  - Coastal - Notification to Corps provided by CT DEEP, OLISP or by applicants as necessary. Written approval from the Corps is required.

If your project is ineligible for Self-Verification (SV), it may be screened under PCN or may require an Individual Permit. The thresholds for activities eligible for Self-Verification and PCN are defined in Appendix A. These GPs do not affect the Corps Individual Permit review process or activities exempt from Corps regulation.

---

<sup>1</sup> Indian reservation lands are considered a sovereign nation, and are therefore acknowledged separately from the State of Connecticut for purposes of this General Permit.

## Connecticut General Permits

An activity is authorized under GPs 1-21 below only if that activity and the permittee satisfy all of the GP's terms and conditions.

1. Aids to navigation & temporary recreational structures
2. Repair or maintenance of existing currently serviceable, authorized or grandfathered structures/fills, removal of structures
3. Moorings
4. Pile-supported structures & floats, including boat lifts/hoists and other miscellaneous Structures & work
5. Boat ramps and marine railways
6. Utility line activities
7. Dredging, transport & disposal of dredged material, beach nourishment, rock removal & rock relocation
8. Discharges of dredged or fill material incidental to the construction of bridges
9. Shoreline and bank stabilization projects
10. Aquatic habitat restoration, establishment and enhancement activities
11. Fish and wildlife harvesting activities
12. Oil spill and hazardous material cleanup
13. Cleanup of hazardous and toxic waste
14. Scientific measurement devices
15. Survey activities
16. Aquaculture projects and fisheries
17. New/expanded developments & recreational facilities
18. Linear transportation projects – wetland crossings only
19. Stream, river & brook crossings (not including wetland crossings)
20. Energy generation and renewable energy generation facilities and hydropower projects
21. Temporary fill not associated with any other GP activities

## SECTION 1

### **REVIEW CATEGORIES AND APPLICATION PROCEDURES FOR PROJECTS WITHIN NON-TIDAL WATERS AND WETLANDS WITHIN THE STATE OF CONNECTICUT AND LANDS LOCATED WITHIN AN INDIAN RESERVATION**

#### **I. ACTIVITIES COVERED:**

The discharge of dredged or fill material into Waters of the United States, which is regulated by the Corps under Section 404 of the Clean Water Act (CWA), see 33 CFR 328.

#### **II. REVIEW PROCESS:**

##### **1. State and Local Approvals:**

In order for authorizations under these GPs to be valid and before commencing any work within Corps jurisdiction, applicants must apply for and obtain State Water Quality Certification as well as any local approvals (see **General Condition 1**):

**Water Quality Certification (WQC)** under Section 401 of the Federal CWA (33 USC Sec. 1341). Section 401(a)(1) of the Clean Water Act requires that applicants obtain a WQC or waiver from the state water pollution control agency which in Connecticut is the Connecticut Department of Energy and Environmental Protection (CT DEEP) or U.S. EPA for Indian reservation lands to discharge dredged or fill material into waters of the U.S. (see **attached Water Quality Certification and table**).

The CT DEEP, Inland Water Resources Division (CT DEEP IWRD) has conditionally granted WQC for Self-Verification (SV) activities in inland wetlands and waterways provided those activities meet the criteria as contained in the attached **Appendix A – General Permits** document.

The CT DEEP- IWRD has granted WQC with terms, limitations and conditions specified therein.

The CT DEEP- IWRD has waived WQC for GP 12, GP 13, GP 14, and GP 15.

The U.S. EPA granted WQC for Self-Verification and PCN activities located on lands within the boundaries of an Indian Reservation.

##### **2. General Permit Review Categories:**

**a. Self-Verification – An application to the Corps is NOT required. However, submittal of the attached Self-Verification Notification Form at Appendix E to the Corps and CT DEEP, IWRD is required prior to commencement of work authorized by these GPs.**

#### **Eligibility Criteria**

Activities in Connecticut and lands located within the boundaries of an Indian reservation that meet the following criteria are eligible under Self-verification of this General Permit:

- are subject to Corps jurisdiction (See **General Condition 2**),
- meet the criteria of Self-Verification in the attached **Appendix A - General Permits**, and
- meet the General Conditions of the GPs.

Project proponents seeking Self-Verification authorizations must comply with the General Conditions and other federal laws such as the National Historic Preservation Act, the Endangered Species Act (ESA) and the Wild and Scenic Rivers Act. Therefore, consultation with the Corps and/or outside experts, such as the State Historic Preservation Office and any appropriate Indian tribes, is recommended when there is a high likelihood of the presence of resources of concern.

**b. Pre-Construction Notification (PCN) – An application to the Corps is required.**

Projects not eligible under Self-Verification of the GPs may be screened under PCN, provided they meet the criteria as defined in the attached **Appendix A – General Permits** for PCN activities.

**Eligibility Criteria**

Activities in Connecticut and lands located within an Indian reservation that meet the following criteria are eligible under PCN of this General Permit:

- are subject to Corps jurisdiction (See **General Condition 2**),
- meet the criteria of PCN in the attached **Appendix A – General Permits**, and
- meet the General Conditions of the GPs.

**3. Applying for an authorization through the PCN process:**

Applicants must also submit two copies of the following to the Corps, on a CD if available and hard copy:

- Corps application form (ENG Form 4345) found at <http://www.usace.army.mil/Missions/CivilWorks/RegulatoryProgramandPermits/ObtainPermit.aspx>
- 8.5” x 11” or 11” x 17” drawings and one large-scale drawing,
- wetlands functions and values assessment,
- Federal wetland delineation documentation (data sheets),
- The CT DEEP addendum found at: [http://www.ct.gov/deep/lib/deep/Permits\\_and\\_Licenses/LandUse\\_General\\_Permits/Inland\\_Water\\_General\\_Permits/CT\\_addendum\\_app.pdf](http://www.ct.gov/deep/lib/deep/Permits_and_Licenses/LandUse_General_Permits/Inland_Water_General_Permits/CT_addendum_app.pdf)
- Correspondence with the State Historic Preservation Office and Tribal Historic Preservation Officer indicating coordination with these entities along with a completed CT SHPO Form. The CT SHPO Form is available on the CT SHPO website under Historic Preservation – Environmental Review at [http://www.cultureandtourism.org/cct/lib/cct/Project\\_Notification\\_Form\\_final.pdf](http://www.cultureandtourism.org/cct/lib/cct/Project_Notification_Form_final.pdf)
- a plan describing any proposed mitigation along with an Invasive Species Control Plan.

Applicants must concurrently submit three copies of the following to the CT DEEP at the address below:

- the Corps application form,
- 8.5” x 11” or 11” x 17” drawings and one large-scale drawing,
- wetlands functions and values assessment,
- Federal wetlands delineation documentation (data sheets),
- CT DEEP addendum, and
- a plan describing any proposed mitigation.

**State of Connecticut  
Department of Energy & Environmental Protection  
Central Permit Processing Unit  
79 Elm Street  
Hartford, CT 06106-5127**

**NOTE: Applicants must submit all project revisions and modifications to both agencies.**

The Corps will coordinate review of all PCN activities with federal and state agencies to ensure that the proposed activity results in no more than a minimal impact to the aquatic environment. To be eligible and subsequently authorized, an activity must meet the eligibility criteria in **2. General Permit Review Categories** above and result in no more than minimal impacts to the aquatic environment as determined by the Corps in conjunction with the interagency review team which consists of federal and state resource agencies. This may require project modifications involving avoidance, minimization, and/or compensatory mitigation for unavoidable impacts to ensure the net effects of a project are minimal.

**Written approval from the Corps for PCN activities is required before work can commence.**

**Emergency Situation Procedures:** 33 CFR 325.2 (e) (4) states that an “emergency” is a situation which would result in an unacceptable hazard to life, a significant loss of property, or an immediate, unforeseen and significant economic hardship if corrective action requiring a permit is not undertaken within a time period less than the normal time needed to process the application under standard procedures.” Notification to the Corps and CT DEEP – IWRD is required. The Corps will determine if a project qualifies as an emergency and will work with all applicable agencies to expedite authorization in emergency situations. If the project qualifies as an emergency, authorization under Self-verification or PCN of the GPs is not required.

**Individual Permit Procedures:** Work that is **NOT** eligible for authorization under the GPs as defined in the attached **Appendix A – General Permits**, or that does not meet the terms and conditions of the GPs, will require review under the Corps Individual Permit procedures (see 33 CFR Part 325.1). The applicant shall submit the appropriate application materials (including the Corps ENG 4345 application form) to the Corps of Engineers. General information and application forms can be obtained at the Corps web site noted in Paragraph 3 above. An individual Water Quality Certification is required from the CT DEEP, IWRD. **The application form and instructions for Section 401 Water Quality Certification are available from the Connecticut DEEP web site at [http://www.ct.gov/deep/cwp/view.asp?a=2709&q=324168&depNav\\_GID=1643](http://www.ct.gov/deep/cwp/view.asp?a=2709&q=324168&depNav_GID=1643).**





**TABLE 1. CONNECTICUT WATER QUALITY CERTIFICATION**  
**Water Quality Certification – Non-Tidal Waters, Wetlands, and Watercourses \***  
**Department of the Army - General Permits for the State of Connecticut**  
**WQC-201607149**  
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	Self-Verification (SV)	Pre-Construction Notification (PCN)
	<u>WHERE GRANTED, APPENDIX E: SELF-VERIFICATION NOTIFICATION FORM AND PLANS ARE REQUIRED TO BE FILED WITH CT DEEP – See Appendix E for instructions</u>	<u>WHERE GRANTED, APPLICATION TO CT DEEP IS REQUIRED – See Section 1, II. 3. (pages 2-3 ) of the Army Corps GP for instructions</u>
<b>GP 2. Repair or Maintenance of Existing Currently Serviceable, Authorized or Grandfathered Structures &amp; Fills, Removal of Structures</b>	<p>Granted subject to the following restriction:</p> <ul style="list-style-type: none"> <li>• Drawdown does not exceed 18 months and one growing season (April through September)</li> </ul> <p><b>Stream, river, brook or other watercourse crossings are not eligible for Section 401 Water Quality Certification under GP 2. (See GP 19.)</b></p> <p><b>Culvert slip-lining is not eligible for Section 401 Water Quality Certification under GP2. (See GP 19.)</b></p>	<p>Granted for impacts not exceed 0.5 acre, subject to the following restriction:</p> <ul style="list-style-type: none"> <li>• Drawdown does not exceed 18 months and one growing season (April through September)</li> </ul> <p><b>Stream, river, brook or other watercourse crossings are not eligible for Section 401 Water Quality Certification under GP 2. (See GP 19.)</b></p>
<b>GP 5. Boat Ramps &amp; Marine Railways</b>	Granted	Granted for impacts not exceeding 0.5 acre.
<b>GP 6. Utility Line Activities</b>	Granted	<p>Granted for activities that receive written approval from the Connecticut Department of Energy and Environmental Protection (CT DEEP) through a formal cooperative state interagency screening process jointly conducted by the Connecticut Department of Transportation (CT DOT) and CT DEEP.</p> <p>Granted for activities conducted or funded by the Connecticut Department of Energy and Environmental Protection (CT DEEP) that receive written approval through a formal cooperative CT DEEP intra-agency screening process.</p> <p><b>Other activities with impacts exceeding 0.5 acre require individual (regular) Section 401 Water Quality Certification.</b></p>
<b>GP 9. Shoreline &amp; Bank Stabilization Projects</b>	<p>Granted for shoreline and banks stabilization activities that receive written approval from the Connecticut Department of Energy and Environmental Protection (CT DEEP) through a formal cooperative state interagency screening process jointly conducted by the Connecticut Department of Transportation (CT DOT) and CT DEEP.</p> <p>Granted for shoreline and bank stabilization activities conducted or funded by the Connecticut Department of Energy and Environmental Protection (CT DEEP) that receive written approval through a formal cooperative CT DEEP intra-agency screening process.</p> <p><b>Other shoreline stabilization activities exceeding 50 feet in length are not eligible for Section 401 Water Quality Certification under SV.</b></p> <p><b>Other stream, river, or brook bank stabilization activities exceeding 50 feet in total length for one stream bank or 50 feet cumulative length for both stream banks are not eligible for Section 401 Water Quality Certification under SV.</b></p> <p><b>Activities that include the placement of fill within the streambed beyond the toe of slope of the stream bank are not eligible for Section 401 Water Quality Certification under SV</b></p>	<p>Granted for activities that receive written approval from the Connecticut Department of Energy and Environmental Protection (CT DEEP) through a formal cooperative state interagency screening process jointly conducted by the Connecticut Department of Transportation (CT DOT) and CT DEEP.</p> <p>Granted for activities conducted or funded by the Connecticut Department of Energy and Environmental Protection (CT DEEP) that receive written approval through a formal cooperative CT DEEP intra-agency screening process.</p> <p><b>Other shoreline stabilization activities exceeding 100 feet in total length require individual (regular) Section 401 Water Quality Certification.</b></p> <p><b>Other stream, river, or brook bank stabilization activities exceeding 100 feet in total length for one stream bank or 100 feet cumulative length for both stream banks require individual (regular) Section 401 Water Quality Certification.</b></p>

**TABLE 1. CONNECTICUT WATER QUALITY CERTIFICATION**  
**Water Quality Certification – Non-Tidal Waters, Wetlands, and Watercourses \***  
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	Self-Verification (SV)	Pre-Construction Notification (PCN)
	<b><u>WHERE GRANTED, APPENDIX E: SELF-VERIFICATION NOTIFICATION FORM AND PLANS ARE REQUIRED TO BE FILED WITH CT DEEP – See Appendix E for instructions</u></b>	<b><u>WHERE GRANTED, APPLICATION TO CT DEEP IS REQUIRED – See Section 1, II. 3. (pages 2-3 ) of the Army Corps GP for instructions</u></b>
<b>GP 10. Aquatic Habitat Restoration, Establishment &amp; Enhancement Activities</b>	<p>Granted for activities that receive written approval from the Connecticut Department of Energy and Environmental Protection (CT DEEP) through a formal cooperative state interagency screening process jointly conducted by the Connecticut Department of Transportation (CT DOT) and CT DEEP.</p> <p>Granted for activities conducted or funded by the Connecticut Department of Energy and Environmental Protection (CT DEEP) or by a federal environmental resource management agency that receive written approval through a formal cooperative CT DEEP intra-agency screening process.</p> <p><b>Other activities are not eligible for Section 401 Water Quality Certification under SV.</b></p>	Granted
<b>GP 11. Fish &amp; Wildlife Harvesting Activities</b>	Granted	Granted
<b>GP 12. Oil Spill &amp; Hazardous Material Cleanup</b>	Waived	Waived
<b>GP 13. Cleanup of Hazardous &amp; Toxic Waste</b>	Waived	Waived
<b>GP 14. Scientific Measurement Devices</b>	Waived	Waived
<b>GP 15. Survey Activities</b>	Waived	Waived
<b>GP 17. New/Expanded Developments &amp; Recreational Facilities</b>	<p>Granted, except as noted below.</p> <p><b>New roadway and driveway crossings in wetlands are not eligible for Section 401 Water Quality Certification under GP 17. (See GP 18.)</b></p> <p><b>Stream, river, brook or other watercourse crossings are not eligible for Section 401 Water Quality Certification under GP17. (See GP 19.)</b></p>	<p>Granted for activities conducted or funded by the Connecticut Department of Energy and Environmental Protection (CT DEEP) that receive written approval through a formal cooperative state intra-agency screening process.</p> <p><b>Other activities with impacts exceeding 0.5 acre require individual (regular) Section 401 Water Quality Certification.</b></p> <p><b>New roadway and driveway crossings in wetlands are not eligible for Section 401 Water Quality Certification under GP 17. (See GP 18.)</b></p> <p><b>Stream, river, brook or other watercourse crossings are not eligible for Section 401 Water Quality Certification under GP 18. (See GP 19.)</b></p>

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	Self-Verification (SV)	Pre-Construction Notification (PCN)
	<b><u>WHERE GRANTED, APPENDIX E: SELF-VERIFICATION NOTIFICATION FORM AND PLANS ARE REQUIRED TO BE FILED WITH CT DEEP – See Appendix E for instructions</u></b>	<b><u>WHERE GRANTED, APPLICATION TO CT DEEP IS REQUIRED – See Section 1, II. 3. (pages 2-3 ) of the Army Corps GP for instructions</u></b>
<b>GP 18. Linear Transportation Projects – Wetland Crossings Only</b>	Granted  <b>Stream, river, brook or other watercourse crossings are not eligible for Section 401 Water Quality Certification under GP 18. (See GP 19.)</b>	Granted for activities that receive written approval from the Connecticut Department of Energy and Environmental Protection (CT DEEP) through a formal cooperative state interagency screening process jointly conducted by the Connecticut Department of Transportation (CT DOT) and CT DEEP.  Granted for activities conducted or funded by the Connecticut Department of Energy and Environmental Protection (CT DEEP) that receive written approval through a formal cooperative CT DEEP intra-agency screening process.  <b>All other activities with impacts exceeding 0.5 acre require individual (regular) Section 401 Water Quality Certification.</b>  <b>Stream, river, brook or other watercourse crossings are not eligible for Section 401 Water Quality Certification under GP 18. (See GP 19.)</b>
<b>GP 19. Stream, River &amp; Brook Crossings (Not Including Wetland Crossings)</b>  Continued on next page	Granted for stream, river or brook crossings that receive written approval from the Connecticut Department of Energy and Environmental Protection (CT DEEP) through a formal cooperative state interagency screening process jointly conducted by the Connecticut Department of Transportation (CT DOT) and CT DEEP.  Granted for activities conducted or funded by the Connecticut Department of Energy and Environmental Protection (CT DEEP) that receive written approval through a formal cooperative CT DEEP intra-agency screening process.  Granted for all other stream, river, brook or other watercourse crossings by means of a BRIDGE or OPEN-BOTTOM STRUCTURE that meets the following standards: <ul style="list-style-type: none"> <li>• spans at least 1.2 times the watercourse bank full width,</li> <li>• allows for the continuous, uninterrupted flow of the 50-year frequency storm flows,</li> <li>• no riprap is placed within or across the bed of the brook; and,</li> <li>• appurtenant stream bank stabilization does not exceed 50 feet along any upstream or downstream bank.</li> </ul> <b>Stream, river, brook and other watercourse crossings that do not meet the standards above are not eligible Section 401 Water Quality Certification for Self-Verification.</b>  <b>Culvert slip lining is not eligible for Section 401 Water Quality Certification for Self-Verification.</b>  <b>Wetland crossings are not eligible for Section 401 Water Quality Certification under GP 19. (See GP 18.)</b>	Granted for stream, river or brook crossings that receive written approval from the Connecticut Department of Energy and Environmental Protection (CT DEEP) through a formal cooperative state interagency screening process jointly conducted by the Connecticut Department of Transportation (CT DOT) and CT DEEP.  Granted for activities conducted or funded by the Connecticut Department of Energy and Environmental Protection (CT DEEP) that receive written approval through a formal cooperative CT DEEP intra-agency screening process.  <b>All other stream, river and brook crossings require individual (regular) Section 401 Water Quality Certification.</b>  <b>Wetland crossings are not eligible for Section 401 Water Quality Certification under GP 19. (See GP 18.)</b>

**TABLE 1. CONNECTICUT WATER QUALITY CERTIFICATION**  
**Water Quality Certification – Non-Tidal Waters, Wetlands, and Watercourses \***  
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	Self-Verification (SV)  <b><u>WHERE GRANTED, APPENDIX E: SELF-VERIFICATION NOTIFICATION FORM AND PLANS ARE REQUIRED TO BE FILED WITH CT DEEP – See Appendix E for instructions</u></b>	Pre-Construction Notification (PCN)  <b><u>WHERE GRANTED, APPLICATION TO CT DEEP IS REQUIRED – See Section 1, II. 3. (pages 2-3 ) of the Army Corps GP for instructions</u></b>
<b>GP 19. Stream, River &amp; Brook Crossings (Not Including Wetland Crossings)</b>	<p>Granted for stream, river, brook or other watercourse crossings using a culvert provided:</p> <ul style="list-style-type: none"> <li>• the tributary watershed to the culvert does not exceed 1 sq. mile (640 acres);</li> <li>• the culvert gradient (slope) is no steeper than the streambed gradient immediately upstream or downstream of the culvert,</li> <li>• for a crossing constructed using a single box or pipe arch culvert, the inverts are set not less than 12 inches below the streambed elevation</li> <li>• for a crossing constructed using multiple box or pipe arch culverts, the inverts of one of the boxes or pipe arch culverts are set not less than 12 inches below the elevation of the streambed,</li> <li>• for a crossing constructed using a pipe culvert, the inverts are set such that not less than 25% of the pipe diameter or 12 inches, whichever is less, is set below the streambed elevation,</li> <li>• the culvert is backfilled with natural substrate material matching upstream and downstream streambed substrate,</li> <li>• the structure, including inlet and outlet protection measures, does not otherwise impede the passage of fish and other aquatic organisms, and</li> <li>• the structure allows for continuous flow of the 50-year frequency storm flows</li> </ul>	
<b>GP 21. Temporary Fill Not Associated With Any Other GP Activities</b>	Granted	<p>Granted for activities that receive written approval from the Connecticut Department of Energy and Environmental Protection (CT DEEP) through a formal cooperative state interagency screening process jointly conducted by the Connecticut Department of Transportation (CT DOT) and CT DEEP.</p> <p>Granted for activities conducted or funded by the Connecticut Department of Energy and Environmental Protection (CT DEEP) that receive written approval through a formal cooperative CT DEEP intra-agency screening process.</p> <p><b>Other activities with impacts exceeding 0.25 acre require individual (regular) Section 401 Water Quality Certification.</b></p>

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**\* ACTIVITIES NOT ELIGIBLE FOR SECTION 401 CERTIFICATION UNDER THIS GENERAL PERMIT CERTIFICATION**

The following activities are not eligible for Section 401 Water Quality Certification under this general permit certification and will require an individual (regular) Section 401 Water Quality Certification:

Detention or retention of stormwater in non-tidal waters, wetlands or watercourses including any watercourse or wetland crossing that by design or default functions to provide stormwater detention, and any construction of a stormwater detention or retention basin in non-tidal waters or wetlands.

Piping, boxing, enclosing or covering of a non-tidal watercourse for a purpose other than a driveway or roadway crossing.

Activities with direct, indirect or secondary impact(s) to: Special Wetlands<sup>(1)</sup>, Threatened, Endangered, or Special Concern Species<sup>(2)</sup>, Significant Natural Communities/Critical Habitats<sup>(2)</sup> identified by the Connecticut Natural Diversity Database.

Activities within a FEMA established floodplain that would adversely affect the hydraulic characteristics of the floodplain<sup>(3)</sup>.

**DEFINITIONS**

<sup>(1)</sup> **Special Wetlands:** Include vernal pools, bogs, fens, cedar swamps, spruce swamps, calcareous seepage swamps, and wetlands that provide habitat for threatened or endangered species or species of special concern as designated by the State of Connecticut Natural Diversity Database. The following definitions for bogs, calcareous seepage wetlands, cedar swamps, fens, spruce swamps, and vernal pools apply for the purposes of this GP:

**Bog:** a peat accumulating wetland dominated by sphagnum moss. Typical plant species include sphagnum moss, leatherleaf, black spruce, pitcher plant and sundew.

**Calcareous Seepage Swamp:** a forested wetland characterized by the discharge of groundwater with a chemistry influenced by an underlying limestone geology.

**Cedar Swamp:** a forested wetland characterized by the presence of Northern White Cedar or Atlantic White Cedar.

**Fen:** a peat accumulating wetland dominated by sedges and/or ericaceous shrubs. Typical plant species include low sedges, ericaceous shrubs, sphagnum and other mosses.

**Spruce Swamp:** a forested wetland characterized by the presence of Red or Black Spruce.

**Vernal Pool:** an often temporary body of water occurring in a shallow depression of natural or human origin that fills during spring rains and snow melt and typically dries up during summer months. Vernal pools support populations of species specially adapted to reproducing in these habitats. Such species may include wood frogs, mole salamanders (*Ambystoma* sp.), fairy shrimp, fingernail clams, and other amphibians, reptiles and invertebrates. Vernal pools lack breeding populations of fish. **All vernal pools are subject to the jurisdiction of the Connecticut Department of Energy and Environmental Protection under Connecticut Water Quality Standards.**

<sup>(2)</sup> **Threatened, Endangered or Special Concern Species; Significant Natural Communities/Critical Habitats:** Species listed by CT DEP pursuant to Chapter 495 of the Connecticut General Statute as threatened or endangered species or species of special concern. General locations of threatened and endangered species and species of special concern, and significant natural communities/critical habitats are identified on maps published by the Connecticut Department of Energy and Environmental Protection entitled "Natural Diversity Data Base Areas" and on the CTECO Interactive Map Viewers at [www.cteco.uconn.edu](http://www.cteco.uconn.edu).

<sup>(3)</sup> **Adverse Effect to Hydraulic Characteristics:** An adverse effect to hydraulic characteristics includes an increase in flood water surface elevation, an increase in flood flow velocity or a restriction of flood flow conveyance in a manner that would impact upstream, downstream or adjacent property.



**SECTION 2:**  
**REVIEW CATEGORIES & APPLICATION PROCEDURES FOR PROJECTS WITHIN  
TIDAL, COASTAL AND NAVIGABLE WATERS WITHIN THE STATE OF  
CONNECTICUT**

Connecticut's coastal area is statutorily defined as: all lands and waters within the municipalities of Greenwich, Stamford, Darien, Norwalk, Westport, Fairfield, Bridgeport, Stratford, Shelton, Milford, Borough of Woodmont, Orange, West Haven, New Haven, Hamden, North Haven, East Haven, Branford, Guilford, Madison, Clinton, Westbrook, Deep River, Chester, Essex, Borough of Fenwick, Old Saybrook, Lyme, Old Lyme, East Lyme, Waterford, New London, Montville, Norwich, Preston, Ledyard, Groton (city, Town and Long Point Borough), Mystic and Stonington (Town & Borough) [Section 22a-94(a) CGS].

**Navigable Waters:** Navigable waters of the United States are those waters that are subject to the ebb and flow of the tide and/or are presently used, or have been used in the past, or may be susceptible for use to transport interstate or foreign commerce. The Connecticut River has been determined to be a navigable water of the United States. [Refer to Title 33 CFR Part 329]

**I. ACTIVITIES COVERED:**

- Work and structures that are located in, under or over any navigable water of the U.S. (defined at 33 CFR 329) that affect the course, location, condition, or capacity of such waters; or the excavating from or depositing material in navigable waters. (Regulated by the Corps under Section 10 of the Rivers and Harbors Act of 1899);
- The discharge of dredged or fill material into waters of the U.S. (defined at 33 CFR 328), which is regulated by the Corps under Section 404 of the Clean Water Act (CWA)
- The transportation of dredged material for the purpose of disposal in the ocean. The Corps regulates these activities under Section 103 of the Marine Protection, Research and Sanctuaries Act. See 33 CFR 324.

**II. REVIEW PROCESS:**

**1. Connecticut Department of Energy & Environmental Protection, Office of Long Island Sound Programs (DEEP OLISP) approvals:**

In order for authorizations under these GPs to be valid and before commencing any work within Corps jurisdiction, applicants are responsible for applying for and obtaining any of the following required State or local approvals (see **General Condition 1**):

**Water Quality Certification (WQC)** Issuance or waiver under Section 401 of the Federal CWA (33 USC Section 1341). Section 401(a)(1) of the Clean Water Act requires that applicants obtain a WQC or waiver from the state water pollution control agency (CT DEEP) or EPA for Indian reservation lands to discharge dredged or fill material into waters of the U.S.

**Coastal Zone Management Consistency (CZM)** - Concurrence under Section 307 of the Federal CZM Act of 1972, as amended. Section 307(c) of the CZM of 1972, as amended, requires applicants to obtain a certification or waiver from CT DEEP OLISP that the activity complies with the state's CZM program for activities affecting a state's Coastal Area.

Project proponents involving dredging/excavation and associated disposal within the Byram River must also coordinate with NY DOS directly to obtain a certification or waiver that the activity complies with NYDOS' CZM program. Also, all projects with disposal at any of the Long Island Sound Disposal Sites require NY DOS CZM consistency. Additional information can be found at their website: <http://www.dos.ny.gov/opd/programs/consistency/>.

## **2. Corps Authorizations:**

**a. Self-Verification (SV) – Applicants are not required to submit an Application or Appendix E to the Corps.** Instead, DEEP OLISP will forward copies of application packages and their approvals to the Corps on a weekly basis. If the Corps determines that a project meets this category, the Corps will forward verification of eligibility to the applicant.

### **Eligibility Criteria**

Activities in Connecticut and lands located within the boundaries of an Indian reservation may proceed without application or notification to the Corps if they:

- are subject to Corps jurisdiction
- meet the definition of Self-Verification in **Appendix A - General Permits**, and
- meet the General Conditions of the GPs

**Note:** Activities subject to Corps jurisdiction that are NOT regulated by the DEEP OLISP will be subject to the Pre-Construction Notification (PCN) screening requirements of the GPs as noted below.

Project proponents seeking eligibility under the SV category must comply with the General Conditions of the GPs and other federal laws such as the National Historic Preservation Act, the Endangered Species Act (ESA) and the Wild and Scenic Rivers Act. Therefore, consultation with the Corps and/or outside experts such as the State Historic Preservation Office and any appropriate Indian tribes is recommended when there is a likelihood of the presence of resources of concern.

### **b. Pre-Construction Notification (PCN) (notification/application and written authorization required)**

Projects not eligible under the SV category of the GPs may be screened under PCN category, provided they meet the criteria.



### **Eligibility Criteria**

Activities in Connecticut and lands located within the boundaries of an Indian reservation that meet the following criteria **require written approval from the Corps**:

- are subject to Corps jurisdiction,
- meet the definition of PCN in this Section, and
- meet the General Conditions of the GPs

### **3. Applying for authorization through the PCN process:**

#### **a. CT DEEP, OLISP regulated activities**

Structures and Dredging Permit Applications: Applicants/agents shall submit to the Corps, a copy of the DEEP Permit Consultation Form for U.S. Army Corps of Engineers Review along with project plans. The Corps will then coordinate this information with the interagency review team (see paragraph 4 below) and then return the form to applicants/agents for their submission to DEEP OLISP.

Certificates of Permission (COPs), General Permits (GPs) and Modifications: OLISP will forward copies of application packages and approvals to the Corps. If a project is determined to meet any of the PCN activities and is complete, the Corps will coordinate these projects with the interagency review team. If the Corps determines that an Individual permit or additional information is required, the Corps will coordinate directly with the applicant/agent.

**NOTE:** For projects which involve dredging and open water disposal - Applicants/agents must submit requests for sampling plans to the DEEP, OLISP and the Corps simultaneously, along with other required information specific to dredging/open water disposal, a detailed open water disposal site alternative analysis, and a completed New York State, Department of State (NYS DOS) Federal Consistency Assessment Form found at <http://nyswaterfronts.com/downloads/pdfs/fcaf2.pdf>. Please see our website at <http://www.nae.usace.army.mil/Regulatory/> for a list of all required additional information.

#### **b. Aquaculture activities regulated by the Connecticut Department of Agriculture**

This refers to marine- and land-based aquaculture activities, including associated structures regulated by the Department of Agriculture, Bureau of Aquaculture (DA/BA), Connecticut General Statutes Section 22-11h.

Applicants should apply directly to the DA/BA using the Joint Application for Aquaculture form found at: [http://www.nae.usace.army.mil/reg/Permits/CT\\_AquacultureApplication.pdf](http://www.nae.usace.army.mil/reg/Permits/CT_AquacultureApplication.pdf). The DA/BA will forward a copy of the aquaculture application package to the Corps, the State of Connecticut Department of Energy & Environmental Protection's (CT DEEP) Boating Division, Marine Fisheries Division, Office of Long Island Sound Programs (OLISP), and CT DEEP, Inland Water Resources Division (IWRD) for activities impacting inland waters.

These application packages for marine-based activities will be screened by the Corps, the Federal resource agencies, and the CT DEEP, OLISP with input from the CT DEEP Boating and Marine Fisheries Divisions. Screening will also initiate review of the application by the CT DEEP OLISP for Coastal Zone Management consistency concurrence. The CT DEEP OLISP will make a determination on the completeness of the application for CZM consistency review and/or the eligibility of the activity for state aquaculture permit exemption within 30 days from the date of the screening meeting.

#### **4. Review Procedures:**

The Corps will coordinate review of all PCN activities with federal and state agencies (interagency review team), as necessary. To be eligible and subsequently authorized, an activity must meet the eligibility criteria listed above and result in no more than minimal impacts to the aquatic environment as determined by the Corps. This may require project modifications involving avoidance, minimization, and/or compensatory mitigation for unavoidable impacts to ensure the net effects of a project are minimal. Applicants are responsible for applying for the appropriate state and local approvals. Authorizations under these GPs are not valid until all required CT DEEP, OLISP authorizations are granted.

**Emergency Situation Procedures:** 33 CFR 325.2 (e)(4) states that an “emergency” is a situation which would result in an unacceptable hazard to life, a significant loss of property, or an immediate, unforeseen and significant economic hardship if corrective action requiring a permit is not undertaken within a time period less than the normal time needed to process the application under standard procedures.” Notification to the Corps is required. The Corps will determine if a project qualifies as an emergency and will work with all applicable agencies to expedite authorization in emergency situations. If the project qualifies as an emergency, authorization under these General Permits is not required.

**Individual/Standard Permit Procedures:** Work that is not eligible under PCN activities as described therein or that does not meet the terms and general conditions of the GPs, will require the submission of an application to the Corps for an Individual Permit (see 33 CFR Part 325.1). The applicant should submit the appropriate application form and materials at the earliest possible date. General information and application forms can be obtained at our website at <http://www.usace.army.mil/Missions/CivilWorks/RegulatoryProgramandPermits/ObtainPermit.aspx> or by calling us. Individual WQC and CZM consistency concurrence are required, when applicable, from the State of Connecticut before Corps issuance of an individual permit. Individual Water Quality Certification must be obtained from EPA for activities on lands located within the boundaries of an Indian reservation. The Corps encourages applicants to concurrently apply for a Corps Individual Permit and state permits.

## APPENDIX A – GENERAL PERMITS

**GP 1. AIDS TO NAVIGATION & TEMPORARY RECREATIONAL STRUCTURES (Section 10; navigable waters of the United States)**

The placement of aids to navigation and regulatory markers which are approved by and installed in accordance with the requirements of the U.S. Coast Guard (see 33 CFR, chapter I, subchapter C, part 66)

<b>Self-Verification (SV) Eligible</b>	<b>Pre-Construction Notification (PCN) Required</b>
<p>Aids to navigation and regulatory markers that are not located within Corps Federal Navigation Projects (FNPs*).</p> <p>Temporary buoys, markers, floats, etc. for recreational use during specific events, provided they are not located within Corps FNPs <b>and</b> are removed within 30 days after use is discontinued.</p> <p>No structures in Submerged Aquatic Vegetation</p> <p><b>*FNPs are comprised of Federal Channels, anchorages and turning basins. Please click on the link below for more information:</b>  <a href="http://www.nae.usace.army.mil/Missions/Navigation/Connecticut-Projects/">http://www.nae.usace.army.mil/Missions/Navigation/Connecticut-Projects/</a></p>	<p>Work not eligible for SV.</p> <p>Aids to navigation or temporary markers, floats, etc. that are within a Corps FNP.</p> <p>Temporary markers, floats, etc. that are not to be removed within 30 days.</p>

**GP 2. REPAIR OR MAINTENANCE OF EXISTING CURRENTLY SERVICEABLE, AUTHORIZED OR GRANDFATHERED\* STRUCTURES & FILLS, REMOVAL OF STRUCTURES (Section 10 & 404; tidal and non-tidal waters of the U.S.)**

Repair, rehabilitation, or replacement of any previously authorized, currently serviceable structure, or fill, or of any currently serviceable structure or fill authorized by 33 CFR 330.3, provided that the structure or fill is not to be put to uses differing from those uses specified or contemplated for it in the original permit or the most recently authorized modification. Minor deviations in the structure's configuration or filled area, including those due to changes in materials, construction techniques, requirements of other regulatory agencies, or current construction codes or safety standards that are necessary to make the repair, rehabilitation, or replacement are authorized. Includes removal of structures and fill. **Not authorized under GP 2:** (a) Permanent impacts >1/2 acre in tidal and non-tidal waters and/or wetlands, >1000 SF in tidal Special Aquatic Site (SAS) other than vegetated shallows, or >100 SF in tidal vegetated shallows.

<b>Self-Verification (SV) Eligible</b>	<b>Pre-Construction Notification (PCN) Required</b>
<p>≤5,000 s.f. of impacts in non-tidal waters &amp; wetlands.</p> <p>No fill in tidal waters &amp; wetlands.</p> <p>Bulkhead replacement via installation of new bulkhead within 18” of existing bulkhead &amp; backfill.</p> <p>Drawdown of impoundment for dam/levee repair provided it does not exceed 18 months and one growing season (April through September)</p> <p>Any stream channel modification is limited to the minimum necessary for the repair, rehabilitation, or replacement of the structure or fill; such modifications, including the removal of material from the stream channel, must be immediately adjacent to the project or within the boundaries of the structure or fill.</p> <p>Any bank stabilization measures not directly associated with the structure requires a separate authorization under <b>GP 9</b>.</p> <p>Appropriate measures must be taken to maintain normal downstream flows and minimize flooding to the maximum extent practicable, when temporary discharges, such as sandbag cofferdams, access fills, etc. are necessary for construction activities or dewatering of construction sites.</p> <p>Temporary fills must consist of materials and be placed in a manner, that will not be eroded by expected high flows. They must be removed in their entirety and the affected areas returned to pre-construction elevations and must be re-vegetated as appropriate.</p> <p>Work to previously approved tide gates with a Corps-approved operation and maintenance plan and tide gates not affecting the hydraulic regime.</p> <p>No impacts in Special Aquatic Sites (SAS) – see definitions.</p> <p>No slip lining or culvert relining that changes invert elevation.</p> <p><b>NOTES:</b></p> <ol style="list-style-type: none"> <li>1. Removal of bridge structures in navigable waters are covered under <b>GP 8</b>, if the Coast Guard issues a bridge permit.</li> <li>2. Stream, river, brook or other watercourse crossings are not eligible under <b>GP 2</b> (See <b>GP 19</b>).</li> </ol>	<p>Work not eligible for SV.</p> <p>Removal of accumulated sediments and debris in the vicinity of existing structures (e.g., bridges, culverted road crossings, water intake structures, etc.) and/or the placement of new or additional riprap, minimum necessary to protect the structure.</p> <p>The removal of accumulated sediment is limited to the minimum necessary to restore the waterway in the vicinity of the structure to the approximate dimensions that existed when the structure was built, but cannot extend farther than 200 feet in any direction from the structure. Excavated materials must be deposited and retained in an area that has no waters of the United States unless otherwise specifically approved by the district engineer.</p> <p>Drawdown of impoundment for dam/levee repair provided it does not exceed 18 months and one growing season (April through September)</p> <p>*Grandfather dates include work performed &amp; structures installed before 1968 &amp; fill placed before 1975 for Corps purposes only.</p>

**GP 3. MOORINGS (Section 10; navigable waters of the U. S.)**

New private, non-commercial, non-rental, single-boat moorings & temporary moorings including moorings to facilitate construction or dredging; minor relocation of previously authorized moorings and mooring field expansions, boundary reconfigurations or modifications of previously authorized mooring fields and maintenance and replacement of moorings.

**Not authorized under GP 3 are:** Moorings within Federal Navigation channels.

<b>Self-Verification (SV) Eligible</b>	<b>Pre-Construction Notification (PCN) Required</b>
<p>1. Private, non-commercial, non-rental, single-boat moorings and temporary moorings including moorings that facilitate construction or dredging provided:</p> <p>No new moorings located in Federal anchorages;</p> <p>No new moorings located in Special Aquatic Sites (SAS);</p> <p>No new moorings located in shellfish beds;</p> <p>Authorized by local harbormaster/town;</p> <p>When existing, authorized moorings in SAS are going to be replaced, they shall be replaced with low impact mooring technology that prevents mooring chains from resting or dragging on the bottom substrate at all tides and helical anchors, or equivalent SAS protection systems.</p> <p>2. Minor relocation of previously authorized moorings, provided:</p> <p>Authorized by the local harbormaster/town;</p> <p>Not located in SAS;</p> <p>Not located in Federal anchorages.</p>	<p>Work not eligible for SV.</p> <p>Moorings associated with an existing boating facility*.</p> <p>Private moorings without harbormaster or local approval.</p> <p>Moorings located such that they, and/or vessels docked or moored at them, are within the buffer zone of the horizontal limits of a Federal Anchorage. The buffer zone is equal to 3 times the authorized depth of that channel.</p> <p><i>*Boating Facility: Facilities that provide for a fee, rent, or sell mooring space, such as marinas, yacht clubs, boat clubs, boat yards, town facilities, dockminiums, etc.</i></p> <p><i>Locating new individual moorings in SAS, including eelgrass, should be avoided to the maximum extent practicable. If SAS cannot be avoided, plans should show elastic mooring systems that prevent mooring chains from resting or dragging on the bottom substrate at all tides and helical anchors, or equivalent SAS protection systems, where practicable. For moorings that appear to impact SAS, the Corps may require an eelgrass survey.</i></p>

**GP 4. PILE-SUPPORTED STRUCTURES & FLOATS, INCLUDING BOAT LIFTS/HOISTS & OTHER MISCELLANEOUS STRUCTURES & WORK (Section 10; navigable waters of the U.S.)**

New, expansions, reconfigurations or modifications of structures for navigation access including floats, stairs, and boat/float lifts.

**Not authorized under GP 4 are:** (a) fill or excavation; (b) no structures within Federal Navigation channels; or (c) structures associated with a NEW boating facility\*.

**Self-Verification (SV) Eligible**

**Pre-Construction Notification (PCN) Required**

Private residential structures with a length limit not to exceed 40' beyond mean high water and to a depth of -4' mean low water and limited to 4' in width. The fixed pier component of the dock located in tidal wetlands shall be constructed such that the lowest horizontal member of the fixed pier is no lower than five (5) feet off the surface of any underlying wetland area.

Floats must be supported at least 18" above the intertidal and shallow sub-tidal substrate during all tidal cycles.

No structures located within Submerged Aquatic Vegetation

No structures or floats can be located within the buffer zone (3x the authorized depth of the FNP) of the horizontal limits of FNPs.

No structures or floats can extend across >25% of the waterway width at mean low water.

No new structures within 25' of riparian property line extensions.

No new structures or floats associated with boating facilities.

No new pile-supported structures within Shellfish Concentration Areas as designated by the Connecticut Department of Environmental Protection, Coastal Area Management Program under CGS Sec. 22a-90

Reconfiguration of existing authorized structures; private or commercial, provided those structures do not extend beyond the existing perimeter of the facility or encroach into Special Aquatic Sites.

Work not eligible for SV.

New structures within an existing boating facility, provided those structures do not extend beyond the existing perimeter of the facility.

Structures or work in or affecting tidal or navigable waters that are not defined under any other GP activity.

Structures that are located within 25 feet of riparian property line extensions unless the properties are owned by the same owner. If so, the Corps may require a letter of no objection from the abutter(s).

***\*Boating Facility: Facilities that provide for a fee, rent, or sell mooring space, such as marinas, yacht clubs, boat clubs, boat yards, town facilities, dockominiums, etc.***

**GP 5. BOAT RAMPS & MARINE RAILWAYS (Sections 10 and 404; tidal and non-tidal waters of the U.S.)** Activities required for the construction of boat ramps and marine railways, including excavation and fill.

**Not authorized under GP 5:** (a) Permanent and temporary fill >1/2 acre of non-tidal waters and/or wetlands, (b) permanent and temporary impacts >1/2 acre in tidal waters; >1000 SF in tidal SAS other than vegetated shallows, or >100 SF in tidal vegetated shallows; or (c) dredging in navigable waters of the U.S. (see GP 7)

**Self-Verification (SV) Eligible**

**Pre-Construction Notification (PCN) Required**

No work in tidal waters and wetlands of the United States.

≤5,000 SF of non-tidal waters and/or wetland fill (permanent and temporary).

No work April 1 through June 30 in non-tidal waters that support diadromous fish species.

Work not eligible for SV.

Work occurs in tidal waters and wetlands of the United States.

Boat ramps are located within 25 feet of riparian property line extensions unless the properties are owned by the same owner. If so, the Corps may require a letter of no objection from the abutter(s).

**GP 6. UTILITY LINE ACTIVITIES (Sections 10 & 404; tidal & non-tidal waters of the U.S.)**

Activities required for (a) The construction, maintenance, relocation, repair, & removal of utility lines, including outfall and intake structures, and the associated excavation, backfill, or bedding for utility lines; (b) The construction, maintenance or expansion of utility line substation facilities associated with a power/utility line in non-tidal waters; and (c) The construction and maintenance of foundations for overhead utility line towers, poles, and anchors provided the foundations are the minimum size necessary and separate footings for each tower leg (rather than a larger single pad) are used where feasible. This GP authorizes the construction of access roads to facilitate construction of the above activities provided the activity, in combination with all other activities included in one single and complete project, does not cause the permanent loss of greater than 1 acre of non-tidal waters of the U.S\*. Impacts resulting from mechanized pushing, dragging or other similar activities that redeposit excavated soil material shall be figured into the area limit determination.

**Not authorized under GP 6:** (a) Permanent and temporary fill >1 acre of non-tidal waters and/or wetlands\*, (b) permanent and temporary impacts >1/2 acre in tidal waters; >1000 SF in tidal Special Aquatic Sites other than vegetated shallows, or >100 SF in tidal vegetated shallows; or (c) blasting or storage of equipment in wetlands.

**Self-Verification (SV) Eligible**

**Pre-Construction Notification (PCN) Required**

No work in, over or under tidal waters.

No outfalls.

≤5,000 SF of non-tidal waters and/or wetland fill (permanent and temporary).

Intake structures that are dry hydrants used exclusively for firefighting activities with no stream impoundments.

No silt producing activities from April 1 through June 30 in non-tidal waters that support diadromous fish species.

**NOTE:** Construction mats of any area necessary to conduct activities do not count towards the 5,000 SF threshold and should be removed as soon as work is completed.

Work not eligible for SV.

Overhead utility lines constructed over Section 10 waters and submarine utility lines that are routed in or under such waters.

*\*See Table 1 Connecticut Water Quality Certification (CT WQC) in Section 1 for additional details on thresholds.*

**NOTE:** Construction mats of any area necessary to conduct activities do not count towards the 1 acre threshold and should be removed as soon as work is completed.

**NOTE:** Temporary fills necessary to conduct the utility line activity are also allowed, provided the utility line activity is **within** Corps jurisdiction. Material resulting from trench excavation may be temporarily sidecasted into waters of the United States for no more than three months, provided the material is not placed in such a manner that it is dispersed by currents or other forces. If the utility line activity is not within Corps jurisdiction but temporary fill will be placed in Corps jurisdiction, then see **GP 21** for temporary fills, etc.



**GP 7. DREDGING (Section 10; navigable waters of the U.S.), TRANSPORT & DISPOSAL OF DREDGED MATERIAL (Sections 10, 404 & 103; tidal waters of the U.S.), BEACH NOURISHMENT (Sections 10 & 404; tidal waters of the U.S.); ROCK REMOVAL (Section 10, navigable waters of the U.S.) & ROCK RELOCATION (Sections 10 & 404; tidal waters of the U.S.)**

New, improvement\* and maintenance\*\* dredging, including: (a) Disposal of dredged material at a confined aquatic disposal, beach nourishment, near shore, designated open water or ocean water disposal site, provided the Corps finds the dredged material to be suitable for such disposal; (b) Beach nourishment not associated with dredging; (c) Rock removal and relocation for navigation.

**Not authorized under GP 7 are:** (a) New dredging with >1000 SF of impacts to intertidal areas or saltmarsh or > 100 SF of impacts to vegetated shallows; (b) Maintenance dredging and/or disposal with >1/2 acre of impacts to tidal Special Aquatic Sites (SAS); (c) new dredging where the primary purpose is sand mining for beach nourishment; (d) Beach scraping; (e) Rock removal and relocation for navigation >1/2 acre; or (f) blasting.

**Self-Verification (SV) Eligible**

**Pre-Construction Notification (PCN) Required**

No work in non-tidal waters or wetlands.

Work not eligible for SV.

Maintenance dredging (with any amount of yardage) provided:

Maintenance dredging not eligible for SV; improvement dredging and new dredging.

Contained upland disposal;

Disposal options include upland disposal, open water disposal, confined aquatic disposal cells (CAD cells), near-shore disposal or beach nourishment.

Proper siltation controls used & maintained to prevent runback into waterway/wetland;

No impacts to SAS, intertidal areas or shellfish beds;

***\*Improvement is dredging to deeper depths in areas previously dredged or authorized.***

Not located within 100' of vegetated shallows or shellfish areas;

***\*\*Maintenance dredging includes areas and depths previously authorized by the Corps and dredged.***

No work in the Connecticut River; and

Work occurs from October 1 through January 31.

Rock/boulder relocation with ≤200 SF of impacts and no impacts to SAS.

No rock removal.

**GP 8. DISCHARGES OF DREDGED OR FILL MATERIAL INCIDENTAL TO THE CONSTRUCTION OF BRIDGES (Sections 10 & 404; navigable waters of the U.S.)**

Discharges of dredged or fill material incidental to the construction and modification of bridges across navigable waters of the U.S., including cofferdams abutments, foundation seals, piers, approach fills, and temporary construction and access fills **provided that the USCG authorizes the construction of the bridge structure under Section 9 of the Rivers and Harbors Act of 1899 or other applicable laws.** A USCG Authorization Act Exemption or a STURRA (144h) exemption do not constitute USCG authorization.

**Not authorized under GP 8 are causeways.**

<b>Self-Verification (SV) Eligible</b>	<b>Pre-Construction Notification (PCN) Required</b>
Discharges of dredged or fill material incidental to the construction and modification of bridges.  No fill in Special Aquatic Sites.  No fill in the Connecticut River.	Work not eligible for SV.

<b>GP 9. SHORELINE &amp; BANK STABILIZATION PROJECTS (Sections 10 &amp; 404; tidal and non-tidal waters of the U.S.)</b> Bank stabilization activities necessary for erosion protection along the banks of lakes, ponds, streams, estuarine and ocean waters, and any other open waters. Includes bulkheads, seawalls, riprap, revetments or slope protection & similar structures as well as vegetative planting, soil bioengineering or alternative techniques that are a combination of the two (e.g. living shorelines), specifically for the purpose of shoreline protection. <b>Not authorized under GP 9 are:</b> (a) Bank stabilization >500 LF* in total length including both stream banks; (b) Permanent and temporary impacts >1/2 acre in tidal waters, >1000 SF in tidal Special Aquatic Sites (SAS) other than vegetated shallows, or >100 SF in tidal vegetated shallows. (c) Stream channelization or relocation activities; or (d) breakwaters, groins and jetties.	
<b>Self-Verification (SV) Eligible</b>	<b>Pre-Construction Notification (PCN) Required</b>
<p>Coastal shoreline &amp; bank stabilization projects <math>\leq 200</math> linear feet; and other stream, river, or brook bank stabilization projects <math>\leq 200</math> linear feet (includes total for more than one stream bank) provided:</p> <p><math>\leq 1</math> cubic yard of fill per linear foot placed between the high tide line (HTL) and mean low water (MLW) or <math>\leq 1</math> cubic yard of fill per linear foot placed waterward of ordinary high water (OHW).</p> <p>No discharge of fill material within SAS, including mudflats, tidal wetlands, Submerged Aquatic Vegetation and/or shellfish beds.</p> <p>Soft stabilization measures such as bioengineered fiber roll revetments or equivalent, shall be used wherever practicable.</p> <p>No vertical stone structures or embankments angled steeper than 1V: 1H. No new bulkheads.</p> <p>No fill within the streambed.</p> <p>Unconfined work, not including installation and removal of cofferdams, is limited to June 30 through September 30 in non-tidal waters supporting diadromous fish.</p> <p>Unconfined work, not including installation and removal of cofferdams, in other non-tidal waters is limited to the low-flow period June 1 through September 30.</p> <p>Work occurring behind a cofferdam may occur at any time.</p> <p><i>*See Table 1 CT WQC in Section 1 for additional details on thresholds.</i></p>	<p>Work not eligible for SV.</p> <p>The slope of the structure is steeper than 1V:3H in lakes/ponds; and 1V:1H in non-tidal streams and tidal waters and streams.</p> <p>Fill waterward of the HTL in coastal waters including alternative stabilization techniques that are a combination of soft and hard shoreline stabilization techniques that will affect SAS, change the natural shoreline configuration or alter natural or ecological processes.</p> <p><i>*See Table 1 CT WQC in Section 1 for additional details on thresholds.</i></p>

**GP 10. AQUATIC HABITAT RESTORATION, ESTABLISHMENT & ENHANCEMENT**

**ACTIVITIES (Sections 10 and 404; tidal and non-tidal waters of the U.S.)** Activities in waters of the United States associated with the restoration, enhancement and establishment of non-tidal and tidal wetlands and riparian areas, including invasive, non-native or nuisance species control; the restoration and enhancement of non-tidal streams and other non-tidal open waters; the relocation of non-tidal waters, including non-tidal streams & associated wetlands for reestablishment of a natural stream morphology and reconnection of the floodplain; the restoration and enhancement of shellfish, finfish and wildlife; and the rehabilitation or enhancement of tidal streams, tidal wetlands and tidal open waters; provided those activities result in net increases in aquatic resource functions and services.

**Not authorized under GP 10 are:** (a) Conversions of wetlands to open water, except for the excavation of new salt pannes and (b) Artificial reefs.

<b>Self-Verification (SV) Eligible</b>	<b>Pre-Construction Notification (PCN) Required</b>
<p>Special Aquatic Site planting and transplanting ≤100 SF in tidal waters.</p> <p>No new ditching to eliminate mosquito breeding habitat.</p> <p>No thin layer deposition.</p> <p>No fill for purposes of converting marsh to upland.</p> <p>Placement of seed shellfish, spatted-shell or cultch in tidal waters for the restoration or enhancement of existing, publicly-managed, recreational shellfish beds provided there is no placement in or impacts to SAS and does not result in degradation of habitat for other aquatic resources.</p> <p>≤5,000 SF of non-tidal waterway and/or non-tidal wetland fill provided the activity is supported in writing by a state or non-Corps Federal environmental resource management agency.</p> <p>No stream channelization.</p>	<p>Work not eligible for SV</p> <p>Pro-active salt marsh restoration work that includes draining of ponded dieback areas through excavation of runnels with handheld tools or low-impact ground equipment; blocking or unclogging of historic mosquito ditches to restore tidal flushing; excavation of new salt pannes to increase shorebird and waterfowl foraging habitat and placing excavated materials on the marsh surface for establishing suitable vegetative beds.</p> <p>Pond or lake reestablishment or restoration.</p> <p>Water impoundments.</p> <p>Dam removals.</p> <p>Integrated Marsh Management in tidal wetlands for combined wetland enhancement and mosquito control and reduction.</p>

**GP 11. FISH & WILDLIFE HARVESTING ACTIVITIES (Sections 10 and 404; tidal and non-tidal waters of the U.S.)**

Activities in waters of the United States associated with fish and wildlife harvesting devices including pound nets, crab traps, crab dredging, eel pots, lobster traps, duck blinds, and clam and oyster digging, fish aggregating devices, and small fish attraction devices such as open water fish concentrators (sea kites, etc.).

**Not authorized by GP 11 are:** (a) Artificial reefs, impoundment(s) or semi-impoundment(s) of water; (b) Permanent and temporary impacts >1/2 acre in tidal waters, >1000 SF in tidal Special Aquatic Sites (SAS) other than vegetated shallows, or >100 SF in tidal vegetated shallows; and (c) Shellfish dredging, either mechanical or hydraulic in SAS.

**Self-Verification (SV) Eligible**

**Pre-Construction Notification (PCN) Required**

Activities associated with fish and wildlife harvesting devices including pound nets, crab traps, crab dredging, eel pots, lobster traps, duck blinds, clam and oyster digging, small fish aggregating and attraction devices such as open water fish concentrators (sea kites, etc.).

No permanent impacts to SAS, including salt marshes and Submerged Aquatic Vegetation (SAV).

No structures, cages or traps located in SAS.

Work not eligible for SV

Devices located in tidal SAS, including salt marsh and SAV.

**GP 12. OIL SPILL & HAZARDOUS MATERIAL CLEANUP (Sections 10 and 404; tidal and non-tidal waters of the U.S.):** **a.** Activities conducted in response to a discharge or release of oil and hazardous substances that are subject to the National Oil and Hazardous Substances Pollution Contingency Plan (40 CFR 300) including containment, cleanup, and mitigation efforts, provided activities are done under either **(i)** The Spill Prevent, Control & Countermeasure Plan require by 40 CFR 112.3; **(ii)** The direction or oversight of the Federal on-site coordinator designated by 40 CFR 300; or **(iii)** Any approved existing State, regional or local contingency plan provided that the Regional Response Team concurs with the proposed response efforts or does not object to the response effort. **b.** Activities required for the cleanup of oil releases in waters of the U.S. from electrical equipment that are governed by EPA’s polychlorinated biphenyl (PCB) spill response regulations at 40 CFR 761. **c.** Booms placed in tidal waters. **d.** Use of structures & fills for spill response training exercises. Special Aquatic Sites (SAS) must be restored in place to pre-impact elevations.

<b>Self-Verification (SV) Eligible</b>	<b>Pre-Construction Notification (PCN) Required</b>
<p>1. Activities that are conducted in accordance with <b>a.</b> or <b>b.</b> above.</p> <p>2. Booms placed in navigable waters for hazardous and toxic waste containment, absorption and prevention, provided they are removed upon completion of the cleanup.</p> <p>3. Temporary impacts for spill response training exercises are <math>\leq 5,000</math> SF in non-tidal waters and <math>\leq 1,000</math> SF in tidal waters, and temporary structures in tidal waters with no impacts to SAS and in place for <math>\leq 30</math> days.</p> <p><b>Note:</b> For activities in non-tidal waters of the U.S., permittees have up to two weeks following commencement of these activities to submit the Self-verification form (Appendix E).</p>	<p>Work not eligible for SV.</p> <p>1. The activity is planned or scheduled, not an emergency response, and will cause turbidity or sediment resuspension in tidal waters or streams.</p> <p>2. Permanent structures or impacts for spill response training exercises.</p>

**GP 13. CLEANUP OF HAZARDOUS & TOXIC WASTE (Sections 10 and 404; tidal and non-tidal waters of the U.S.)** Specific activities to effect the containment, stabilization or removal of hazardous or toxic waste materials, including court ordered remedial action plans or related settlements which are performed, ordered or sponsored by a government agency with established legal or regulatory authority\*. Special Aquatic Sites must be restored in place to pre-impact elevations.

**Not authorized under GP 13 are:** (a) the establishment of new disposal sites; or (b) the expansion of existing sites used for the disposal of hazardous or toxic waste.

**Self-Verification (SV) Eligible**

**Pre-Construction Notification (PCN) Required**

Permanent and temporary impacts are  $\leq 5,000$  SF in non-tidal waters and wetlands.

Booms placed in navigable waters for oil and hazardous substance containment, absorption and prevention, provided they are removed upon completion of the cleanup.

**Notes:** For activities in non-tidal waters of the U.S., permittees have up to two weeks following commencement of these activities to submit the Self-verification form (Appendix E).

Work not eligible for SV.

Permanent and temporary impacts are  $> 5,000$  SF in non-tidal waters and wetlands.

Work in navigable waters of the U.S. other than booms placed for hazardous and toxic waste containment, absorption and prevention.

*\*Activities undertaken entirely on a Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) site by authority of CERCLA, are not required to obtain permits under Section 404 of the Clean Water Act or Section 10 of the Rivers and Harbors Act.*

**GP 14. SCIENTIFIC MEASUREMENT DEVICES (Sections 10 and 404; tidal and non-tidal waters of the U.S.)** Scientific devices for measuring and recording scientific data, such as staff gauges, tide and current gauges, meteorological stations, water recording and biological observation devices, water quality testing and improvement devices, and similar structures. Also eligible are small temporary weirs and flumes constructed primarily to record water quantity and velocity provided the discharge is less than 25 cubic yards.

**Not authorized under GP 14 are:** (a) Permanent and temporary impacts >1 acre in non-tidal waters and wetlands; and (b) Permanent and temporary impacts >1/2 acre in tidal waters, >1000 SF in tidal Special Aquatic Sites (SAS) other than vegetated shallows, or >100 SF in tidal vegetated shallows.

**Self-Verification (SV) Eligible**

**Pre-Construction Notification (PCN) Required**

Permanent and temporary impacts are  $\leq 1,000$  SF in non-tidal waters and wetlands.

No impacts in non-tidal SAS, other than non-tidal wetlands.

No fill in tidal waters and/or wetlands.

No impacts in tidal Submerged Aquatic Vegetation.

Devices in tidal waters that do not restrict movement of aquatic organisms and will not adversely affect the course, condition or capacity of a waterway.

Work not eligible for SV.

**NOTE:** Upon completion of the use of the device to measure and record scientific data, the measuring device, and any other structures or fills associated with that device (e.g., foundations, anchors, buoys, lines, etc.), must be removed to the maximum extent practicable.



**GP 15. SURVEY ACTIVITIES (Sections 10 and 404; tidal and non-tidal waters of the U.S.)**

Survey activities such as soil borings, core sampling, seismic exploratory operations, plugging of seismic shot holes and other exploratory-type bore holes, exploratory trenching\* and historic resources surveys.

**Not authorized under GP 15 are:** (a) Permanent and temporary fill >1 acre of non-tidal waters and/or wetlands, and (b) permanent and temporary impacts >1/2 acre in tidal waters; >1000 SF in tidal Special Aquatic Sites other than vegetated shallows or >100 SF in tidal vegetated shallows.

**Self-Verification (SV) Eligible**

**Pre-Construction Notification (PCN) Required**

Permanent and temporary impacts ≤5,000 SF in non-tidal waters and wetlands.

No impacts, other than soil borings or core sampling, in tidal waters.

No permanent structures or drilling and discharge of excavated material from test wells for oil and gas exploration allowed.

**NOTE:** Construction mats of any area necessary to conduct activities do not count towards the 5,000 SF threshold and should be removed as soon as work is completed.

*\* For the purposes of this GP, the term “exploratory trenching” means mechanical land clearing of the upper soil profile to expose bedrock or substrate, for the purpose of mapping or sampling the exposed material.*

Work not eligible for SV.

**NOTE:** Construction mats of any area necessary to conduct activities do not count towards the 1 acre threshold and should be removed as soon as work is completed.

**NOTE:** The area in which the exploratory trench is dug must be restored to its preconstruction elevation upon completion of the work and must not drain a water of the United States. In wetlands, the top 6 to 12 inches of the trench should normally be backfilled with topsoil from the trench.

**GP 16. AQUACULTURE PROJECTS & FISHERIES (Sections 10 and 404; navigable waters of the U.S.)** The installation of buoys, floats, racks, trays, nets, lines or other structures in navigable waters for the containment and cultivation of indigenous species of shellfish and seaweed/kelp. Also authorized are anchored upweller floats, small-scale shellfish hatchery seawater intake/discharge structures, and discharges of dredged or fill material associated with cultivation such as the placement of cultch or spatted-shell on bottom.

Depth of cultch or spatted-shell must comply with Special Conditions in Section 5, Part (h), items (1) through (7) of [CT DEEP, General Permit for Coastal Maintenance \(DEEP-OLISP-GP2015-02\)](#) and must not result in visible degradation of habitat for other aquatic resources. All structures must be permitted by State of Connecticut Navigation Safety/Boating Access Unit and marked in conformance with applicable State or U.S. Coast Guard Aids to Navigation. **NOTE: All facilities must be installed and operated in compliance with the attached Appendix C Aquaculture Conditions**

**Not authorized under GP 16 are impacts to Special Aquatic Sites, including Submerged Aquatic Vegetation.**

Self-Verification (SV) Eligible	Pre-Construction Notification (PCN) Required
<p>Placement of seed shellfish, spatted-shell or cultch for commercial shellfish aquaculture on leased grounds when performed in compliance with the conditions in Section 5 h. of the CT DEEP General Permit for Coastal Maintenance (DEEP-OLISP-GP-2015-02).</p> <p>The installation of temporary (&lt; six months) structures for research, educational or experimental aquaculture gear impacting <math>\leq 1,000</math> SF for indigenous species under the direct supervision of the Dept. of Agricultural, Bureau of Aquaculture provided there is no adverse effect to navigation.</p> <p>Suspended cages or bags located wholly below and within the footprint of an existing <u>authorized</u> fixed or floating structure in water depths <math>\leq 10</math> feet MLW; provided no loose lines and there is a vertical clearance of at least 2 feet between the bottom of the gear and the sea floor at mean low water.</p> <p>Shellfish upweller floats not to exceed 160 sf (anchored/berthed only, no piling installation), with a vertical clearance of at least 2 feet between the bottom of the gear and the sea floor at mean low water, cannot be located within the buffer of a Federal Navigation Project.</p>	<p>Work not eligible for SV.</p> <p>Vertical-drop longlines and suspended gear for the culture of shellfish or other marine organisms, such as kelp and seaweed.</p> <p>Cages, trays, racks, netting or other structures on the ocean bottom or floating on the water surface used to contain, cultivate or depurate shellfish.</p> <p>For additional information, please see “A Guide for Marine Aquaculture Permitting in Connecticut” for guidance and application materials found at: <a href="http://www.nae.usace.army.mil/Portals/74/docs/regulatory/StateGeneralPermits/CT/AquaculturePermitGuide.pdf">http://www.nae.usace.army.mil/Portals/74/docs/regulatory/StateGeneralPermits/CT/AquaculturePermitGuide.pdf</a></p> <p>Intake and discharge structure with a diameter <math>\leq 3</math> inches, for the withdrawal and discharge of water to support small-scale shellfish land-based hatchery with negative impact on source or discharge waters.</p> <p>Activities that involve a change from authorized gear for bottom culture to floating or suspended gear.</p> <p>Boundaries of Submerged Aquatic Vegetation may be required to be located/surveyed in the field. See Corps website for guidance: <a href="http://www.nae.usace.army.mil/Portals/74/docs/regulatory/JurisdictionalLimits/SubmergedAquaticVegetationSurveyGuidance(Updated7-12-2016).pdf">http://www.nae.usace.army.mil/Portals/74/docs/regulatory/JurisdictionalLimits/SubmergedAquaticVegetationSurveyGuidance(Updated7-12-2016).pdf</a></p>

**GP 17. NEW/EXPANDED DEVELOPMENTS & RECREATIONAL FACILITIES (Section 404; non-tidal waters of the U.S.)** Discharges of dredged or fill material for the construction or expansion of developments and/or recreational facilities. This GP authorizes attendant features that are necessary for the use such as parking lots, garages, and yards. Fill area includes all temporary and permanent fill, and regulated discharges associated with excavation.

**Not authorized under GP 17 are:** (a) Permanent impacts that are >1 acre\* in non-tidal waters and wetlands; (b) Stormwater treatment or detention systems, or subsurface sewerage disposal systems in waters of the U.S.; and (c) New roadway and driveway crossings in non-tidal waters and/or wetlands. (See **GPs 18 & 19**)

**Self-Verification (SV) Eligible**

**Pre-Construction Notification (PCN) Required**

Permanent and temporary impacts  $\leq 5,000$  SF of non-tidal waters and/or wetlands provided no impacts to Special Aquatic Sites other than wetlands (e.g. riffle and pool stream habitat, shellfish beds).

Work not eligible for SV.

*\*See Table 1 CT WQC in Section 1 for additional details on thresholds.*

**NOTE:** Construction mats of any area necessary to conduct activities do not count towards the 5,000 SF threshold and should be removed as soon as work is completed.

**NOTE:** Construction mats of any area necessary to conduct activities do not count towards the 1 acre threshold and should be removed as soon as work is completed.

**GP 18. LINEAR TRANSPORTATION PROJECTS – WETLAND CROSSINGS ONLY**

**(Section 404; non-tidal waters of the U.S.)** Activities required for the construction, expansion, modification, or improvement of linear transportation projects (e.g., driveways, roads, highways, railways, trails, airport runways, and taxiways) and attendant features.

**Not authorized under GP 18 are:** (a) Permanent and temporary impacts for any single and complete project that are >1 acre\* or (b) Stream, river, or brook crossing projects (see **GP 19**)

**Self-Verification (SV) Eligible**

**Pre-Construction Notification (PCN) Required**

Permanent and temporary impacts ≤5,000 SF of non-tidal wetland fill provided:

No work in non-tidal Special Aquatic Sites other than wetlands.

No slip lining or culvert relining that changes invert elevation.

**NOTE:** Construction mats of any area necessary to conduct activities do not count towards the 5,000 SF threshold and should be removed as soon as work is completed.

Work not eligible for SV.

*\*See Table 1 CT WQC in Section 1 for additional details on thresholds.*

**NOTE:** Construction mats of any area necessary to conduct activities do not count towards the 1 acre threshold and should be removed as soon as work is completed.

**GP 19. STREAM, RIVER & BROOK CROSSINGS (NOT INCLUDING WETLAND**

**CROSSINGS) (Sections 10 and 404; tidal and non-tidal waters of the U.S.)** Activities required for the construction, expansion, modification, or improvement of linear transportation projects (e.g., driveways, roads, highways, railways, trails, airport runways, and taxiways) and attendant features, provided that work is performed in accordance with Connecticut General Permit Stream Crossing Best Management Practices to the extent practicable - See Appendix G.

**Not authorized under GP 19 are:** (a) Permanent impacts for any single and complete projects that are >1 acre in non-tidal waters and wetlands\*, >1/2 acre in tidal waters of the U.S., >1000 SF in tidal Special Aquatic Sites (SAS) other than vegetated shallows or >100 SF in tidal vegetated shallows; (b) Temporary impacts >1 acre in tidal waters, >5000 SF in tidal SAS other than vegetated shallows, or >1000 SF in vegetated shallows; or (c) Wetland Crossings (see GP 18).

**Self-Verification (SV) Eligible**

**Pre-Construction Notification (PCN) Required**

No impacts to tidal waters and/or wetlands.

Permanent and temporary impacts ≤5,000 SF of non-tidal waters and wetlands provided for stream, river, brook crossings by means of a Bridge or Open-Bottom Structure that meets the following standards: 1. Spans at least 1.2 times the watercourse bank full width, 2. Allows for the continuous, uninterrupted flow of the 50-year frequency storm flows, and 3. No riprap is placed within or across the bed of the brook, and appurtenant stream bank stabilization does not exceed 50 feet along any upstream or downstream bank.

Permanent and temporary impacts ≤5,000 SF of non-tidal waters and wetlands provided for stream, river, brook crossings by means of a culvert provided the tributary watershed to the culvert does not exceed 1 sq. mile (640 acres)\*

No open trench excavation in flowing waters.

Unconfined, in-stream work, not including installation and removal of cofferdams, is limited to the low-flow period, June 1 through September 30 unless CT DEEP requires different resource-driven time of year restriction.

Work occurring behind a cofferdam may occur at any time.

No stream relocations; no dams or dikes; no new culvert crossings of perennial streams. No slip lining or culvert relining that changes invert elevation.

**NOTE:** Construction mats of any area necessary to conduct activities do not count towards the 5,000 SF threshold and should be removed as soon as work is completed.

*\*See Table 1 CT WQC in Section 1 for additional details on thresholds.*

Work not eligible for SV.

*\*See Table 1 CT WQC in Section 1 for additional details on thresholds.*

**NOTE:** Construction mats of any area necessary to conduct activities do not count towards the 1 acre threshold and should be removed as soon as work is completed.

**GP 20. ENERGY GENERATION & RENEWABLE ENERGY GENERATION FACILITIES (Sections 10 and 404; tidal waters of the U.S.) & HYDROPOWER PROJECTS (Sections 10 and 404; tidal waters of the U.S.)** Structures and work in navigable waters of the U.S. and discharges of dredged or fill material into tidal waters of the U.S. for the construction, expansion, modification or removal of: **(a)** Land-based renewable energy production facilities, including attendant features; **(b)** Water-based wind or hydrokinetic renewable energy generation pilot projects and their attendant features; and **(c)** Discharges of dredged or fill material associated with hydropower projects.

Attendant features may include, but are not limited to, land-based collection and distribution facilities, control facilities, and parking lots. For each single and complete project in **(b)** above, no more than 10 generation units (e.g., wind turbines or hydrokinetic devices) are authorized in navigable waters of the U.S.

**Self-Verification (SV) Eligible**

**Pre-Construction Notification (PCN) Required**

Not allowed under SV.

**For land-based facilities, impacts are:**

Permanent impacts  $\leq 1/2$  acre in tidal waters; or  $\leq 100$  SF in tidal vegetated shallows or  $\leq 1,000$  SF in other tidal Special Aquatic Sites (SAS).

Temporary impacts  $\leq 1$  acre in tidal waters;  $\leq 1,000$  SF in vegetated shallows and  $\leq 5,000$  SF in other tidal SAS.

**For water-based wind or hydrokinetic renewable energy generation pilot projects, and hydropower projects permanent and temporary impacts are:**

$\leq 1/2$  acre in tidal waters.

**NOTE:** Construction mats of any area necessary to conduct activities do not count towards the 1 acre threshold and should be removed as soon as work is completed.

**GP 21. TEMPORARY FILL NOT ASSOCIATED WITH ANY OTHER GP ACTIVITES**

**(Section 404; non-tidal waters of the U.S.)** Temporary discharges, such as sandbag/earth cofferdams, access fills, etc., necessary for construction activities or dewatering of construction sites.

**Not authorized under GP 21:** Temporary impacts >1 acre in non-tidal waters and wetlands\*

**Self-Verification (SV) Eligible**

**Pre-Construction Notification (PCN) Required**

Temporary impacts ≤5,000 SF of temporary non-tidal waters and/or non-tidal wetland.

Work not eligible for SV.

*\*See Table 1 CT WQC in Section 1 for additional details on thresholds.*

**NOTE:** Construction mats of any area necessary to conduct activities do not count towards the 5,000 SF threshold and should be removed as soon as work is completed.

**NOTE:** Construction mats of any area necessary to conduct activities do not count towards the 1 acre threshold and should be removed as soon as work is completed.





## APPENDIX B - GENERAL CONDITIONS

**1. Other Permits.** Permittees must obtain other Federal, State, or local authorizations required by law. Applicants are responsible for applying for and obtaining all required State or local approvals. Work that is not regulated by the State, but is subject to Corps jurisdiction, may be eligible for these General Permits (GPs).

### **2. Federal Jurisdiction.**

a. Applicability of the GPs shall be evaluated with reference to Federal jurisdictional limits. Applicants are responsible for ensuring that the limits depicted satisfy the Federal criteria defined at 33 CFR 328 “Waters of the United States.” and 33 CFR 329 “Navigable Waters of the United States”

**NOTE:** Waters of the U.S. include the subcategories “navigable waters of the United States.” and “wetlands.”

b. Pre-Construction Notification (PCN) Eligible projects require an application to the Corps which must include a delineation of wetlands, other special aquatic sites, and other waters such as lakes and ponds and perennial, intermittent, and ephemeral streams that are on the project site. Wetland delineations must be prepared in accordance with the current federal method required by the Corps. For Corps Wetland Delineation Manual, regional supplements and data sheets, and the National List of Plant Species that Occur in Wetlands, visit our website at <http://www.nae.usace.army.mil/Missions/Regulatory.aspx> and then click on “Jurisdiction and Wetlands”. The Natural Resources Conservation Service (NRCS) publishes the current hydric soil definition, criteria and lists which can be found at

<http://www.nrcs.usda.gov/wps/portal/nrcs/main/soils/use/hydric/>. For the Field Indicators for Identifying Hydric Soils in New England, visit: [www.neiwpc.org/hydricsoils.asp](http://www.neiwpc.org/hydricsoils.asp).

### **3. Mitigation (Avoidance, Minimization, and Compensatory Mitigation)**

a. Activities must be designed and constructed to avoid and minimize adverse effects, both temporary and permanent, to waters of the United States (U.S.) to the maximum extent practicable at the project site (i.e., on site). Consideration of mitigation (avoiding, minimizing, rectifying, reducing, or compensating) is required to the extent necessary to ensure that the adverse effects to the aquatic environment are no more than minimal.

b. Applicants should consider riparian/forested buffers for stormwater management and low impact development (LID) best management practices (BMPs) to reduce impervious cover and manage stormwater to minimize impacts to the maximum extent practicable.

c. Compensatory mitigation<sup>1</sup> for effects to waters of the U.S., including direct, secondary and temporal<sup>2</sup>, will generally be required for projects with permanent impacts that exceed the SV area limits, and may be required for temporary impacts that exceed the SV area limits, to offset unavoidable impacts which remain after all appropriate and practicable avoidance and minimization has been achieved and to ensure that the adverse effects to the aquatic environment are no more than minimal. Proactive restoration projects or temporary impact work with no secondary effects may generally be excluded from this requirement.

The Corps **Connecticut In-Lieu Fee Program** allows Corps permittees, as compensation for their project impacts to aquatic resources of the United States in Connecticut pursuant to Section 404 of the Clean Water Act, to make monetary payment *in-lieu* of permittee-responsible mitigation. Information is provided at <http://www.nae.usace.army.mil/Missions/Regulatory/Mitigation.aspx> >>Mitigation>>Connecticut In-Lieu Fee Program. Please note that this only applies to Corps required mitigation and additional Connecticut DEEP mitigation may be required.

**4. Discretionary Authority.** Notwithstanding compliance with the terms and conditions of this permit, the Corps retains discretionary authority to require an Individual Permit review based on concerns for the aquatic environment or for any other factor of the public interest [33 CFR 320.4(a)]. This authority is invoked on a case-by-case basis whenever the Corps determines that the potential consequences of the proposal warrant Individual Permit review based on the concerns stated above. This authority may be invoked for projects with

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<sup>1</sup> Compensatory mitigation projects provided to offset losses of aquatic resources must comply with the applicable provisions of 33 CFR 332. See also the New England District Compensatory Mitigation Guidance at <http://www.nae.usace.army.mil/Missions/Regulatory/Mitigation.aspx>

<sup>2</sup> Temporal loss: The time lag between the losses of aquatic resource functions caused by the permitted impacts and the replacement of aquatic resource functions at the compensatory mitigation site(s) (33 CFR 332.2).

cumulative adverse environmental effects that are more than minimal, or if there is a special resource or concern associated with a particular project. Whenever the Corps notifies an applicant that an Individual Permit may be required, authorization under these GPs is voided and no work may be conducted until a Corps Individual Permit is obtained or until the Corps notifies the applicant that further review has demonstrated that the work may be reviewed under these GPs.

**5. Single and Complete Projects.** The term “single and complete project” is defined at 33 CFR 330.2(i) as the total project proposed or accomplished by one owner/developer or partnership or other association of owners/developers. The GPs shall not be used for piecemeal work and shall be applied to single and complete projects.

a. For non-linear projects, a single and complete project must have independent utility. Portions of a multi-phase project that depend upon other phases of the project do not have independent utility. Phases of a project that would be constructed, even if the other phases were not built, can be considered as separate single and complete projects with independent utility.

b. Unless the Corps determines the activity has independent utility, all components of a single project and/or all planned phases of a multi-phased project (e.g., subdivisions should include all work such as roads, utilities, and lot development) shall be treated together as constituting one single and complete project.

c. For linear projects such as power lines or pipelines with multiple crossings, a “single and complete project” is all crossings of a single water of the U.S. (i.e. single waterbody) at a specific location. For linear projects crossing a single waterbody several times at separate and distant locations, each crossing is considered a single and complete project. However, individual channels in a braided stream or river, or individual arms of a large, irregularly-shaped wetland or lake, etc., are not separate waterbodies, and crossings of such features cannot be considered separately. If any crossing requires a PCN review or an individual permit review, then the entire linear project shall be reviewed as one project under PCN or the individual permit procedures.

**6. Corps Property and Federal Projects.**

a. In addition to any authorization under these GPs, proponents must contact the Corps Real Estate Division at (978) 318-8585 for work occurring on or potentially affecting Corps properties and/or Corps-controlled easements to initiate reviews and determine what real estate instruments are necessary to perform work. Permittees may not commence work on Corps properties and/or Corps-controlled easements until they have received any required Corps real estate documents evidencing site-specific permission to work.

b. Any proposed temporary or permanent modification or use of a Federal project (including but not limited to a levee, dike, floodwall, channel, anchorage, seawall, bulkhead, jetty, wharf, pier or other work built but not necessarily owned by the United States), or any use which would obstruct or impair the usefulness of the Federal project in any manner, and/or would involve changes to the authorized Federal project’s scope, purpose, and/or functioning, is not eligible for SV and will also require review and approval by the Corps pursuant to 33 USC 408. Where Section 408 is applicable, a decision on a Department of the Army general permit application will not be rendered prior to the decision on a Section 408 request.

**7. National Lands.** Activities that impinge upon the value of any National Wildlife Refuge, National Forest, National Marine Sanctuary or any area administered by the National Park Service, U. S. Fish and Wildlife Service (USFWS) or U.S. Forest Service are not eligible for SV.

**8. Wild and Scenic Rivers.** No activity may occur in a component of the National Wild and Scenic River System, or in a river officially designated by Congress as a “study river” for possible inclusion in the system while the river is in an official study status, unless the appropriate Federal agency with direct management responsibility for such river, has determined in writing that the proposed activity will not adversely affect the Wild and Scenic River designation or study status. Information on Wild and Scenic Rivers may be obtained from the appropriate Federal land management agency responsible for the designated Wild and Scenic River or study river (e.g. National Park Service, U.S. Forest Service, Bureau of Land Management, U. S. Fish and Wildlife Service).

As of July 15, 2016, affected rivers in Connecticut include: the West Branch of the Farmington River from Colebrook to Canton (designated river); the Eightmile River and tributaries in Salem, Lyme and East Haddam (designated river); and the Lower Farmington River from Canton to Windsor (study river – including its tributary Salmon Brook). Additional information can be found at: <http://www.rivers.gov/connecticut.php>

## **9. Historic Properties.**

a. No undertaking shall cause effects (defined at 33 CFR 325 Appendix C and 36 CFR 800) on properties listed on, determined to be eligible for listing on, or potentially eligible for listing on the National Register of Historic Places<sup>3</sup>, including previously unknown historic properties within the permit area, unless the Corps or another Federal action agency has satisfied the consultation requirements of Section 106 of the National Historic Preservation Act (NHPA). The State Historic Preservation Officer (SHPO), Tribal Historic Preservation Officer (THPO) and the National Register of Historic Places can assist with locating information on: i) previously identified historic properties; and ii) areas with potential for the presence of historic resources, which may require identification and evaluation by qualified historic preservation and/or archaeological consultants in consultation with the Corps and the SHPO and/or THPO(s).

b. For activities eligible for SV (inland projects), proponents must ensure and document that the activity will not cause effects as stated in 9(a).

c. Proponents must submit a PCN to the Corps as soon as possible if the authorized activity may cause effects as stated in 9(a) to ensure that the Corps is aware of any potential effects of the permitted activity on any historic property that the consultation requirements of Section 106 of NHPA are satisfied.

d. All PCN (inland projects): i) show notification to the SHPO and applicable THPO(s)<sup>4</sup> for their identification of historic properties, ii) state which historic properties may be affected by the proposed work or include a vicinity map indicating the location of the historic properties or the potential for the presence of historic properties, and iii) include any available documentation from the SHPO or THPO(s) indicating that there are or are not historic properties affected. Starting consultation early in project planning can save proponents time and money.

e. If you discover any previously unknown historic, cultural or archeological remains and artifacts while accomplishing the activity authorized by this permit, you must immediately notify the district engineer of what you have found, and to the maximum extent practicable, avoid construction activities that may affect the remains and artifacts until the required coordination has been completed. The district engineer will initiate the Federal, Tribal and state coordination required to determine if the items or remains warrant a recovery effort or if the site is eligible for listing in the National Register of Historic Places.

## **10. Federal Threatened and Endangered Species.**

a. No activity is authorized which: a) is likely to directly or indirectly jeopardize the continued existence of any listed or proposed species or result in the destruction or adverse modification of designated or proposed critical habitat, as identified under the Federal Endangered Species Act (ESA); b) result in take of a listed species or adversely modifies designated critical habitat; or c) violates the ESA.

b. For listed species or critical habitat under U. S. Fish and Wildlife Service (USFWS) jurisdiction, a PCN is required when a proposed project may affect a listed species or designated critical habitat. To ensure compliance with the Endangered Species Act, project proponents must request an 'Official Species List' from the USFWS IPaC website <http://ecos.fws.gov/ipac> <http://ecos.fws.gov/ipac>>. This USFWS IPaC website will record the request and immediately email the list to you. Include the list with all applications. An activity is SV eligible if the Official Species List states the northern long-eared bat (NLEB) (*Myotis septentrionalis*) is present BUT the activity: i) will not remove trees  $\geq 3$  inches dbh; ii) is not within the "buffer" of a NLEB hibernacula or maternity roost tree; and iii) does not involve work on an existing dam, riprap or bridges.

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<sup>3</sup> The majority of historic properties are not listed on the National Register of Historic Places and may require identification and evaluation by qualified historic preservation and/or archaeological consultants in consultation with the Corps and the SHPO and/or THPO(s).

<sup>4</sup> Appendix D, #3 Historic Resources, provides contact information and each tribe's "area of concern."

c. For listed species or habitat under NMFS jurisdiction, the Corps will coordinate with NMFS as appropriate for all work eligible for SV that may have an effect on listed species or habitat; therefore SV eligible project proponents are not required to check for listed species or habitat for their projects.

d. Federal applicants should follow their own procedures for complying with the requirements of the ESA. Work may be eligible for SV if another Federal agency has satisfied the requirements of Section 7 of the ESA. Upon request, permittees must provide the Corps with the appropriate documentation to demonstrate compliance with those requirements.

#### **11. Pile Removal and Related Time of Year Restrictions**

a. Derelict, degraded or abandoned piles and sheet piles in navigable waters, except for those inside of existing work footprints for piers, must be completely removed or cut and/or driven to 3 feet below the substrate to prevent interference with navigation and in some cases to remove polluting materials. Existing creosote piles in the project area that are affected by project activities should be completely removed. In areas of fine-grained substrates, piles must be removed by the direct, vibratory or clamshell pull method<sup>5</sup> to minimize turbidity and sedimentation impacts. Removed piles shall be disposed of in an upland location landward of MHW or OHW and not in wetlands, tidal wetlands, their substrate or mudflats.

b. Piles should either be installed between November 1 and March 15 **OR** must use a soft start each day of pile driving, building up power slowly from a low energy start-up over a period of 20-40 minutes to provide adequate time for fish and marine mammals to leave the vicinity. The buildup of power should occur in uniform stages to provide a constant increase in output. Bubble curtains can be used to reduce sound pressure levels during vibratory or impact hammer pile driving.

#### **12. Navigation.**

a. No activity may cause more than a minimal adverse effect on navigation.

b. Any safety lights and signals prescribed by the U.S. Coast Guard, through regulations must be installed and maintained at the permittee's expense on authorized facilities in navigable waters of the U.S.

c. Any structure or work that extends closer to the horizontal limits of any Corps Federal Navigation Project than a distance of three times the project's authorized depth shall be subject to removal at the owner's expense prior to any future Corps dredging or the performance of periodic hydrographic surveys. This is applicable to SV and PCN.

d. There shall be no unreasonable interference with navigation by the existence or use of the activity authorized herein, and no attempt shall be made by the permittee to prevent the full and free use by the public of all navigable waters at or adjacent to the activity authorized herein.

e. The permittee understands and agrees that if future U.S. operations require the removal, relocation, or other alteration of the structure or work herein authorized, or if, in the opinion of the Secretary of the Army or his authorized representative, said structure or work shall cause unreasonable obstruction to the free navigation of the navigable waters, the permittee will be required, upon due notice from the Corps, to remove, relocate, or alter the structural work or obstructions caused thereby, without expense to the U.S. No claim shall be made against the U.S. on account of any such removal or alteration.

f. An application to the Corps is required for all work in, over or under an FNP or its buffer zone unless otherwise indicated in Appendix A.

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<sup>5</sup> **Direct Pull:** Each piling is wrapped with a choker cable or chain that is attached at the top to a crane. The crane then pulls the piling directly upward, removing the piling from the sediment. **Vibratory Pull:** The vibratory hammer is a large mechanical device (5-16 tons) that is suspended from a crane by a cable. The vibrating hammer loosens the piling while the crane pulls up. **Clamshell Pull:** This can remove intact, broken or damaged pilings. The clamshell bucket is a hinged steel apparatus that operates like a set of steel jaws. The bucket is lowered from a crane and the jaws grasp the piling stub as the crane pulls up. The size of the clamshell bucket is minimized to reduce turbidity during piling removal.

**13. Federal Liability.** In issuing this permit, the Federal Government does not assume any liability for the following: (a) damages to the permitted project or uses thereof as a result of other permitted or unpermitted activities or from natural causes; (b) damages to the permitted project or uses thereof as a result of current or future activities undertaken by or on behalf of the U.S. in the public interest; (c) damages to persons, property, or to other permitted or unpermitted activities or structures caused by the activity authorized by this permit; (d) design or construction deficiencies associated with the permitted work; (e) damage claims associated with any future modification, suspension, or revocation of this permit.

**14. Heavy Equipment in Wetlands.** Operating heavy equipment other than fixed equipment (drill rigs, fixed cranes, etc.) within wetlands shall be minimized, and such equipment shall not be stored, maintained or repaired in wetlands, to the maximum extent practicable. Where construction requires heavy equipment operation in wetlands, the equipment shall either have low ground pressure (typically <3 psi), or it shall be placed on swamp/construction/timber mats (herein referred to as “construction mats”) that are adequate to support the equipment in such a way as to minimize disturbance of wetland soil and vegetation. Construction mats are to be placed in the wetland from the upland or from equipment positioned on swamp mats if working within a wetland. Dragging construction mats into position is prohibited. Other support structures that are capable of safely supporting equipment may be used with written Corps authorization. Similarly, the permittee may request written authorization from the Corps to waive use of mats during frozen or dry conditions. An adequate supply of spill containment equipment shall be maintained on site. Construction mats should be managed in accordance with the following construction mat best management practices:

- Mats should be in good condition to ensure proper installation, use and removal.
- Where feasible, mats should be carried and not dragged unless they are being used as a grading implement.
- Where feasible, place mats in a location that would minimize the amount needed for the wetlands crossing.
- Minimize impacts to wetland areas during installation, use, and removal.
- Install adequate erosion & sediment controls at approaches to mats to promote a smooth transition to, and minimize sediment tracking onto, swamp mats.
- In most cases, construction mats should be placed along the travel area so that the individual boards are resting perpendicular to the direction of traffic. No gaps should exist between mats. Place mats far enough on either side of the resource area to rest on firm ground.
- Provide standard construction mat BMP details to work crews.

**15. Temporary Fill.**

a. Temporary fill, construction mats and corduroy roads shall be **entirely** removed as soon as they are no longer needed to construct the authorized work. Temporary fill shall be placed in its original location or disposed of at an upland site and suitably contained to prevent its subsequent erosion into waters of the U.S.

b. All temporary fill and disturbed soils shall be stabilized to prevent its eroding into waters of the U.S. where it is not authorized. Work shall include phased or staged development to ensure only areas under active development are exposed and to allow for stabilization practices as soon as practicable. Temporary fill must be placed in a manner that will prevent it from being eroded by expected high flows.

c. Unconfined temporary fill authorized for discharge into waters of the U.S. shall consist of material that minimizes impacts to water quality (e.g. washed stone, stone, etc.).

d. Appropriate measures must be taken to maintain normal downstream flows and minimize flooding to the maximum extent practicable when temporary structures, work, and discharges of dredged or fill material, including cofferdams, are necessary for construction activities, access fills, or dewatering of construction sites. Materials shall be placed in a location and manner that does not adversely impact surface or subsurface water flow into or out of the wetland. Temporary fill authorized for discharge into wetlands shall be placed on geotextile fabric or other appropriate material laid on the pre-construction wetland grade where practicable to minimize impacts and to facilitate restoration to the original grade. Construction mats are excluded from this requirement.

e. Construction debris and/or deteriorated materials shall not be located in waters of the U.S.

## **16. Restoration of Inland Wetland Areas.**

a. Upon completion of construction, all disturbed wetland areas (the disturbance of these areas must be authorized) shall be stabilized with a wetland seed mix containing only plant species native to New England and shall not contain any species listed in the “Invasive and Other Unacceptable Plant Species” Appendix D in the “New England District Compensatory Mitigation Guidance” found at <http://www.nae.usace.army.mil/Portals/74/docs/regulatory/Mitigation/CompensatoryMitigationGuidance.pdf>

b. The introduction or spread of invasive plant species in disturbed areas shall be controlled. If swamp or timber mats are to be used, they shall be thoroughly cleaned before re-use.

c. In areas of authorized temporary disturbance, if trees are cut they shall be cut at or above ground level and not uprooted in order to prevent disruption to the wetland soil structure and to allow stump sprouts to revegetate the work area, unless otherwise authorized.

d. Wetland areas where permanent disturbance is not authorized shall be restored to their original condition and elevation, which under no circumstances shall be higher than the pre-construction elevation. Original condition means careful protection and/or removal of existing soil and vegetation, and replacement back to the original location such that the original soil layering and vegetation schemes are approximately the same, unless otherwise authorized.

**17. Coastal Bank Stabilization.** Projects involving construction or reconstruction/maintenance of bank stabilization structures within Corps jurisdiction should be designed to minimize environmental effects, effects to neighboring properties, scour, etc. to the maximum extent practicable. For example, vertical bulkheads should only be used in situations where reflected wave energy can be tolerated. This generally eliminates bodies of water where the reflected wave energy may interfere with or impact on harbors, marinas, or other developed shore areas. A revetment is sloped and is typically employed to absorb the direct impact of waves more effectively than a vertical seawall. It typically has a less adverse effect on the beach in front of it, abutting properties and wildlife. For more information on this topic, go to the Corps Coastal Engineering Manual (supersedes the Shore Protection Manual), located at <http://chl.ercd.usace.army.mil>. Select “Products/ Services,” “Publications.” Part 5, Chapter 7-8, a (2) c.

**18. Soil Erosion and Sediment Controls.** Appropriate soil erosion and sediment controls must be used and maintained in effective operating condition during construction, and all exposed soil and other fills, as well as any work below the ordinary high water mark or high tide line, must be permanently stabilized at the earliest practicable date. Permittees are encouraged to perform work within waters of the U.S. during periods of low-flow or no-flow, or during low tides.

## **19. Aquatic Life Movements & Management of Water Flows.**

a. No activity may substantially disrupt the necessary life cycle movements of those species of aquatic life indigenous to the waterbody, including those species that normally migrate through the area, unless the activity’s primary purpose is to impound water. Unless otherwise stated, activities impounding water in a stream require a PCN to ensure impacts to aquatic life species are avoided and minimized. All permanent and temporary crossings of waterbodies (e.g., streams, wetlands) shall be:

i. Suitably culverted, bridged, or otherwise designed and constructed to maintain low flows to sustain the movement of those aquatic species; and

ii. Properly aligned and constructed to prevent bank erosion or streambed scour both adjacent to and inside the culvert. Permanent and temporary crossings of wetlands shall be suitably culverted, spanned or bridged in such a manner as to preserve hydraulic and ecological connectivity between the wetlands on either side of the road.

b. To avoid adverse impacts on aquatic organisms, the low flow channel/thalweg shall remain unobstructed during periods of low flow, except when it is necessary to perform the authorized work.

c. To the maximum extent practicable, the pre-construction course, condition, capacity, and location of open waters must be maintained for each activity, including stream channelization and storm water management activities. The activity must be constructed to withstand expected high flows. The activity must not restrict or impede the passage of normal or high flows, unless the primary purpose of the activity is to impound water or

manage high flows. The activity may alter the preconstruction course, condition, capacity, and location of open waters if it benefits the aquatic environment (e.g., stream restoration or relocation activities).

**20. Discharge of Pollutants.** All activities involving any discharge of pollutants into waters of the U.S. authorized under these GPs shall be consistent with applicable water quality standards, effluent limitations, standards of performance, prohibitions, and pretreatment standards and management practices established pursuant to the CWA (33 U.S.C. 1251), and applicable state and local laws. If applicable water quality standards, limitations, etc., are revised or modified during the term of this permit, the authorized work shall be modified to conform with these standards within 6 months of the effective date of such revision or modification, or within a longer period of time deemed reasonable by the District Engineer in consultation with the Regional Administrator of the EPA. Applicants may presume that state water quality standards are met with issuance of the Section 401 WQC (Applicable only to the Section 404 activity).

**21. Spawning, Breeding, and Migratory Areas**

a. Jurisdictional activities and impacts such as excavations, discharges of dredged or fill material, and/or suspended sediment producing activities in jurisdictional waters that provide value as fish migratory areas, fish and shellfish spawning or nursery areas, or amphibian and migratory bird breeding areas, during spawning or breeding seasons shall be avoided and minimized to the maximum extent practicable.

b. Jurisdictional activities in waters of the U.S. that provide value as breeding areas for migratory birds must be avoided to the maximum extent practicable. The permittee is responsible for obtaining any “take” permits required under the USFWS’s regulations governing compliance with the Migratory Bird Treaty Act or the Bald and Golden Eagle Protection Act. The permittee should contact the appropriate local office of the USFWS to determine if such “take” permits are required for a particular activity.

**22. Storage of Seasonal Structures.** Coastal structures, such as pier sections and floats, that are removed from the waterway for a portion of the year (often referred to as seasonal structures) shall be stored in an upland location, located above mean high water (MHW) and **not** in tidal wetlands. These seasonal structures may be stored on the fixed, pile-supported portion of the structure that is seaward of MHW. This is intended to prevent structures from being stored on the marsh substrate and the substrate seaward of MHW.

**23. Environmental Functions and Values.** The permittee shall make every reasonable effort to carry out the construction or operation of the work authorized herein in a manner that minimizes any adverse impacts on existing fish, wildlife, and the environmental functions to the extent practicable. The permittee will discourage the establishment or spread of plant species identified as non-native invasive species by any federal or state agency.

**24. Vernal Pools.**

a. Only vernal pools that meet the current definition of waters of the U.S. are regulated by the Corps.

b. Direct and indirect adverse effects to all vernal pools (VPs), including their envelopes and critical terrestrial habitats (VP Management Areas), shall be avoided and minimized to the maximum extent practicable. Site clearing, grading, and construction activities associated with a regulated activity in the VP Management Area may cause these adverse effects to the VP.

c. When any regulated activities occur within 750 feet of a vernal pool, the following management practices must be followed for all work within any VP Management Area (750’ of a VP’s edge) *in order to qualify for SV*:

i. No disturbance within the VP Depression or VP Envelope (area within 100 feet of the VP Depression’s edge)– does not apply to temporary impact associated with construction mats in previously disturbed areas of existing utility projects or linear transportation projects provided there is a Vegetation Management Plan that avoids, minimizes and mitigates impacts to aquatic resources.

ii. Maintain a minimum of 75% of the Critical Terrestrial Habitat (area within 100-750 feet of the VP Depression’s edge) as unfragmented forest with at least a partly-closed canopy of overstory trees to provide shade, deep litter and woody debris;

iii. Maintain or restore forest corridors connecting wetlands and significant vernal pools;

iv. Minimize forest floor disturbance;

- v. Maintain native understory vegetation and downed woody debris; and
- vi. Cape Cod style-curbings or no curbings options shall be used on new roads to facilitate amphibian passage.

d. A PCN is required for any regulated activity within 750' of a vernal pool when all work within the VP Management Area does not comply with the SV requirements in (c) above. Information on directional buffers in accordance with the VP Directional Buffer Guidance document may be provided in order to demonstrate minimal impact and avoid compensation requirements. Conservation of the un-impacted area within the VP Management Area will often be required.

## **25. Invasive Species.**

a. The introduction, spread, or the increased risk of invasion of invasive plant or animal species on the project site, into new or disturbed areas, or areas adjacent to the project site caused by the site work shall be avoided. Hence, swamp and timber mats shall be thoroughly cleaned before reuse.

b. Unless otherwise directed by the Corps, all applications for PCN inland projects proposing fill in Corps jurisdiction shall include an Invasive Species Control Plan. Additional information can be found at [www.hort.uconn.edu/cipwg/](http://www.hort.uconn.edu/cipwg/)

**26. Permit/Authorization Letter On-Site.** For PCN projects, the permittee shall ensure that a copy of these GPs and the accompanying authorization letter are at the work site (and the project office) whenever work is being performed, and that all personnel with operational control of the site ensure that all appropriate personnel performing work are fully aware of its terms and conditions. The entire permit authorization shall be made a part of any and all contracts and sub-contracts for work that affects areas of Corps jurisdiction at the site of the work authorized by these GPs. This shall be achieved by including the entire permit authorization in the specifications for work. The term "entire permit authorization" means these GPs, including General Conditions and the authorization letter (including its drawings, plans, appendices and other attachments) and also includes permit modifications. If the authorization letter is issued after the construction specifications, but before receipt of bids or quotes, the entire permit authorization shall be included as an addendum to the specifications. If the authorization letter is issued after receipt of bids or quotes, the entire permit authorization shall be included in the contract or sub-contract as a change order. Although the permittee may assign various aspects of the work to different contractors or sub-contractors, all contractors and sub-contractors shall be obligated by contract to comply with all environmental protection provisions contained within the entire authorization letter, and no contract or sub-contract shall require or allow unauthorized work in areas of Corps jurisdiction.

**27. Inspections.** The permittee shall allow the Corps to make periodic inspections at any time deemed necessary in order to ensure that the work is being or has been performed in accordance with the terms and conditions of this permit. The Corps may also require post-construction engineering drawings for completed work or post-dredging survey drawings for any dredging work.

**28. Maintenance.** The permittee shall maintain the activity authorized by these GPs in good condition and in conformance with the terms and conditions of this permit. This does not include maintenance of dredging projects. Maintenance dredging is subject to the review thresholds in Appendix A – General Permit #7 as well as any conditions included in a written Corps authorization. Maintenance dredging includes only those areas and depths previously authorized and dredged. Some maintenance activities may not be subject to regulation under Section 404 in accordance with 33 CFR 323.4(a) (2).

**29. Property Rights.** These GPs do not convey any property rights, either in real estate or material, or any exclusive privileges, nor does it authorize any injury to property or invasion of rights or any infringement of federal, state, or local laws or regulations.

**30. Transfer of GP Verifications.** When the work authorized by these GPs are still in existence at the time the property is transferred, the terms and conditions, including any special conditions, will continue to be binding on the entity or individual who received the authorization, as well as the new owner(s) of the property. If the permittee sells the property associated with a General Permit authorization, the permittee may transfer the General Permit authorization to the new owner by submitting a letter to the Corps to validate the transfer. A



copy of the General Permit authorization letter must be attached to the letter, and the letter must include the following statement: "The terms and conditions of these General Permits, including any special conditions, will continue to be binding on the new owner(s) of the property". This letter should be signed by both the seller and new property owner(s).

**31. Modification, Suspension, and Revocation.** This permit and any individual authorizations issued thereof may either be modified, suspended, or revoked in whole or in part pursuant to the policies and procedures of 33 CFR 325.7; and any such action shall not be the basis for any claim for damages against the United States.

**32. Special Conditions.** The Corps may impose other special conditions on a project authorized pursuant to this general permit that are determined necessary to minimize adverse environmental effects or based on any other factor of the public interest. These may be based on concerns from CT DEEP or a Federal resource agency. Failure to comply with all conditions of the authorization, including special conditions, will constitute a permit violation and may subject the permittee to criminal, civil, or administrative penalties and/or restoration.

**33. False or Incomplete Information.** If the Corps makes a determination regarding the eligibility of a project under this permit, and subsequently discovers that it has relied on false, incomplete, or inaccurate information provided by the permittee, the authorization will not be valid, and the U.S. government may institute appropriate legal proceedings.

**34. Abandonment.** If the permittee decides to abandon the activity authorized under this General Permit, unless such abandonment is merely the transfer of property to a third party, he/she may be required to restore the area to the satisfaction of the Corps.

**35. Enforcement cases.** These GPs do not apply to any existing or proposed activity in Corps jurisdiction associated with an on-going Corps or EPA enforcement action, until such time as the enforcement action is resolved or the Corps determines that the activity may proceed independently without compromising the enforcement action.

**36. Duration of Authorization.** These GPs expire five years from the date issued as listed at the top of the cover sheet. Activities authorized by these GPs that have either commenced (i.e., are under construction) or are under contract to commence in reliance upon this authorization will have an additional year from the expiration date to complete the work. The permittee must be able to document to the Corps' satisfaction that the project was under construction or under contract by the expiration date of these GPs. If work is not completed within the one year extended timeframe, the permittee must contact the Corps. The Corps may issue a new authorization provided the project meets the terms and conditions of the CT GPs in effect at the time.

Activities authorized under these GPs will remain authorized until the GP expires, unless discretionary authority has been exercised on a case-by-case basis to modify, suspend, or revoke the authorization in accordance with 33 CFR 325.2(e)(2). Activities completed under the SV or PCN authorizations of these GPs will continue to be authorized after its expiration date.

  
\_\_\_\_\_  
Jennifer L. McCarthy  
Chief, Regulatory Division

19 Aug 16  
\_\_\_\_\_  
Date



## APPENDIX C

### GENERAL PERMIT 16 - STANDARD AQUACULTURE TERMS AND CONDITIONS

#### DEPARTMENT OF THE ARMY/STATE OF CONNECTICUT

#### 2016 Connecticut General Permit

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1. Aquaculture activities under this General Permit as identified within Appendix 2, Section F are subject to the current General Permit Conditions and Requirements of the Connecticut General Permit.
2. All gear, including buoys shall be marked and maintained in a manner that will make it identifiable to the specific aquaculture project/lease.
3. Before the authorized structures are installed the project proponent **must** contact the CT DEEP Boating Division, Navigation Safety/Boating Access Unit, P.O. Box 280, 333 Ferry Road, Old Lyme, CT 06371-0280 to either obtain a waiver as to the need to install gear-area boundary marker buoys or submit a permit application and receive authorization for Regulatory Markers ([Link to Regulatory Marker Permit](#)). If CT DEEP Boating regulation does not apply, the applicant shall contact the U.S. Coast Guard (USCG), First District; Aids to Navigation Branch at 408 Atlantic Avenue, Boston, MA 02110-3350 (800-848-3942) to coordinate the proper buoy markers. The permittee shall install and maintain lights, markings and other features as the CT DEEP/USCG requires. Note: Documentation of this coordination will be necessary for existing operations that seek reconfigurations and/or new approvals for structures from the Dept. of Army and for authorizations from the CT DA/BA.
4. Gear may not be located over or within beds of submerged aquatic vegetation (SAV) such as eelgrass or turtle grass, and coastal wetlands (salt marsh), nor shall such beds or vegetated marsh areas be damaged or removed. Routine lease activity including cage maintenance, washing etc. shall not occur within 25 feet of the edge of beds of SAV.
5. All gear shall be designed and deployed in such a manner as to limit, to the greatest extent practicable, negative impacts on avian resources such as, but not limited to, shore birds, wading birds or members of the waterfowl group. This is meant to include nesting, feeding or resting activities by migratory birds identified at 50 CFR 10.13.
6. Installation of structures, their mooring tackle and lines and any attendant vessels shall not create a hazard or interfere with existing navigation uses in the waterway, and structures shall be set back from the Federal Navigation Project (FNP) a distance of at least 200 feet. A list of Connecticut FNP projects can be obtained from the U.S Army Corps of Engineers website <http://www.nae.usace.army.mil/Missions/Navigation/Connecticut-Projects/>

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### GENERAL PERMIT 16 - STANDARD AQUACULTURE TERMS AND CONDITIONS

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7. The right of the public to traverse or utilize the waters not physically occupied by authorized structures and/or moored vessels within the areal limits of the authorized gear perimeter shall not be impeded.
8. The placement of cultch shall comply with all of the Special Conditions in Section 5, part (h), items (1) through (7) of the Connecticut DEEP, General Permit for Coastal Maintenance (DEEP-OLISP-GP2015-02) as listed below:
  - Such placement of cultch shall only be conducted by a licensed shellfish operator in beds or areas designated for shellfishing under section 26-194 or section 26-242 of the General Statutes.
  - Such placement of cultch shall be conducted only in appropriate locations for colonization by oysters, based upon factors of salinity, water quality, water circulation patterns and substrate composition.
  - Such placement of cultch shall not be conducted in areas of tidal wetlands or submerged aquatic vegetation beds.
  - (Prior to the commencement of such placement of cultch, such licensed shellfish operator obtains all required authorizations from the Department of Agriculture Bureau of Aquaculture and Laboratory and the local shellfish commission, as applicable.
  - Prior to the commencement of such placement of cultch, such licensed shellfish operator obtains permission in writing from the owner or lessee of such shellfish bed or area.
  - Such placement of cultch shall be conducted in such a manner that it does not exceed a layer of cultch on the seafloor greater than 12" in depth.
  - Such placement of cultch shall be conducted such that the placement does not exceed 1,500 bushels per acre of seafloor.

## APPENDIX C

### GENERAL PERMIT 16 - STANDARD AQUACULTURE TERMS AND CONDITIONS

#### DEPARTMENT OF THE ARMY/STATE OF CONNECTICUT 2016 Connecticut General Permit

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9. The permittee shall be responsible to remove all gear and associated equipment within any leased or designated shellfish area in the event that the operator surrenders or loses the right to its use. <sup>1</sup>
10. The subject aquaculture activity shall not discernibly interfere with natural sedimentation and erosion processes.
11. Suspended cages or nets for the rearing or grow out of shellfish are permitted as Self Verification, provided they are located wholly below and within the footprint of an existing, authorized fixed or floating structure and provided there is a vertical clearance of at least 2 feet between the bottom of the gear and the sea floor at MLW. The structures that the gear will be adhered to must be in conformance with the structures permit for that "site."
12. Aquaculture projects authorized herein shall not interfere with public shore access at or below mean high water or interfere with the access to any riparian or littoral property.
13. The following conditions may be required as Special Conditions of an authorization to protect Federally-listed, protected sea turtles:
  - a. All gear, including buoys shall be marked and maintained in a manner that will make it identifiable to the specific aquaculture project/lease.
  - b. The length of the buoy line shall not exceed 23.1 feet (10% of the maximum water depth at MHHW at the lease site)
  - c. The gear sites shall be visited by an attendant surface vessel at least once a week, site conditions permitting.

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<sup>1</sup> In some situations, a performance bond may be required.

## APPENDIX C

### GENERAL PERMIT 16 - STANDARD AQUACULTURE TERMS AND CONDITIONS

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- d. If any listed species of sea turtle is observed to be entangled or otherwise interacting with the facility structure, the permittee (or onboard staff) shall immediately contact the Mystic Aquarium & Institute for Exploration, Marine Mammal and Sea Turtle Stranding Program Hotline at 860-572-5955 x107 and notify the NOAA Fisheries 24-hour Hotline at (866) 755-6622. The permittee should also contact the NOAA Fisheries Protected Resources Division, Sea Turtle Stranding & Disentanglement Coordinator at (978) 282-8470 or [NERStranding.staff@noaa.gov](mailto:NERStranding.staff@noaa.gov).
- e. The permittee shall keep the enclosed Sea Turtle Handling and Resuscitation Requirements in a visible location on the attendant vessels at all times. If a sea turtle is entangled in the authorized aquaculture gear and comatose or inactive (but not dead), resuscitation should be attempted by following these procedures.

## APPENDIX D

### CONTACTS FOR CONNECTICUT GENERAL PERMIT:

#### **1. FEDERAL**

##### ***U.S. Army Corps of Engineers***

New England District, Regulatory Division  
696 Virginia Road  
Concord, Massachusetts 01742-2751  
(800) 343-4789 or (978) 318-8335  
(978) 318-8303 - fax

##### ***National Park Service***

North Atlantic Region  
15 State Street  
Boston, Massachusetts 02109  
(617) 223-5203  
(*Wild & Scenic Rivers*)

##### ***Federal Endangered Species (F&WS):***

U.S. Fish and Wildlife Service  
70 Commercial Street, Suite 300  
Concord, New Hampshire 03301-5087  
(603) 223-2541

##### ***Federal Endangered Species & EFH (NMFS)***

National Marine Fisheries Service  
55 Great Republic Drive  
Gloucester, MA 01930  
Phone: (978) 281-9102  
(978) 281-9301 - fax

##### ***U.S. Environmental Protection Agency, Region I***

5 Post Office Square, Suite 100  
Boston, Massachusetts 02109  
(617) 918-2000

##### ***Department of Agriculture***

Bureau of Aquaculture  
P. O. Box 97  
190 Rogers Avenue  
Milford, Connecticut 06460  
(203) 874-0696

#### **2. STATE OF CONNECTICUT**

##### ***Department of Energy & Environmental Protection***

##### **(Coastal Projects)**

Office of Long Island Sound Programs  
79 Elm Street  
Hartford, Connecticut 06106-5127  
(860) 424-3034

##### **(Aquaculture Projects)**

Connecticut Department of Agriculture  
Bureau of Aquaculture & Laboratory  
PO Box 97  
Milford, CT 06460  
(203) 874-0696

##### **(Inland Projects)**

Inland Water Resources Division  
79 Elm Street  
Hartford, Connecticut 06106-5127  
(860) 424-3019

##### **(State Endangered Species)**

Bureau of Natural Resources  
Wildlife Division  
Natural Diversity Data  
Base  
79 Elm Street  
Hartford, Connecticut 06106-5127  
(860) 424-3011

##### **(Mashantucket Pequot Tribal Nation)**

Department of Natural Resources Protection &  
Regulatory Affairs  
550 Trolley Line Boulevard  
P. O. Box 3202  
Mashantucket, Connecticut 06338-3202

### **3. HISTORIC RESOURCES**

#### ***Tribal Historic Preservation Officers***

Mashantucket Pequot Tribal Nation  
Marissa Turnbull, THPO  
550 Trolley Line Boulevard  
P. O. Box 3202  
Mashantucket, Connecticut 06338-3202  
Phone (860) 396-6887  
Fax (860) 396-6914

Mohegan Tribe of Indians of Connecticut  
James Quinn, Tribal Historic Preservation Officer  
13 Crow Hill Rd.  
Uncasville, CT 06382

Phone (860) 862-6393  
Fax (860) 862-6395

Mohegan Tribe of Indians of Connecticut  
Compliance and Regulations Department  
13 Crow Hill Road  
Uncasville, CT 06382

#### ***Archaeological Information***

State Historic Preservation Office  
Department of Economic and Community Development  
Catherine Labadia, Deputy State Historic Preservation Officer  
One Constitution Plaza, 2<sup>nd</sup> Floor  
Hartford, Connecticut 06103-6103  
(860) 256-2800 (main)  
(860) 256-2764 (direct)

### **4. ORGANIZATIONAL WEBSITES**

U. S. Army Corps of Engineers – New England District

[www.nae.usace.army.mil/missions/regulatory.aspx](http://www.nae.usace.army.mil/missions/regulatory.aspx)

U. S. Army Corps of Engineers Headquarters [www.usace.army.mil](http://www.usace.army.mil) (click “Services for the Public”)

U.S. Environmental Protection Agency [www.epa.gov/owow/wetlands/](http://www.epa.gov/owow/wetlands/)

National Marine Fisheries Service [www.nmfs.noaa.gov](http://www.nmfs.noaa.gov)

U.S. Fish and Wildlife Service [www.fws.gov](http://www.fws.gov)

National Park Service [www.nps.gov/rivers/index.html/](http://www.nps.gov/rivers/index.html/)

Federal Emergency Management Agency [www.fema.gov](http://www.fema.gov)

Connecticut Dept. of Energy & Environmental Protection <http://www.ct.gov/deep/site/default.asp>

Connecticut Dept. of Agriculture, Bureau of Aquaculture & Laboratory  
<http://www.ct.gov/doag/cwp/view.asp?a=3768&q=451508&doagNav=>

U.S. Environmental Protection Agency, Region 1 – Low Impact Development-practices and state-specific resources, including CT DEP Stormwater Quality Manual [www.epa.gov/ne/topics/water/lid.html](http://www.epa.gov/ne/topics/water/lid.html)

U.S. Environmental Protection Agency – Green Infrastructure website [www.epa.gov/greeninfrastructure](http://www.epa.gov/greeninfrastructure)





**US Army Corps  
of Engineers**®  
New England District

**Appendix E: Self-Verification Notification Form**

This form is required for all **non-tidal projects in Connecticut**, but **not** required if work is done within boundaries of Mashantucket Pequot or Mohegan Tribal Lands. **Before** work commences, complete **all** fields (write “none” if applicable); attach project plans (not required for projects involving the installation of construction mats only); and any state or local approval(s); and send to:

Permits & Enforcement Branch B  
U.S. Army Corps of Engineers  
696 Virginia Road  
Concord, MA 01742-2751  
*or* [cenae-r@usace.army.mil](mailto:cenae-r@usace.army.mil)

*and*

CT DEEP  
Inland Water Resources Division  
79 Elm Street  
Hartford, CT 06106-5127

\*\*\*\*\*

State or local Permit Number: \_\_\_\_\_  
Date of State or local Permit: \_\_\_\_\_  
State/local Project Manager: \_\_\_\_\_

Permittee: \_\_\_\_\_  
Address, City, State & Zip: \_\_\_\_\_  
Phone(s) and Email: \_\_\_\_\_

Contractor: \_\_\_\_\_  
Address, City, State & Zip: \_\_\_\_\_  
Phone(s) and Email: \_\_\_\_\_

Consultant/Engineer/Designer: \_\_\_\_\_  
Address, City, State & Zip: \_\_\_\_\_  
Phone(s) and Email: \_\_\_\_\_

Wetland/Soil Scientist Consultant: \_\_\_\_\_  
Address, City, State & Zip: \_\_\_\_\_  
Phone(s) and Email: \_\_\_\_\_

Project Location (provide detailed description & locus map): \_\_\_\_\_  
\_\_\_\_\_  
Address, City, State & Zip: \_\_\_\_\_  
Latitude/Longitude Coordinates: \_\_\_\_\_  
Waterway Name: \_\_\_\_\_  
Project Purpose (include all aspects of the project including those not within Corps jurisdiction):  
\_\_\_\_\_  
\_\_\_\_\_

Work Description: \_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

Work will be done under the following GP(s) (check all that have associated impacts):

       **GP. 2 - Repair or maintenance of authorized or grandfathered structures/fills**

Area of total wetland impacts: temporary \_\_\_\_\_SF permanent \_\_\_\_\_SF

Area of total waterway impacts: temporary \_\_\_\_\_SF permanent \_\_\_\_\_SF

       **GP. 5 - Boat ramps/marine railways**

Area of total wetland impacts: temporary \_\_\_\_\_SF permanent \_\_\_\_\_SF

Area of total waterway impacts: temporary \_\_\_\_\_SF permanent \_\_\_\_\_SF

       **GP. 6 - Utility line activities (include calculations for each single & complete crossing**

**- attach additional sheet if necessary)**

Area of total wetland impacts: temporary \_\_\_\_\_SF permanent \_\_\_\_\_SF

Area of total waterway impacts: temporary \_\_\_\_\_SF permanent \_\_\_\_\_SF

       **GP. 9 - Shoreline and bank stabilization projects**

Area of total wetland impacts: temporary \_\_\_\_\_SF permanent \_\_\_\_\_SF

Area of total waterway impacts: temporary \_\_\_\_\_SF permanent \_\_\_\_\_SF

       **GP. 10 - Aquatic habitat restoration, establishment and enhancement activities**

Area of total wetland impacts: temporary \_\_\_\_\_SF permanent \_\_\_\_\_SF

Area of total waterway impacts: temporary \_\_\_\_\_SF permanent \_\_\_\_\_SF

       **GP. 11 - Fish & wildlife harvesting, enhancement and attraction devices and activities**

Area of total wetland impacts: temporary \_\_\_\_\_SF permanent \_\_\_\_\_SF

Area of total waterway impacts: temporary \_\_\_\_\_SF permanent \_\_\_\_\_SF

       **GP. 12 - Oil Spill and Hazardous material cleanup**

Area of total wetland impacts: temporary \_\_\_\_\_SF permanent \_\_\_\_\_SF

Area of total waterway impacts: temporary \_\_\_\_\_SF permanent \_\_\_\_\_SF

       **GP. 13 - Cleanup of hazardous and toxic waste**

Area of total wetland impacts: temporary \_\_\_\_\_SF permanent \_\_\_\_\_SF

Area of total waterway impacts: temporary \_\_\_\_\_SF permanent \_\_\_\_\_SF

       **GP. 14 - Scientific measurements devices**

Area of total wetland impacts: temporary \_\_\_\_\_SF permanent \_\_\_\_\_SF

Area of total waterway impacts: temporary \_\_\_\_\_SF permanent \_\_\_\_\_SF

       **GP. 15 - Survey activities**

Area of total wetland impacts: temporary \_\_\_\_\_SF permanent \_\_\_\_\_SF

Area of total waterway impacts: temporary \_\_\_\_\_SF permanent \_\_\_\_\_SF

       **GP. 17 - New/expanded developments & recreational facilities**

Area of total wetland impacts: temporary \_\_\_\_\_SF permanent \_\_\_\_\_SF

Area of total waterway impacts: temporary \_\_\_\_\_SF permanent \_\_\_\_\_SF

**\_\_\_\_\_ GP. 18 - Linear transportation projects- wetland crossings only (include calculations for each single & complete crossing - attach additional sheet if necessary)**

Area of total wetland impacts: temporary \_\_\_\_\_SF permanent \_\_\_\_\_SF

Area of total waterway impacts: temporary \_\_\_\_\_SF permanent \_\_\_\_\_SF

**\_\_\_\_\_ GP. 19 - Stream, river & brook crossings – not including wetland crossings (include calculations for each single & complete crossing – attach additional sheet if necessary)**

Area of total wetland impacts: temporary \_\_\_\_\_SF permanent \_\_\_\_\_SF

Area of total waterway impacts: temporary \_\_\_\_\_SF permanent \_\_\_\_\_SF

**\_\_\_\_\_ GP. 21 - Temporary fill not associated with any other GP activities**

Area of total wetland impacts: temporary \_\_\_\_\_SF permanent \_\_\_\_\_SF

Area of total waterway impacts: temporary \_\_\_\_\_SF permanent \_\_\_\_\_SF

**Does your project include any secondary effects?** Yes \_\_\_\_\_ No \_\_\_\_\_

(Secondary effects include, but are not limited to non-tidal waters or wetlands drained, flooded, fragmented, or mechanically cleared resulting from a single and complete project. See Appendix F - Definitions.) If YES, describe here: \_\_\_\_\_

\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

**Proposed Work Dates:** Start: \_\_\_\_\_ Finish: \_\_\_\_\_

**Your name/signature below, as permittee, confirms that your project meets the self-verification criteria and that you accept and agree to comply with the applicable terms and conditions in the Connecticut General Permits.**

\_\_\_\_\_  
**Signature of Permittee**

\_\_\_\_\_  
**Date**



## APPENDIX F - DEFINITIONS

**Artificial Reef:** A structure which is constructed or placed in waters for the purpose of enhancing fishery resources and commercial and recreational fishing opportunities.

**Boating facilities:** These provide, rent or sell mooring space, such as marinas, boat/yacht clubs, boat yards, dockminiums, town facilities, dockminiums, etc. Not classified as boating facilities are piers shared between two abutting properties or town mooring fields that charge an equitable user fee based on the actual costs incurred.

**Construction mats:** Construction, swamp and timber mats (herein referred to as “construction mats”) are generic terms used to describe structures that distribute equipment weight to prevent wetland damage while facilitating passage and providing work platforms for workers and equipment. They are comprised of sheets or mats made from a variety of materials in various sizes. A timber mat consists of large timbers bolted or cabled together.

**Compensatory mitigation:** The restoration (re-establishment or rehabilitation), establishment (creation), enhancement, and/or in certain circumstances preservation of aquatic resources for the purposes of offsetting unavoidable adverse impacts which remain after all appropriate and practicable avoidance and minimization has been achieved.

**Currently serviceable:** Useable as is or with some minor maintenance, but not so degraded as to essentially require reconstruction.

**Direct effects:** Effects that are caused by the activity and occur at the same time and place.

**Dredged material & discharge of dredged material:** These are defined at 33 CFR 323.2(c) and (d). The term dredged material means material that is excavated or dredged from waters of the United States.

**Discharge:** The term “discharge” means any discharge of dredged or fill material into waters of the United States.

**Enhancement:** The manipulation of the physical, chemical, or biological characteristics of an aquatic resource to heighten, intensify, or improve a specific aquatic resource function(s). Enhancement results in the gain of selected aquatic resource function(s), but may also lead to a decline in other aquatic resource function(s). Enhancement does not result in a gain in aquatic resource area.

**Ephemeral stream:** An ephemeral stream has flowing water only during, and for a short duration after, precipitation events in a typical year. Ephemeral stream beds are located above the water table year-round. Groundwater is not a source of water for the stream. Runoff from rainfall is the primary source of water for stream flow.

**Establishment (creation):** The manipulation of the physical, chemical or biological characteristics present to develop an aquatic resource that did not previously exist at an upland site. Establishment results in a gain in aquatic resource area.

**Expansions:** Work that increases the footprint of fill, depth of basin or drainage feature, structures or floats, or slip capacity.

**Fill material & discharge of fill material:** These are defined at 33 CFR 323.2(e) and (f). The term fill material is defined as material placed in waters of the U.S. where the material has the effect of either replacing any portion of a water of the U.S. with dry land or changing the bottom elevation of any portion of a water of the U.S.

**Federal navigation projects (FNPs):** These areas are maintained by the Corps; authorized, constructed and maintained on the premise that they will be accessible and available to all on equal terms; and are comprised of Corps Federal anchorages, Federal channels and Federal turning basins. Information, including the limits, is provided at <http://www.nae.usace.army.mil/Missions/Navigation.aspx>

**FNP Buffer Zone:** The buffer zone of a Corps FNP is equal to three times the authorized depth of the FNP. For additional information see <http://www.nae.usace.army.mil/Missions/Navigation/Connecticut-Projects/>

**Historic Property:** Any prehistoric or historic district, site (including archaeological site), building, structure, or other object included in, or eligible for inclusion in, the National Register of Historic Places maintained by the Secretary of the Interior. This term includes artifacts, records, and remains that are related to and located within such properties. The term includes properties of traditional religious and cultural importance to an Indian tribe or Native Hawaiian organization and that meet the National Register criteria (36 CFR part 60).

**Intermittent stream:** An intermittent stream has flowing water during certain times of the year, when groundwater provides water for stream flow. During dry periods, intermittent streams may not have flowing water. Runoff from rainfall is a supplemental source of water for stream flow.

**Indirect effects:** Effects that are caused by the activity and are later in time or farther removed in distance, but are still reasonably foreseeable.

**Individual Permit:** A Department of the Army authorization that is issued following a case-by-case evaluation of a specific structure or work in accordance with the procedures of 33 CFR 322, or a specific project involving the proposed discharge(s) in accordance with the procedures of 33 CFR 323, and in accordance with the procedures of 33 CFR 325 and a determination that the proposed discharge is in the public interest pursuant to 33 CFR 320.

**Living Shoreline:** A term used to describe a combination of mostly naturally derived materials including plants, shell and rock or manufactured rock-like surfaces that are used along a shoreline exhibiting erosion to dissipate wave energy and to collect naturally deposited sediment.

**Maintenance:** Maintenance does not include any modification that changes the character, scope, or size of the original fill design.

**Navigable waters of the United States:** Navigable waters of the United States are those waters that are subject to the ebb and flow of the tide and/or are presently used, or have been used in the past, or may be susceptible for use to transport interstate or foreign commerce. The Connecticut River has been determined to be a Navigable water of the United States. Refer to Title 33 CFR Part 329.

**Ordinary High Water Mark (OHW):** A line on the shore established by the fluctuations of water and indicated by physical characteristics, or by other appropriate means that consider the characteristics of the surrounding areas. See 33 CFR 328.3(e).

**Perennial stream:** A perennial stream has flowing water year-round during a typical year. The water table is located above the stream bed for most of the year. Groundwater is the primary source of water for stream flow. Runoff from rainfall is a supplemental source of water for stream flow.

**Practicable:** Available and capable of being done after taking into consideration cost, existing technology, and logistics in light of overall project purposes.

**Preservation:** The removal of a threat to, or preventing the decline of, aquatic resources by an action in or near those aquatic resources. This term includes activities commonly associated with the protection and maintenance of aquatic resources through the implementation of appropriate legal and physical mechanisms. Preservation does not result in a gain of aquatic resource area or functions.

**Re-establishment:** The manipulation of the physical, chemical, or biological characteristics of a site with the goal of returning natural/historic functions to a former aquatic resource. Re-establishment results in rebuilding a former aquatic resource and results in a gain in aquatic resource area.

**Rehabilitation:** The manipulation of the physical, chemical, or biological characteristics of a site with the goal of repairing natural/historic functions to a degraded aquatic resource. Rehabilitation results in a gain in aquatic resource function, but does not result in a gain in aquatic resource area.

**Restoration:** The manipulation of the physical, chemical, or biological characteristics of a site with the goal of returning natural/historic functions to a former or degraded aquatic resource. For the purpose of tracking net gains in aquatic resource area, restoration is divided into two categories: reestablishment and rehabilitation.

**Secondary effects:** These are effects on an aquatic ecosystem that are associated with a discharge of dredged or fill materials, but do not result from the actual placement of the dredged or fill material. Information about secondary effects on aquatic ecosystems shall be considered prior to the time final Section 404 action is taken by permitting authorities. Some examples of secondary effects on an aquatic ecosystem are a) aquatic areas drained, flooded, fragmented, or mechanically cleared, b) fluctuating water levels in an impoundment and downstream associated with the operation of a dam, c) septic tank leaching and surface runoff from residential or commercial developments on fill, and d) leachate and runoff from a sanitary landfill located in waters of the U.S. See 40 CFR 230.11(h).

**Shellfish dredging:** Shellfish dredging typically consists of a net on a frame towed behind a boat to capture shellfish and leave the sediment behind. Dredges may skim the surface, utilize hydraulic jets, toothed rakes or suction apparatus.

**Special aquatic sites:** These include inland and saltmarsh wetlands, mud flats, vegetated shallows (submerged aquatic vegetation), sanctuaries and refuges, coral reefs, and riffle and pool complexes. These are defined at 40 CFR 230.3 and listed in 40 CFR 230 Subpart E.

**Stream bed:** The substrate of the stream channel between the OHW marks. The substrate may be bedrock or inorganic particles that range in size from clay to boulders. Wetlands contiguous to the streambed, but outside of the OHW marks, are not considered part of the streambed.

**Stream channelization:** The manipulation of a stream's course, condition, capacity, or location that causes more than minimal interruption of normal stream processes. A channelized stream remains a water of the United States.

**Structure:** An object that is arranged in a definite pattern of organization. Examples of structures include, without limitation, any pier, boat dock, boat ramp, wharf, dolphin, weir, boom, breakwater, bulkhead, revetment, riprap, jetty, artificial island, artificial reef, permanent mooring structure, power transmission line, permanently moored floating vessel, piling, aid to navigation, or any other manmade obstacle or obstruction.

**Temporary impacts:** Temporary impacts include waters of the U.S. that are temporarily filled, flooded, excavated, drained or mechanically cleared because of the regulated activity.

**Tide gates:** Structures such as duckbills, flap gates, manual and self-regulating tide gates, etc. that regulate or prevent upstream tidal flows.

**Utility Line:** Any pipe or pipeline for the transportation of any gaseous, liquid, liquescent, or slurry substance, for any purpose, and any cable, line, or wire for the transmission for any purpose of electrical energy, telephone, data, and telegraph messages, and radio and television communication. The term utility line does not include activities that drain a water of the U.S., such as drainage tile or French drains, but it does apply to pipes conveying drainage from another area.

**Vegetated shallows:** Permanently inundated areas that under normal circumstances support communities of rooted aquatic vegetation, such as eelgrass and widgeon grass (*Rupia maritima*) in marine systems (doesn't include salt marsh) as well as a number of freshwater species in rivers and lakes. Note: These areas are also commonly referred to as submerged aquatic vegetation (SAV).

**Vernal pools (VPs):** Vernal pools (VPs): For the purposes of these GPs, VPs are depressional wetland basins that typically go dry in most years and may contain inlets or outlets, typically of intermittent flow. Vernal pools range in both size and depth depending upon landscape position and parent material(s). In most years, VPs support one or more of the following obligate indicator species: wood frog, spotted salamander, blue-spotted salamander, marbled salamander, Jefferson's salamander and fairy shrimp. However, they should preclude sustainable populations of predatory fish. VP areas are:

- Depression (includes the VP depression up to the spring or fall high water mark, and includes any vegetation growing within the depression),
- Envelope (area within 0-100 feet of the VP depression's edge), and
- Critical terrestrial habitat (area within 100-750 feet of the VP depression's edge).

The envelope and critical terrestrial habitat protect the water quality of the breeding site (e.g., providing shade, leaf litter, and coarse woody material) and support the non-larval life-cycle stages of amphibian species. Note: The Corps may determine that a waterbody should not be designated as a VP based on available evidence.

**Weir:** A barrier across a river designed to alter the flow characteristics. In most cases, weirs take the form of a barrier, smaller than most conventional dams, across a river that causes water to pool behind the structure (not unlike a dam) and allows water to flow over the top. Weirs are commonly used to alter the flow regime of the river, prevent flooding, measure discharge and help render a river navigable.

**Waters of the United States.:** Waters of the United States are defined in Title 33 CFR Part 328. These waters include more than navigable waters of the U.S. and are the waters where permits are required for the discharge of dredged or fill material pursuant to Section 404 of the Clean Water Act. Waters of the U.S. include jurisdictional wetlands.





Design and construction guidance may be found in the U.S. Forest Service stream simulation manual, “Stream Simulation: An Ecological Approach to Providing Passage for Aquatic Organisms at Road-Stream Crossings”<sup>1</sup>. Section 5.3.3 Headcutting Potential and 6.2 Design of the Stream-Simulation Channel Bed are particularly relevant. Sections 7.5.2.3 Construction Methods and 8.2.11 Stream-Simulation Bed Material Placement both show important steps in the project construction. Chapter 6.1 is relevant for proper alignment and construction to prevent bank erosion or streambed scour.

#### Permanent Crossings in Tidal Streams

These are relevant for new and replacement crossings and culvert extensions.

1. Match the velocity, depth, cross-sectional area, and substrate of the existing stream outside the crossing, if it exists, and size crossings such that they do not restrict tidal flow over the full natural tide range seaward of the crossing. The Corps will typically require a low lying property analysis to ensure flooding is not a concern.
2. Construct crossings in dry conditions.

#### Permanent Crossings in Non-Tidal Streams

These are relevant for new and replacement crossings and culvert extensions.

1. Span<sup>2</sup> streams or size culverts or pipe arches such that they are wider than bankfull width (BFW). Spans are strongly preferred as they avoid or minimize disruption to the streambed, and avoid entire streambed reconstruction and maintenance inside the culvert or pipe arch (see 4, 5 & 7 below), which may be difficult in smaller structures. The span width of bridges, box culverts and arches at bankfull elevation should be  $\geq 1.2$  times BFW where practicable. In many cases bankfull width is not necessarily interchangeable with the elevation of ordinary high water.<sup>3</sup>
2. Embed culverts or pipe arches below the grade of the streambed. This is not required when ledge/bedrock and/or utilities prevents embedment, in which case spans are preferred. The following depths are recommended to prevent streambed washout, and ensure compliance and long-term success:
  - a.  $\geq 1$ -2 feet for box culverts and pipe arches<sup>4</sup>, or
  - b.  $\geq 1$ -2 feet and at least 25% for round pipe culverts.
3. Match the culvert gradient (slope) with the stream channel profile.
4. Construct crossings carrying normal flows with a natural bottom substrate within the structure matching the characteristics of the substrate in the natural stream channel and the banks

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<sup>1</sup> [www.nae.usace.army.mil/missions/regulatory.aspx](http://www.nae.usace.army.mil/missions/regulatory.aspx) >> “[Stream and River Continuity](#).”

<sup>2</sup> For the purposes of this GP, spans are bridges, three-sided box culverts, open-bottom culverts or arches that span the stream. The use of bridge piers or similar supports does not prevent a structure from being considered as a span.

<sup>3</sup> BFW corresponds with “bankfull stage” and this should be field delineated in accordance with the U.S. Forest Service documents: a) [U.S. Forest Service stream simulation manual](#)<sup>1</sup>; b) “[Stream Channel Reference Sites: An Illustrated Guide to Field Technique](#)” (Harrelson, et al. 1994); and c) “[A Guide to Identification of Bankfull Stage in the Northeastern United States](#)”.

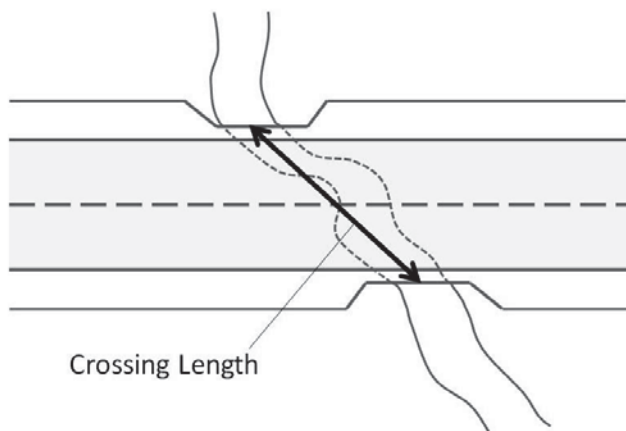
<sup>4</sup> For 2(a) and 2(b), deeper embedment depths may be needed if there are elements of the constructed stream bed that are greater than 15 inches in diameter.

(mobility, slope, stability, confinement, grain and rock size) at the time of construction and over time as the structure has had the opportunity to pass substantial high flow events.

5. Construct crossings with appropriate bed forms and streambed characteristics so that water depths and velocities are comparable to those found in the natural channel at a variety of flows at the time of construction and over time. In order to provide appropriate water depths and velocities at a variety of flows and especially low flows, it is usually necessary to reconstruct the streambed (sometimes including a low flow channel), or replicate or preserve the natural channel within the structure. Otherwise, the width of the structure needed to accommodate higher flows will create conditions that are too shallow at low flows. The grain and rock size, and arrangement of streambed materials within the structure should be in accordance with (4) above. Flows could go subsurface within the structure if only large material is used without smaller material filling the voids.

6. *Openness > 0.82 feet (0.25 meters)*

Openness is the cross-sectional area of a structure opening divided by its crossing length when measured in consistent units (e.g. feet). For a box culvert, openness = (height x width)/ length.



For crossing structures with multiple cells or barrels, openness is calculated separately for each cell or barrel. At least one cell or barrel must meet the appropriate openness standard. The embedded portion of a culvert is not included in the calculation of cross-sectional area for determining openness.<sup>5</sup>

Openness > 0.82 feet is recommended to make the structure more likely to pass small, riverine wildlife such as turtles, mink, muskrat and otter that may tend to

avoid structures that appear too constricted. This openness standard is too small to accommodate large wildlife such as deer, bear, and moose. Structures that meet this openness standard are much more likely than traditional culverts to pass flood flows and woody debris that would otherwise obstruct water passage. It is likely that most structures that meet all the other general standards will also meet this openness standard. However, for some very long structures it may be impractical or impossible to meet this standard.

7. Construct banks on each side of the stream inside the span that match the horizontal profile of the existing stream and banks outside the span. To prevent failure, all constructed banks should have a height to width ratio of no greater than 1:1.5 (vertical:horizontal) unless the stream is naturally incised. Tie the banks into the up and downstream banks and configure them to be stable during expected high flows. Use materials that match the up and downstream banks (avoid the use of angular riprap and armored slopes, except where necessary for structural reasons, in which case they should be top-dressed with natural stream bed material). Construct a wildlife shelf on at least one of the banks. The constructed banks (with a wildlife shelf) will allow for terrestrial passage for wildlife and prevent flow from being focused to one side and

<sup>5</sup> An Openness Ratio Spreadsheet shows how to calculate the open area for embedded pipe culverts to meet the 0.82 standard for openness. See [www.nae.usace.army.mil/missions/regulatory.aspx](http://www.nae.usace.army.mil/missions/regulatory.aspx) >> Stream and River Continuity.

scouring the bed, especially against the structure's sidewall which may undermine the footings in the case of spans.

#### Temporary Crossings in Non-Tidal Streams

Temporary crossings shall consist of spans, culverts, construction mats or fords designed and constructed as follows:

1. All temporary crossings:
  - a. Impacts to the streambed or banks require restoration to their original condition (see U.S. Forest Service stream simulation manual referenced on page 1 of this document for stream simulation restoration methods). Use geotextile fabric or other appropriate bedding for stream beds and approaches where practicable to ensure restoration to the original grade.
  - b. Avoid excavating the stream or embedding crossings.
2. Culverts:
  - a. Install energy dissipating devices downstream if necessary to prevent scour.
3. Stream fords: Equipment may ford streams when: it is not feasible to construct a span or culvert (e.g., streams having no or low banks, emergency situations); the natural stream bed and banks consist of ledge, rock or sand that prevents disturbance and turbidity; and there is a stable, gradual approach.
4. Spans: Anchor spans where practicable so they do not wash out during high water.
5. Construction mats: Build construction mat stream crossings in accordance with the Construction Mat BMPs, specifically the Wetland/Stream Channel Crossing section. See [www.nae.usace.army.mil/missions/regulatory.aspx](http://www.nae.usace.army.mil/missions/regulatory.aspx) >> [State General Permits](#) >> Connecticut General Permit Documents.



REPLY TO  
ATTENTION OF

**DEPARTMENT OF THE ARMY**  
NEW ENGLAND DISTRICT, CORPS OF ENGINEERS  
696 VIRGINIA ROAD  
CONCORD, MASSACHUSETTS 01742-2751

July 19, 2018

Regulatory Division  
File Number: NAE-2018-01777

Connecticut Department of Transportation  
Attn: Kimberly Lesay  
2500 Berlin Turnpike  
Newington, CT 06131

Dear Ms. Lesay:

RE: Project Name & Location of Work: **Bridge #196, RT 1, Branford, CT**

We received your Connecticut General Permits (CT GPs) Appendix E Self-Verification Notification Form indicating that you plan to conduct the above work within our jurisdiction under Self-Verification of the GPs. We have assigned this file number **NAE-2018-01777**. Please reference this number in any future correspondence with us.

We have recorded this project as permittee self-verification of the CT GPs in our database. You are responsible for ensuring the work meets the terms and conditions of the CT GPs.

If you have any questions, please contact me at (978) 318-8879.

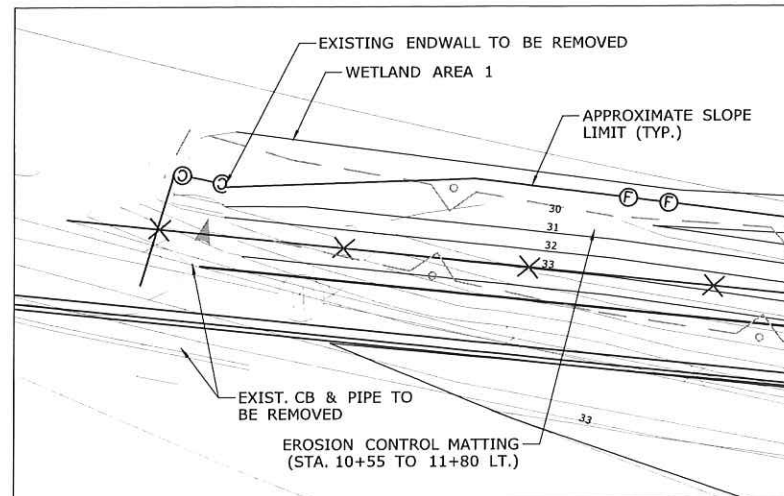
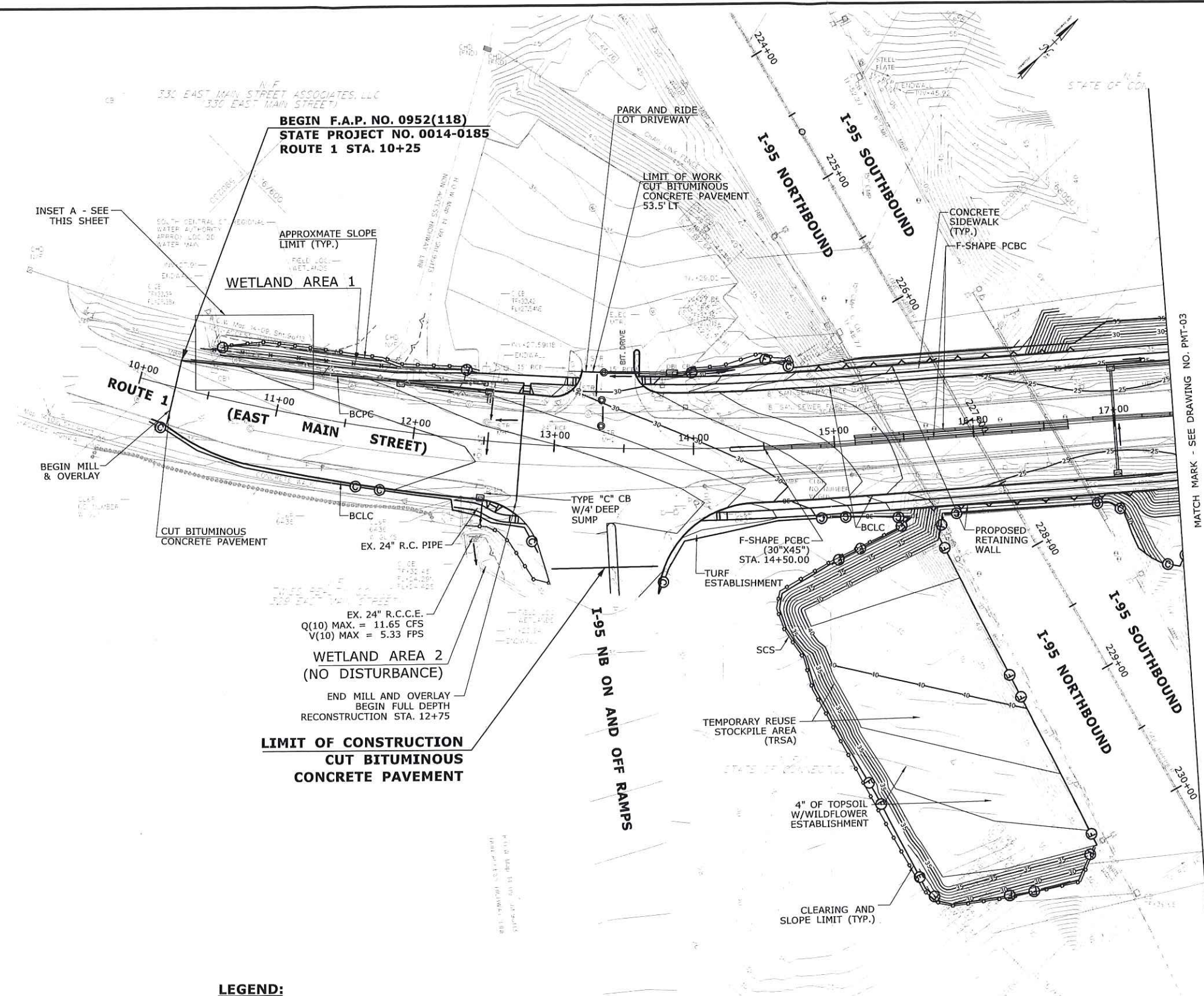
A handwritten signature in cursive script, appearing to read "Kevin R. Kotelly".

for: Kevin R. Kotelly, P.E.  
Chief, Permits and Enforcement Branch

Copy furnished:

Brian Golembiewski, CT DEEP, Chief, Land & Water Resources Southeast Division – via email





**INSET A**  
SCALE: 1" = 10'

- LEGEND:**
- SEDIMENTATION CONTROL SYSTEM (SCS)
  - - - - - STATE/FEDERAL WETLANDS

**ENVIRONMENTAL PERMIT PLANS**  
PLAN DATE: JUNE 12, 2018

REV.	DATE	REVISION DESCRIPTION	SHEET NO.	Plotted Date: 6/13/2018

DESIGNER/DRAFTER:  
O. BELGUET  
CHECKED BY:  
S. SUEHR  
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SCALE 1"=40'

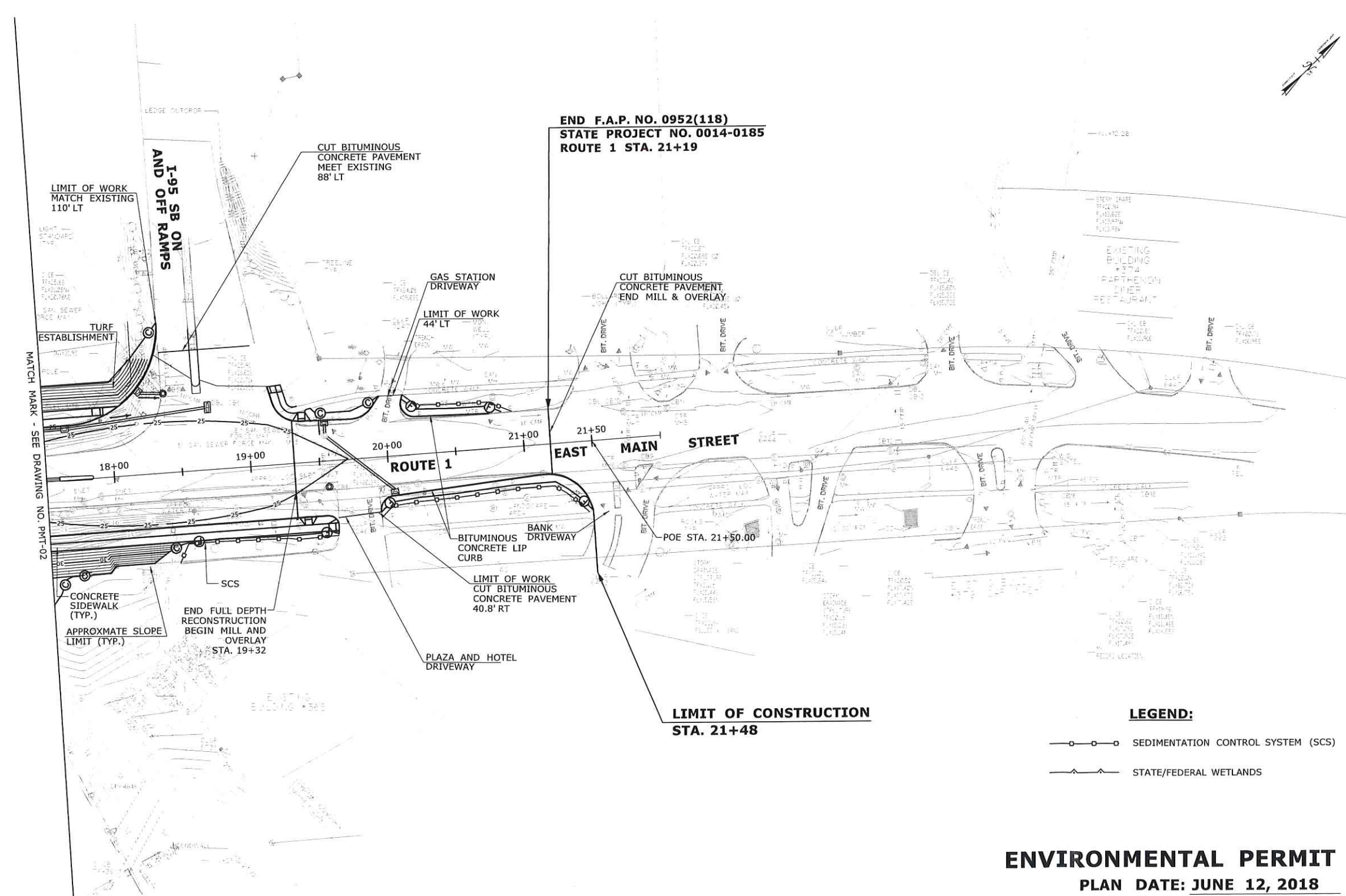
STATE OF CONNECTICUT  
DEPARTMENT OF TRANSPORTATION

AMMANN & WHITNEY  
2500 WESTCHESTER AVENUE  
SUITE 305  
PURCHASE, NEW YORK

PROJECT TITLE:  
**REHABILITATION OF BRIDGE  
NO. 00196 - INTERSTATE 95  
OVER U.S. ROUTE 1**

TOWN: **BRANFORD**  
DRAWING TITLE:  
**GENERAL SITE PLAN**

PROJECT NO.  
**14-185**  
DRAWING NO.  
**PMT-02**  
SHEET NO.  
**01.02**



END F.A.P. NO. 0952(118)  
 STATE PROJECT NO. 0014-0185  
 ROUTE 1 STA. 21+19

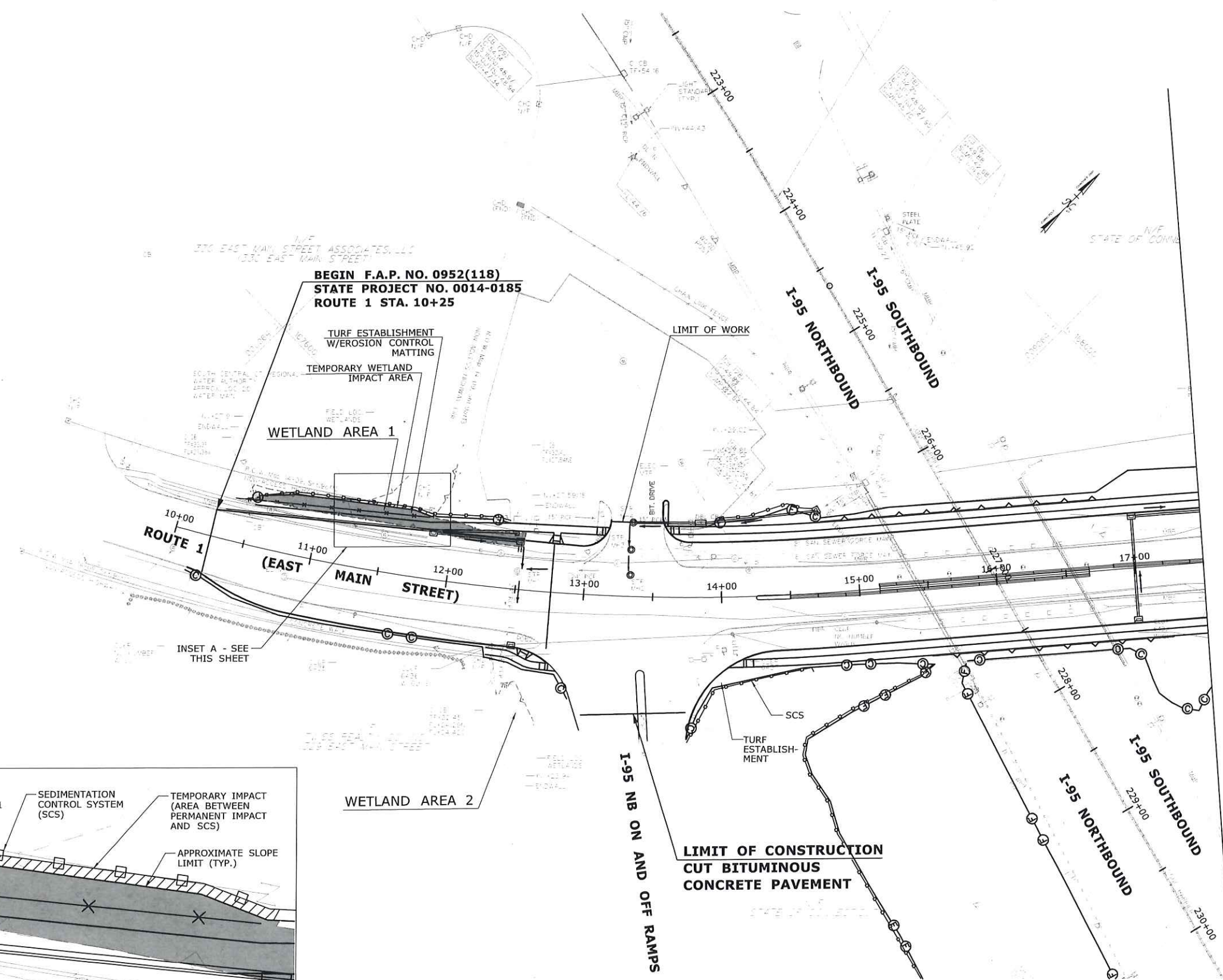
LIMIT OF CONSTRUCTION  
 STA. 21+48

**LEGEND:**

- SEDIMENTATION CONTROL SYSTEM (SCS)
- ▲—▲— STATE/FEDERAL WETLANDS

**ENVIRONMENTAL PERMIT PLANS**  
 PLAN DATE: JUNE 12, 2018

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: <b>O. BELGUET</b> CHECKED BY: <b>S. SUEHR</b>	<p>STATE OF CONNECTICUT          DEPARTMENT OF TRANSPORTATION</p>	<p>AMMANN &amp; WHITNEY          2500 WESTCHESTER AVENUE          SUITE 305          PURCHASE, NEW YORK</p>	PROJECT TITLE: <b>REHABILITATION OF BRIDGE NO. 00196 - INTERSTATE 95 OVER U.S. ROUTE 1</b>	TOWN: <b>BRANFORD</b>	PROJECT NO. <b>14-185</b>
REV. DATE REVISION DESCRIPTION SHEET NO. Plotted Date: 6/13/2018	SCALE IN FEET 0 40 80 SCALE 1"=40'	DRAWING TITLE: <b>GENERAL SITE PLAN</b>				DRAWING NO. <b>PMT-03</b> SHEET NO. <b>01.03</b>	



WETLAND IMPACT TABLE				
AREA #	PERMANENT		TEMPORARY	
	AREA (SF)	AREA (AC)	AREA (SF)	AREA (AC)
1	1965	0.045	162	0.004
2	0	0	0	0
<b>TOTAL</b>	<b>1965</b>	<b>0.045</b>	<b>162</b>	<b>0.004</b>

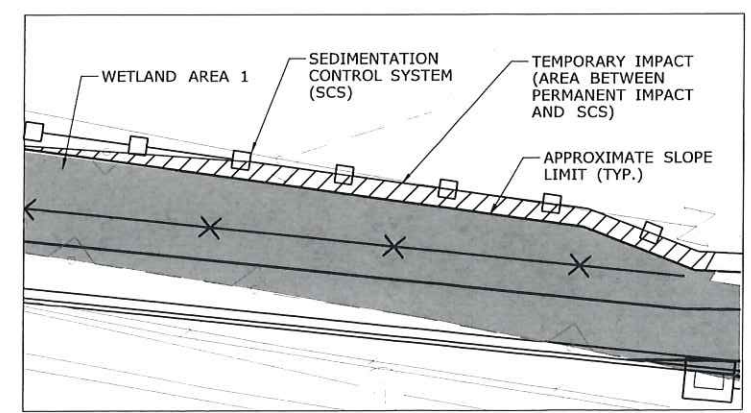
**NOTE:**

1. THE CONTRACTOR SHALL NOT WORK WITHIN THE LIMITS OF THE WETLANDS AND WATERCOURSES WITH THE EXCEPTION OF THOSE AREAS DELINEATED AS TEMPORARY OR PERMANENT IMPACTS TO THE WETLANDS AND WATERCOURSE. ALL DISTURBED AREAS SHALL BE RESTORED.
2. WOOD MULCH SHALL NOT BE PLACED IN THE WETLAND AREA.

**LEGEND:**

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

- SEDIMENTATION CONTROL SYSTEM (SCS)
- - - - STATE/FEDERAL WETLANDS
- PERMANENT IMPACT
- ▨ TEMPORARY IMPACT



**INSET A**  
SCALE: 1" = 10'

**ENVIRONMENTAL PERMIT PLANS**  
PLAN DATE: JUNE 12, 2018

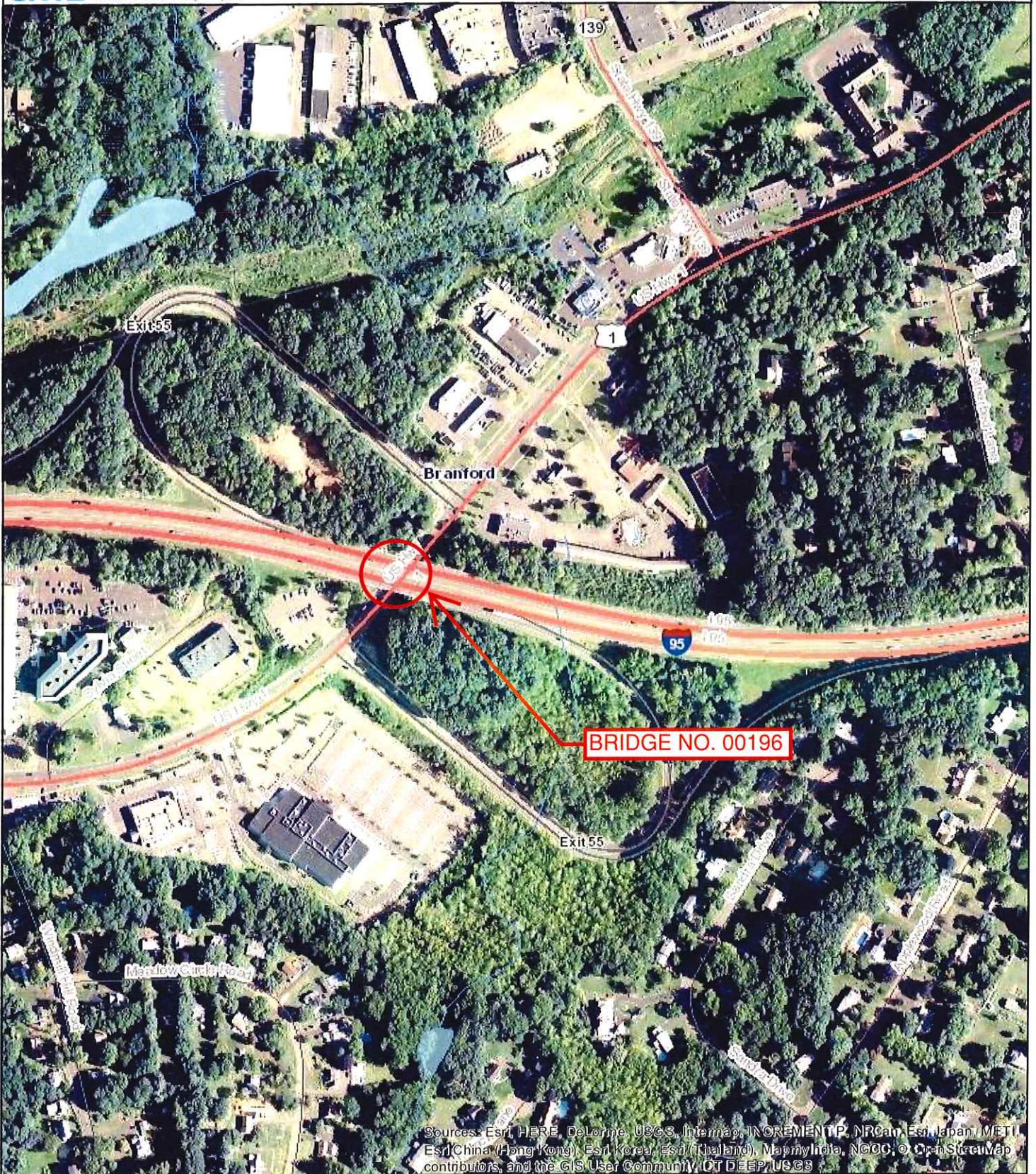
REV. DATE REVISION DESCRIPTION SHEET NO. Plotted Date: 6/14/2018	DESIGNER/DRAFTER: O. BELGUET CHECKED BY: S. SUEHR	<p>STATE OF CONNECTICUT DEPARTMENT OF TRANSPORTATION</p>	<p>AMMANN &amp; WHITNEY 2500 WESTCHESTER AVENUE SUITE 305 PURCHASE, NEW YORK</p>	PROJECT TITLE: <b>REHABILITATION OF BRIDGE NO. 00196 - INTERSTATE 95 OVER U.S. ROUTE 1</b>	TOWN: <b>BRANFORD</b>	PROJECT NO. <b>14-185</b>
	SCALE IN FEET 0 40 80 SCALE 1"=40'					SIGNATURE/BLOCK: 





Engineers  
Designers  
Consultants  
Planners  
Scientists  
101 East River Drive, 3 Floor • East Hartford, CT 06108  
T.860.290.4100 • www.cmeengineering.com

**PROJECT NO. 14-185**  
**BRIDGE NO. 00196 IN BRANFORD, CT**  
**INTERSTATE 95 OVER US ROUTE 1**



Sources: Esri, HERE, DeLorme, USGS, Intermap, INCREMENT P, NRCan, Esri Japan, METI, Esri China (Hong Kong), Esri Korea, Esri (Thailand), MapmyIndia, NGCC, © OpenStreetMap contributors, and the GIS User Community, © DEEP, USGS



**CTECO AERIAL  
MAP  
BRANFORD,  
CONNECTICUT**

**1 INCH = 500 FEET**



**Construction Contracts - Required Contract Provisions  
(FHWA Funded Contracts)**

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4. Requirements of Title 49, CFR , Part 26, Participation by DBEs
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  - d. Awarding of Contracts to Occupational Safety and Health Law Violators Prohibited
  - e. Residents Preference in Work on Other Public Facilities (Not Applicable to Federal Aid Contracts)
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12. Connecticut Freedom of Information Act
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20. Tangible Personal Property
21. Bid Rigging and/or Fraud – Notice to Contractor
22. Consulting Agreement Affidavit
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**1. Federal Highway Administration (FHWA) Form 1273**

The Contractor shall comply with the Federal Highway Administration (FHWA), Form 1273 attached at Exhibit A, as revised, which is hereby made part of this contract. The Contractor shall also require its subcontractors to comply with the FHWA – Form 1273 and include the FHWA – Form 1273 as an attachment to all subcontracts and purchase orders.

**2. Title VI of the Civil Rights Act of 1964 / Nondiscrimination Requirements**

The Contractor shall comply with Title VI of the Civil Rights Act of 1964 as amended (42 U.S.C. 2000 et seq.), all requirements imposed by the regulations of the United States Department of Transportation (49 CFR Part 21) issued in implementation thereof, and the Title VI Contractor Assurances attached hereto at Exhibit B, all of which are hereby made a part of this Contract.

**3. Contractor Work Force Utilization (Federal Executive Order 11246) / Equal Employment Opportunity**

- (a) The Contractor shall comply with the Contractor Work Force Utilization (Federal Executive Order 11246) / Equal Employment Opportunity requirements attached at Exhibit C and hereby made part of this Contract, whenever a contractor or subcontractor at any tier performs construction work in excess of \$10,000. These goals shall be included in each contract and subcontract. Goal achievement is calculated for each trade using the hours worked under each trade.
- (b) Companies with contracts, agreements or purchase orders valued at \$10,000 or more will develop and implement an Affirmative Action Plan utilizing the ConnDOT Affirmative Action Plan Guideline. This Plan shall be designed to further the provision of equal employment opportunity to all persons without regard to their race, color, religion, sex or national origin, and to promote the full realization of equal employment opportunity through a positive continuation program. Plans shall be updated as required by ConnDOT.

**4. Requirements of Title 49, Code of Federal Regulations (CFR), Part 26, Participation by DBEs, as may be revised.**

Pursuant to 49 CFR 26.13, the following paragraph is part of this Contract and shall be included in each subcontract the Contractor enters into with a subcontractor:

“The Contractor, subrecipient or subcontractor shall not discriminate on the basis of race, color, national origin, or sex in the performance of this contract. The Contractor shall carry out applicable requirements of 49 CFR Part 26, Participation by DBEs, in the award and administration of U.S. DOT-assisted contracts. Failure by the Contractor to carry out these requirements is a material breach of this Contract, which may result in the termination of this contract or such other remedy as ConnDOT (recipient) deems appropriate, which may include, but is not limited to: (1) Withholding monthly progress payments, (2) Assessing sanctions, (3) Liquidated damages; and/or, (4) Disqualifying the contractor from future bidding as non-responsible.”

## 5. Contract Wage Rates

The Contractor shall comply with:

The Federal and State wage rate requirements indicated in Exhibits F and G hereof, as revised, are hereby made part of this Contract. The Federal wage rates (Davis-Bacon Act) applicable to this Contract shall be the Federal wage rates that are current on the US Department of Labor website (<http://www.wdol.gov/dba.aspx>) as may be revised 10 days prior to bid opening. These applicable Federal wage rates will be physically incorporated in the final contract document executed by both parties. The Department will no longer physically include revised Federal wage rates in the bid documents or as part of addenda documents, prior to the bid opening date. During the bid advertisement period, bidders are responsible for obtaining the appropriate Federal wage rates from the US Department of Labor website.

To obtain the latest Federal wage rates go to the US Department of Labor website (link above). Under Davis-Bacon Act, choose "Selecting DBA WDs" and follow the instruction to search the latest wage rates for the State, County and Construction Type. Refer to the Notice to Contractor (NTC) - Federal Wage Determinations (Davis Bacon Act).

If a conflict exists between the Federal and State wage rates, the higher rate shall govern.

Prevailing Wages for Work on State Highways; Annual Adjustments. With respect to contracts for work on state highways and bridges on state highways, the Contractor shall comply with the provisions of Section 31-54 and 31-55a of the Connecticut General Statutes, as revised.

As required by Section 1.05.12 (Payrolls) of the State of Connecticut, Department of Transportation's Standard Specification for Roads, Bridges and Incidental Construction (FORM 816), as may be revised, every Contractor or subcontractor performing project work on a Federal aid project is required to post the relevant prevailing wage rates as determined by the United States Secretary of Labor. The wage rate determinations shall be posted in prominent and easily accessible places at the work site.

## 6. Americans with Disabilities Act of 1990, as Amended

This provision applies to those Contractors who are or will be responsible for compliance with the terms of the Americans with Disabilities Act of 1990, as amended (42 U.S.C. 12101 et seq.), (Act), during the term of the Contract. The Contractor represents that it is familiar with the terms of this Act and that it is in compliance with the Act. Failure of the Contractor to satisfy this standard as the same applies to performance under this Contract, either now or during the term of the Contract as it may be amended, will render the Contract voidable at the option of the State upon notice to the contractor. The Contractor warrants that it will hold the State harmless and indemnify the State from any liability which may be imposed upon the State as a result of any failure of the Contractor to be in compliance with this Act, as the same applies to performance under this Contract.

## 7. Connecticut Statutory Labor Requirements

**(a) Construction, Alteration or Repair of Public Works Projects; Wage Rates.** The Contractor shall comply with Section 31-53 of the Connecticut General Statutes, as revised. The wages paid on an hourly basis to any person performing the work of any mechanic, laborer or worker on the work herein contracted to be done and the amount of payment or contribution paid or payable on behalf of each such person to any employee welfare fund, as defined in subsection (i)

of section 31-53 of the Connecticut General Statutes, shall be at a rate equal to the rate customary or prevailing for the same work in the same trade or occupation in the town in which such public works project is being constructed. Any contractor who is not obligated by agreement to make payment or contribution on behalf of such persons to any such employee welfare fund shall pay to each mechanic, laborer or worker as part of such person's wages the amount of payment or contribution for such person's classification on each pay day.

**(b) Debarment List. Limitation on Awarding Contracts.** The Contractor shall comply with Section 31-53a of the Connecticut General Statutes, as revised.

**(c) Construction Safety and Health Course.** The Contractor shall comply with section 31-53b of the Connecticut General Statutes, as revised. The contractor shall furnish proof to the Labor Commissioner with the weekly certified payroll form for the first week each employee begins work on such project that any person performing the work of a mechanic, laborer or worker pursuant to the classifications of labor under section 31-53 of the Connecticut General Statutes, as revised, on such public works project, pursuant to such contract, has completed a course of at least ten hours in duration in construction safety and health approved by the federal Occupational Safety and Health Administration or, has completed a new miner training program approved by the Federal Mine Safety and Health Administration in accordance with 30 CFR 48 or, in the case of telecommunications employees, has completed at least ten hours of training in accordance with 29 CFR 1910.268.

Any employee required to complete a construction safety and health course as required that has not completed the course, shall have a maximum of fourteen (14) days to complete the course. If the employee has not been brought into compliance, they shall be removed from the project until such time as they have completed the required training.

Any costs associated with this notice shall be included in the general cost of the contract. In addition, there shall be no time granted to the contractor for compliance with this notice. The contractor's compliance with this notice and any associated regulations shall not be grounds for claims as outlined in Section 1.11 – "Claims".

**(d) Awarding of Contracts to Occupational Safety and Health Law Violators Prohibited.** The Contract is subject to Section 31-57b of the Connecticut General Statutes, as revised.

**(e) Residents Preference in Work on Other Public Facilities. NOT APPLICABLE TO FEDERAL AID CONTRACTS.** Pursuant to Section 31-52a of the Connecticut General Statutes, as revised, in the employment of mechanics, laborers or workmen to perform the work specified herein, preference shall be given to residents of the state who are, and continuously for at least six months prior to the date hereof have been, residents of this state, and if no such person is available, then to residents of other states

## **8. Tax Liability - Contractor's Exempt Purchase Certificate (CERT – 141)**

The Contractor shall comply with Chapter 219 of the Connecticut General Statutes pertaining to tangible personal property or services rendered that is/are subject to sales tax. The Contractor is responsible for determining its tax liability. If the Contractor purchases materials or supplies pursuant to the Connecticut Department of Revenue Services' "Contractor's Exempt Purchase Certificate (CERT-141)," as may be revised, the Contractor acknowledges and agrees that title to such materials and supplies installed or placed in the project will vest in the State simultaneously with passage of title

from the retailers or vendors thereof, and the Contractor will have no property rights in the materials and supplies purchased.

Forms and instructions are available anytime by:

Internet: Visit the DRS website at [www.ct.gov/DRS](http://www.ct.gov/DRS) to download and print Connecticut tax forms; or Telephone: Call 1-800-382-9463 (Connecticut calls outside the Greater Hartford calling area only) and select Option 2 or call 860-297-4753 (from anywhere).

## 9. Executive Orders

This contract is subject to the provisions of Executive Order No. Three of Governor Thomas J. Meskill, promulgated June 16, 1971, concerning labor employment practices, Executive Order No. Seventeen of Governor Thomas J. Meskill, promulgated February 15, 1973, concerning the listing of employment openings and Executive Order No. Sixteen of Governor John G. Rowland promulgated August 4, 1999, concerning violence in the workplace, all of which are incorporated into and are made a part of the contract as if they had been fully set forth in it. The contract may also be subject to Executive Order No. 14 of Governor M. Jodi Rell, promulgated April 17, 2006, concerning procurement of cleaning products and services and to Executive Order No. 49 of Governor Dannel P. Malloy, promulgated May 22, 2015, mandating disclosure of certain gifts to public employees and contributions to certain candidates for office. If Executive Order No. 14 and/or Executive Order No. 49 are applicable, they are deemed to be incorporated into and are made a part of the contract as if they had been fully set forth in it. At the Contractor's request, the Department shall provide a copy of these orders to the Contractor.

## 10. Non Discrimination Requirement (pursuant to section 4a-60 and 4a-60a of the Connecticut General Statutes, as revised): References to "minority business enterprises" in this Section are not applicable to Federal-aid projects/contracts. Federal-aid projects/contracts are instead subject to the Federal Disadvantaged Business Enterprise Program.

(a) For purposes of this Section, the following terms are defined as follows:

- i. "Commission" means the Commission on Human Rights and Opportunities;
- ii. "Contract" and "contract" include any extension or modification of the Contract or contract;
- iii. "Contractor" and "contractor" include any successors or assigns of the Contractor or contractor;
- iv. "gender identity or expression" means a person's gender-related identity, appearance or behavior, whether or not that gender-related identity, appearance or behavior is different from that traditionally associated with the person's physiology or assigned sex at birth, which gender-related identity can be shown by providing evidence including, but not limited to, medical history, care or treatment of the gender-related identity, consistent and uniform assertion of the gender-related identity or any other evidence that the gender-related identity is sincerely held, part of a person's core identity or not being asserted for an improper purpose.
- v. "good faith" means that degree of diligence which a reasonable person would exercise in the performance of legal duties and obligations;
- vi. "good faith efforts" shall include, but not be limited to, those reasonable initial efforts necessary to comply with statutory or regulatory requirements and additional or substituted efforts when it is determined that such initial efforts will not be sufficient to comply with such requirements;
- vii. "marital status" means being single, married as recognized by the State of Connecticut, widowed, separated or divorced;

- viii. "mental disability" means one or more mental disorders, as defined in the most recent edition of the American Psychiatric Association's "Diagnostic and Statistical Manual of Mental Disorders", or a record of or regarding a person as having one or more such disorders;
- ix. "minority business enterprise" means any small contractor or supplier of materials fifty-one percent or more of the capital stock, if any, or assets of which is owned by a person or persons: (1) who are active in the daily affairs of the enterprise, (2) who have the power to direct the management and policies of the enterprise, and (3) who are members of a minority, as such term is defined in subsection (a) of Connecticut General Statutes § 32-9n; and
- x. "public works contract" means any agreement between any individual, firm or corporation and the State or any political subdivision of the State other than a municipality for construction, rehabilitation, conversion, extension, demolition or repair of a public building, highway or other changes or improvements in real property, or which is financed in whole or in part by the State, including, but not limited to, matching expenditures, grants, loans, insurance or guarantees.

For purposes of this Section, the terms "Contract" and "contract" do not include a contract where each contractor is (1) a political subdivision of the State, including, but not limited to, a municipality, (2) a quasi-public agency, as defined in Conn. Gen. Stat. Section 1-120, (3) any other state, including but not limited to any federally recognized Indian tribal governments, as defined in Conn. Gen. Stat. Section 1-267, (4) the federal government, (5) a foreign government, or (6) an agency of a subdivision, agency, state or government described in the immediately preceding enumerated items (1), (2), (3), (4) or (5).

- (b) (1) The Contractor agrees and warrants that in the performance of the Contract such Contractor will not discriminate or permit discrimination against any person or group of persons on the grounds of race, color, religious creed, age, marital status, national origin, ancestry, sex, gender identity or expression, intellectual disability, mental disability or physical disability, including, but not limited to, blindness, unless it is shown by such Contractor that such disability prevents performance of the work involved, in any manner prohibited by the laws of the United States or of the State of Connecticut; and the Contractor further agrees to take affirmative action to insure that applicants with job-related qualifications are employed and that employees are treated when employed without regard to their race, color, religious creed, age, marital status, national origin, ancestry, sex, gender identity or expression, intellectual disability, mental disability or physical disability, including, but not limited to, blindness, unless it is shown by the Contractor that such disability prevents performance of the work involved; (2) the Contractor agrees, in all solicitations or advertisements for employees placed by or on behalf of the Contractor, to state that it is an "affirmative action-equal opportunity employer" in accordance with regulations adopted by the Commission; (3) the Contractor agrees to provide each labor union or representative of workers with which the Contractor has a collective bargaining Agreement or other contract or understanding and each vendor with which the Contractor has a contract or understanding, a notice to be provided by the Commission, advising the labor union or workers' representative of the Contractor's commitments under this section and to post copies of the notice in conspicuous places available to employees and applicants for employment; (4) the Contractor agrees to comply with each provision of this Section and Connecticut General Statutes §§ 46a-68e and 46a-68f and with each regulation or relevant order issued by said Commission pursuant to Connecticut General Statutes §§ 46a-56, 46a-68e and 46a-68f; and (5) the Contractor agrees to provide the Commission on Human Rights and Opportunities with such information requested by the Commission, and permit access to pertinent books, records and accounts, concerning the



employment practices and procedures of the Contractor as relate to the provisions of this Section and Connecticut General Statutes § 46a-56. If the contract is a public works contract, the Contractor agrees and warrants that he will make good faith efforts to employ minority business enterprises as subcontractors and suppliers of materials on such public works projects.

- (c) Determination of the Contractor's good faith efforts shall include, but shall not be limited to, the following factors: The Contractor's employment and subcontracting policies, patterns and practices; affirmative advertising, recruitment and training; technical assistance activities and such other reasonable activities or efforts as the Commission may prescribe that are designed to ensure the participation of minority business enterprises in public works projects.
- (d) The Contractor shall develop and maintain adequate documentation, in a manner prescribed by the Commission, of its good faith efforts.
- (e) The Contractor shall include the provisions of subsection (b) of this Section in every subcontract or purchase order entered into in order to fulfill any obligation of a contract with the State and such provisions shall be binding on a subcontractor, vendor or manufacturer unless exempted by regulations or orders of the Commission. The Contractor shall take such action with respect to any such subcontract or purchase order as the Commission may direct as a means of enforcing such provisions including sanctions for noncompliance in accordance with Connecticut General Statutes §46a-56; provided if such Contractor becomes involved in, or is threatened with, litigation with a subcontractor or vendor as a result of such direction by the Commission, the Contractor may request the State of Connecticut to enter into any such litigation or negotiation prior thereto to protect the interests of the State and the State may so enter.
- (f) The Contractor agrees to comply with the regulations referred to in this Section as they exist on the date of this Contract and as they may be adopted or amended from time to time during the term of this Contract and any amendments thereto.
- (g) (1) The Contractor agrees and warrants that in the performance of the Contract such Contractor will not discriminate or permit discrimination against any person or group of persons on the grounds of sexual orientation, in any manner prohibited by the laws of the United States or the State of Connecticut, and that employees are treated when employed without regard to their sexual orientation; (2) the Contractor agrees to provide each labor union or representative of workers with which such Contractor has a collective bargaining Agreement or other contract or understanding and each vendor with which such Contractor has a contract or understanding, a notice to be provided by the Commission on Human Rights and Opportunities advising the labor union or workers' representative of the Contractor's commitments under this section, and to post copies of the notice in conspicuous places available to employees and applicants for employment; (3) the Contractor agrees to comply with each provision of this section and with each regulation or relevant order issued by said Commission pursuant to Connecticut General Statutes § 46a-56; and (4) the Contractor agrees to provide the Commission on Human Rights and Opportunities with such information requested by the Commission, and permit access to pertinent books, records and accounts, concerning the employment practices and procedures of the Contractor which relate to the provisions of this Section and Connecticut General Statutes § 46a-56.
- (h) The Contractor shall include the provisions of the foregoing paragraph in every subcontract or purchase order entered into in order to fulfill any obligation of a contract with the State and such provisions shall be binding on a subcontractor, vendor or manufacturer unless exempted by

regulations or orders of the Commission. The Contractor shall take such action with respect to any such subcontract or purchase order as the Commission may direct as a means of enforcing such provisions including sanctions for noncompliance in accordance with Connecticut General Statutes § 46a-56; provided, if such Contractor becomes involved in, or is threatened with, litigation with a subcontractor or vendor as a result of such direction by the Commission, the Contractor may request the State of Connecticut to enter into any such litigation or negotiation prior thereto to protect the interests of the State and the State may so enter.”

The Nondiscrimination Certifications can be found at the Office of Policy and Management website.

<http://www.ct.gov/opm/cwp/view.asp?a=2982&Q=390928>

## 11. Whistleblower Provision

The following clause is applicable if the Contract has a value of Five Million Dollars (\$5,000,000) or more.

**Whistleblowing.** This Contract may be subject to the provisions of Section 4-61dd of the Connecticut General Statutes. In accordance with this statute, if an officer, employee or appointing authority of the Contractor takes or threatens to take any personnel action against any employee of the Contractor in retaliation for such employee's disclosure of information to any employee of the contracting state or quasi-public agency or the Auditors of Public Accounts or the Attorney General under the provisions of subsection (a) of such statute, the Contractor shall be liable for a civil penalty of not more than five thousand dollars for each offense, up to a maximum of twenty per cent of the value of this Contract. Each violation shall be a separate and distinct offense and in the case of a continuing violation, each calendar day's continuance of the violation shall be deemed to be a separate and distinct offense. The State may request that the Attorney General bring a civil action in the Superior Court for the Judicial District of Hartford to seek imposition and recovery of such civil penalty. In accordance with subsection (f) of such statute, each large state contractor, as defined in the statute, shall post a notice of the provisions of the statute relating to large state contractors in a conspicuous place which is readily available for viewing by the employees of the Contractor.

## 12. Connecticut Freedom of Information Act

**(a) Disclosure of Records.** This Contract may be subject to the provisions of section 1-218 of the Connecticut General Statutes. In accordance with this statute, each contract in excess of two million five hundred thousand dollars between a public agency and a person for the performance of a governmental function shall (a) provide that the public agency is entitled to receive a copy of records and files related to the performance of the governmental function, and (b) indicate that such records and files are subject to FOIA and may be disclosed by the public agency pursuant to FOIA. No request to inspect or copy such records or files shall be valid unless the request is made to the public agency in accordance with FOIA. Any complaint by a person who is denied the right to inspect or copy such records or files shall be brought to the Freedom of Information Commission in accordance with the provisions of sections 1-205 and 1-206 of the Connecticut General Statutes.

**(b) Confidential Information.** The State will afford due regard to the Contractor's request for the protection of proprietary or confidential information which the State receives from the Contractor. However, all materials associated with the Contract are subject to the terms of the FOIA and all corresponding rules, regulations and interpretations. In making such a request, the Contractor may not merely state generally that the materials are proprietary or confidential in nature and not, therefore, subject to release to third parties. Those particular sentences, paragraphs, pages or sections that the Contractor believes are exempt from disclosure under the FOIA must be specifically identified as such. Convincing explanation

and rationale sufficient to justify each exemption consistent with the FOIA must accompany the request. The rationale and explanation must be stated in terms of the prospective harm to the competitive position of the Contractor that would result if the identified material were to be released and the reasons why the materials are legally exempt from release pursuant to the FOIA. To the extent that any other provision or part of the Contract conflicts or is in any way inconsistent with this section, this section controls and shall apply and the conflicting provision or part shall not be given effect. If the Contractor indicates that certain documentation is submitted in confidence, by specifically and clearly marking the documentation as "CONFIDENTIAL," DOT will first review the Contractor's claim for consistency with the FOIA (that is, review that the documentation is actually a trade secret or commercial or financial information and not required by statute), and if determined to be consistent, will endeavor to keep such information confidential to the extent permitted by law. See, *e.g.*, Conn. Gen. Stat. §1-210(b)(5)(A-B). The State, however, has no obligation to initiate, prosecute or defend any legal proceeding or to seek a protective order or other similar relief to prevent disclosure of any information that is sought pursuant to a FOIA request. Should the State withhold such documentation from a Freedom of Information requester and a complaint be brought to the Freedom of Information Commission, the Contractor shall have the burden of cooperating with DOT in defense of that action and in terms of establishing the availability of any FOIA exemption in any proceeding where it is an issue. In no event shall the State have any liability for the disclosure of any documents or information in its possession which the State believes are required to be disclosed pursuant to the FOIA or other law.

### **13. Service of Process**

The Contractor, if not a resident of the State of Connecticut, or, in the case of a partnership, the partners, if not residents, hereby appoints the Secretary of State of the State of Connecticut, and his successors in office, as agent for service of process for any action arising out of or as a result of this Contract; such appointment to be in effect throughout the life of this Contract and six (6) years thereafter.

### **14. Substitution of Securities for Retainages on State Contracts and Subcontracts**

This Contract is subject to the provisions of Section 3-112a of the General Statutes of the State of Connecticut, as revised.

### **15. Health Insurance Portability and Accountability Act of 1996 (HIPAA)**

The Contractor shall comply, if applicable, with the Health Insurance Portability and Accountability Act of 1996 and, pursuant thereto, the provisions attached at Exhibit D, and hereby made part of this Contract.

### **16. Forum and Choice of Law**

Forum and Choice of Law. The parties deem the Contract to have been made in the City of Hartford, State of Connecticut. Both parties agree that it is fair and reasonable for the validity and construction of the Contract to be, and it shall be, governed by the laws and court decisions of the State of Connecticut, without giving effect to its principles of conflicts of laws. To the extent that any immunities provided by Federal law or the laws of the State of Connecticut do not bar an action against the State, and to the extent that these courts are courts of competent jurisdiction, for the purpose of venue, the complaint shall be made returnable to the Judicial District of Hartford only or shall be

brought in the United States District Court for the District of Connecticut only, and shall not be transferred to any other court, provided, however, that nothing here constitutes a waiver or compromise of the sovereign immunity of the State of Connecticut. The Contractor waives any objection which it may now have or will have to the laying of venue of any Claims in any forum and further irrevocably submits to such jurisdiction in any suit, action or proceeding.

### **17. Summary of State Ethics Laws**

Pursuant to the requirements of section 1-101qq of the Connecticut General Statutes, the summary of State ethics laws developed by the State Ethics Commission pursuant to section 1-81b of the Connecticut General Statutes is incorporated by reference into and made a part of the Contract as if the summary had been fully set forth in the Contract.

### **18. Audit and Inspection of Plants, Places of Business and Records**

- (a) The State and its agents, including, but not limited to, the Connecticut Auditors of Public Accounts, Attorney General and State's Attorney and their respective agents, may, at reasonable hours, inspect and examine all of the parts of the Contractor's and Contractor Parties' plants and places of business which, in any way, are related to, or involved in, the performance of this Contract. For the purposes of this Section, "Contractor Parties" means the Contractor's members, directors, officers, shareholders, partners, managers, principal officers, representatives, agents, servants, consultants, employees or any one of them or any other person or entity with whom the Contractor is in privity of oral or written contract and the Contractor intends for such other person or entity to Perform under the Contract in any capacity.
- (b) The Contractor shall maintain, and shall require each of the Contractor Parties to maintain, accurate and complete Records. The Contractor shall make all of its and the Contractor Parties' Records available at all reasonable hours for audit and inspection by the State and its agents.
- (c) The State shall make all requests for any audit or inspection in writing and shall provide the Contractor with at least twenty-four (24) hours' notice prior to the requested audit and inspection date. If the State suspects fraud or other abuse, or in the event of an emergency, the State is not obligated to provide any prior notice.
- (d) The Contractor shall keep and preserve or cause to be kept and preserved all of its and Contractor Parties' Records until three (3) years after the latter of (i) final payment under this Agreement, or (ii) the expiration or earlier termination of this Agreement, as the same may be modified for any reason. The State may request an audit or inspection at any time during this period. If any Claim or audit is started before the expiration of this period, the Contractor shall retain or cause to be retained all Records until all Claims or audit findings have been resolved.
- (e) The Contractor shall cooperate fully with the State and its agents in connection with an audit or inspection. Following any audit or inspection, the State may conduct and the Contractor shall cooperate with an exit conference.
- (f) The Contractor shall incorporate this entire Section verbatim into any contract or other agreement that it enters into with any Contractor Party.

### **19. Campaign Contribution Restriction**

For all State contracts, defined in Conn. Gen. Stat. §9-612(f)(1) as having a value in a calendar year of \$50,000 or more, or a combination or series of such agreements or contracts having a value of \$100,000 or more, the authorized signatory to this contract expressly acknowledges receipt of the State Elections Enforcement Commission's notice advising state contractors of state campaign contribution and solicitation prohibitions, and will inform its principals of the contents of the notice, as set forth in "Notice to Executive Branch State Contractors and Prospective State Contractors of Campaign Contribution and Solicitation Limitations," a copy of which is attached hereto and hereby made a part of this contract, attached as Exhibit E.

## 20. Tangible Personal Property

- (a) The Contractor on its behalf and on behalf of its Affiliates, as defined below, shall comply with the provisions of Conn. Gen. Stat. §12-411b, as follows:
- (1) For the term of the Contract, the Contractor and its Affiliates shall collect and remit to the State of Connecticut, Department of Revenue Services, any Connecticut use tax due under the provisions of Chapter 219 of the Connecticut General Statutes for items of tangible personal property sold by the Contractor or by any of its Affiliates in the same manner as if the Contractor and such Affiliates were engaged in the business of selling tangible personal property for use in Connecticut and had sufficient nexus under the provisions of Chapter 219 to be required to collect Connecticut use tax;
  - (2) A customer's payment of a use tax to the Contractor or its Affiliates relieves the customer of liability for the use tax;
  - (3) The Contractor and its Affiliates shall remit all use taxes they collect from customers on or before the due date specified in the Contract, which may not be later than the last day of the month next succeeding the end of a calendar quarter or other tax collection period during which the tax was collected;
  - (4) The Contractor and its Affiliates are not liable for use tax billed by them but not paid to them by a customer; and
  - (5) Any Contractor or Affiliate who fails to remit use taxes collected on behalf of its customers by the due date specified in the Contract shall be subject to the interest and penalties provided for persons required to collect sales tax under chapter 219 of the general statutes.
- (b) For purposes of this section of the Contract, the word "Affiliate" means any person, as defined in section 12-1 of the general statutes, that controls, is controlled by, or is under common control with another person. A person controls another person if the person owns, directly or indirectly, more than ten per cent of the voting securities of the other person. The word "voting security" means a security that confers upon the holder the right to vote for the election of members of the board of directors or similar governing body of the business, or that is convertible into, or entitles the holder to receive, upon its exercise, a security that confers such a right to vote. "Voting security" includes a general partnership interest.
- (c) The Contractor represents and warrants that each of its Affiliates has vested in the Contractor plenary authority to so bind the Affiliates in any agreement with the State of Connecticut. The Contractor on its own behalf and on behalf of its Affiliates shall also provide, no later than 30 days after receiving a request by the State's contracting authority, such information as the State may require to ensure, in the State's sole determination, compliance with the provisions of Chapter 219 of the Connecticut General Statutes, including, but not limited to, §12-411b.

## 21. Bid Rigging and/or Fraud – Notice to Contractor

The Connecticut Department of Transportation is cooperating with the U.S. Department of Transportation and the Justice Department in their investigation into highway construction contract bid rigging and/or fraud.

A toll-free "HOT LINE" telephone number 800-424-9071 has been established to receive information from contractors, subcontractors, manufacturers, suppliers or anyone with knowledge of bid rigging and/or fraud, either past or current. The "HOT LINE" telephone number will be available during normal working hours (8:00 am – 5:00 pm EST). Information will be treated confidentially and anonymity respected.

## 22. Consulting Agreement Affidavit

The Contractor shall comply with Connecticut General Statutes Section 4a-81(a) and 4a-81(b), as revised. Pursuant to Public Act 11-229, after the initial submission of the form, if there is a change in the information contained in the form, a contractor shall submit the updated form, as applicable, either

(i) not later than thirty (30) days after the effective date of such change or (ii) prior to execution of any new contract, whichever is earlier.

The Affidavit/Form may be submitted in written format or electronic format through the Department of Administrative Services (DAS) website.

### **23. Cargo Preference Act Requirements (46 CFR 381.7(a)-(b)) – Use of United States Flag Vessels**

The Contractor agrees to comply with the following:

(a) ***Agreement Clauses.***

- (1) Pursuant to Pub. L. 664 ([43 U.S.C. 1241\(b\)](#)) at least 50 percent of any equipment, materials or commodities procured, contracted for or otherwise obtained with funds granted, guaranteed, loaned, or advanced by the U.S. Government under this agreement, and which may be transported by ocean vessel, shall be transported on privately owned United States-flag commercial vessels, if available.
- (2) Within 20 days following the date of loading for shipments originating within the United States or within 30 working days following the date of loading for shipments originating outside the United States, a legible copy of a rated, ‘on-board’ commercial ocean bill-of-lading in English for each shipment of cargo described in paragraph (a)(1) of this section shall be furnished to both the Contracting Officer (through the prime contractor in the case of subcontractor bills-of-lading) and to the Division of National Cargo, Office of Market Development, Maritime Administration, Washington, DC 20590.

(b) ***Contractor and Subcontractor Clauses.*** The contractor agrees—

- (1) To utilize privately owned United States-flag commercial vessels to ship at least 50 percent of the gross tonnage (computed separately for dry bulk carriers, dry cargo liners, and tankers) involved, whenever shipping any equipment, material, or commodities pursuant to this contract, to the extent such vessels are available at fair and reasonable rates for United States-flag commercial vessels.
- (2) To furnish within 20 days following the date of loading for shipments originating within the United States or within 30 working days following the date of loading for shipments originating outside the United States, a legible copy of a rated, ‘on-board’ commercial ocean bill-of-lading in English for each shipment of cargo described in paragraph (b) (1) of this section to both the Contracting Officer (through the prime contractor in the case of subcontractor bills-of-lading) and to the Division of National Cargo, Office of Market Development, Maritime Administration, Washington, DC 20590.
- (3) To insert the substance of the provisions of this clause in all subcontracts issued pursuant to this contract.

**EXHIBIT A**

FHWA-1273 -- Revised May 1, 2012

**REQUIRED CONTRACT PROVISIONS  
FEDERAL-AID CONSTRUCTION CONTRACTS**

- I. General
- II. Nondiscrimination
- III. Nonsegregated Facilities
- IV. Davis-Bacon and Related Act Provisions
- V. Contract Work Hours and Safety Standards Act Provisions
- VI. Subletting or Assigning the Contract
- VII. Safety: Accident Prevention
- VIII. False Statements Concerning Highway Projects
- IX. Implementation of Clean Air Act and Federal Water Pollution Control Act
- X. Compliance with Governmentwide Suspension and Debarment Requirements
- XI. Certification Regarding Use of Contract Funds for Lobbying

**I. GENERAL**

1. Form FHWA-1273 must be physically incorporated in each construction contract funded under Title 23 (excluding emergency contracts solely intended for debris removal). The contractor (or subcontractor) must insert this form in each subcontract and further require its inclusion in all lower tier subcontracts (excluding purchase orders, rental agreements and other agreements for supplies or services).

The applicable requirements of Form FHWA-1273 are incorporated by reference for work done under any purchase order, rental agreement or agreement for other services. The prime contractor shall be responsible for compliance by any subcontractor, lower-tier subcontractor or service provider.

Form FHWA-1273 must be included in all Federal-aid design-build contracts, in all subcontracts and in lower tier subcontracts (excluding subcontracts for design services, purchase orders, rental agreements and other agreements for supplies or services). The design-builder shall be responsible for compliance by any subcontractor, lower-tier subcontractor or service provider.

Contracting agencies may reference Form FHWA-1273 in bid proposal or request for proposal documents, however, the Form FHWA-1273 must be physically incorporated (not referenced) in all contracts, subcontracts and lower-tier subcontracts (excluding purchase orders, rental agreements and other agreements for supplies or services related to a construction contract).

2. Subject to the applicability criteria noted in the following sections, these contract provisions shall apply to all work performed on the contract by the contractor's own organization and with the assistance of workers under the contractor's immediate superintendence and to all work performed on the contract by piecework, station work, or by subcontract.

3. A breach of any of the stipulations contained in these Required Contract Provisions may be sufficient grounds for withholding of progress payments, withholding of final payment, termination of the contract, suspension / debarment or any other action determined to be appropriate by the contracting agency and FHWA.

4. Selection of Labor: During the performance of this contract, the contractor shall not use convict labor for any purpose within the limits of a construction project on a Federal-aid highway unless it is labor performed by convicts who are on parole, supervised release, or probation. The term Federal-aid highway does not include roadways functionally classified as local roads or rural minor collectors.

## II. NONDISCRIMINATION

The provisions of this section related to 23 CFR Part 230 are applicable to all Federal-aid construction contracts and to all related construction subcontracts of \$10,000 or more. The provisions of 23 CFR Part 230 are not applicable to material supply, engineering, or architectural service contracts.

In addition, the contractor and all subcontractors must comply with the following policies: Executive Order 11246, 41 CFR 60, 29 CFR 1625-1627, Title 23 USC Section 140, the Rehabilitation Act of 1973, as amended (29 USC 794), Title VI of the Civil Rights Act of 1964, as amended, and related regulations including 49 CFR Parts 21, 26 and 27; and 23 CFR Parts 200, 230, and 633.

The contractor and all subcontractors must comply with: the requirements of the Equal Opportunity Clause in 41 CFR 60-1.4(b) and, for all construction contracts exceeding \$10,000, the Standard Federal Equal Employment Opportunity Construction Contract Specifications in 41 CFR 60-4.3.

Note: The U.S. Department of Labor has exclusive authority to determine compliance with Executive Order 11246 and the policies of the Secretary of Labor including 41 CFR 60, and 29 CFR 1625-1627. The contracting agency and the FHWA have the authority and the responsibility to ensure compliance with Title 23 USC Section 140, the Rehabilitation Act of 1973, as amended (29 USC 794), and Title VI of the Civil Rights Act of 1964, as amended, and related regulations including 49 CFR Parts 21, 26 and 27; and 23 CFR Parts 200, 230, and 633.

The following provision is adopted from 23 CFR 230, Appendix A, with appropriate revisions to conform to the U.S. Department of Labor (US DOL) and FHWA requirements.

**1. Equal Employment Opportunity:** Equal employment opportunity (EEO) requirements not to discriminate and to take affirmative action to assure equal opportunity as set forth under laws, executive orders, rules, regulations (28 CFR 35, 29 CFR 1630, 29 CFR 1625-1627, 41 CFR 60 and 49 CFR 27) and orders of the Secretary of Labor as modified by the provisions prescribed herein, and imposed pursuant to 23 U.S.C. 140 shall constitute the EEO and specific affirmative action standards for the contractor's project activities under this contract. The provisions of the Americans with Disabilities Act of 1990 (42 U.S.C. 12101 et seq.) set forth under 28 CFR 35 and 29 CFR 1630 are incorporated by reference in this contract. In the execution of this contract, the contractor agrees to comply with the following minimum specific requirement activities of EEO:

a. The contractor will work with the contracting agency and the Federal Government to ensure that it has made every good faith effort to provide equal opportunity with respect to all of its terms and conditions of employment and in their review of activities under the contract.

b. The contractor will accept as its operating policy the following statement:



"It is the policy of this Company to assure that applicants are employed, and that employees are treated during employment, without regard to their race, religion, sex, color, national origin, age or disability. Such action shall include: employment, upgrading, demotion, or transfer; recruitment or recruitment advertising; layoff or termination; rates of pay or other forms of compensation; and selection for training, including apprenticeship, pre-apprenticeship, and/or on-the-job training."

**2. EEO Officer:** The contractor will designate and make known to the contracting officers an EEO Officer who will have the responsibility for and must be capable of effectively administering and promoting an active EEO program and who must be assigned adequate authority and responsibility to do so.

**3. Dissemination of Policy:** All members of the contractor's staff who are authorized to hire, supervise, promote, and discharge employees, or who recommend such action, or who are substantially involved in such action, will be made fully cognizant of, and will implement, the contractor's EEO policy and contractual responsibilities to provide EEO in each grade and classification of employment. To ensure that the above agreement will be met, the following actions will be taken as a minimum:

a. Periodic meetings of supervisory and personnel office employees will be conducted before the start of work and then not less often than once every six months, at which time the contractor's EEO policy and its implementation will be reviewed and explained. The meetings will be conducted by the EEO Officer.

b. All new supervisory or personnel office employees will be given a thorough indoctrination by the EEO Officer, covering all major aspects of the contractor's EEO obligations within thirty days following their reporting for duty with the contractor.

c. All personnel who are engaged in direct recruitment for the project will be instructed by the EEO Officer in the contractor's procedures for locating and hiring minorities and women.

d. Notices and posters setting forth the contractor's EEO policy will be placed in areas readily accessible to employees, applicants for employment and potential employees.

e. The contractor's EEO policy and the procedures to implement such policy will be brought to the attention of employees by means of meetings, employee handbooks, or other appropriate means.

**4. Recruitment:** When advertising for employees, the contractor will include in all advertisements for employees the notation: "An Equal Opportunity Employer." All such advertisements will be placed in publications having a large circulation among minorities and women in the area from which the project work force would normally be derived.

a. The contractor will, unless precluded by a valid bargaining agreement, conduct systematic and direct recruitment through public and private employee referral sources likely to yield qualified minorities and women. To meet this requirement, the contractor will identify sources of potential minority group employees, and establish with such identified sources procedures whereby minority and women applicants may be referred to the contractor for employment consideration.

b. In the event the contractor has a valid bargaining agreement providing for exclusive hiring hall referrals, the contractor is expected to observe the provisions of that agreement to the extent that the system meets the contractor's compliance with EEO contract provisions. Where implementation of

such an agreement has the effect of discriminating against minorities or women, or obligates the contractor to do the same, such implementation violates Federal nondiscrimination provisions.

c. The contractor will encourage its present employees to refer minorities and women as applicants for employment. Information and procedures with regard to referring such applicants will be discussed with employees.

**5. Personnel Actions:** Wages, working conditions, and employee benefits shall be established and administered, and personnel actions of every type, including hiring, upgrading, promotion, transfer, demotion, layoff, and termination, shall be taken without regard to race, color, religion, sex, national origin, age or disability. The following procedures shall be followed:

a. The contractor will conduct periodic inspections of project sites to insure that working conditions and employee facilities do not indicate discriminatory treatment of project site personnel.

b. The contractor will periodically evaluate the spread of wages paid within each classification to determine any evidence of discriminatory wage practices.

c. The contractor will periodically review selected personnel actions in depth to determine whether there is evidence of discrimination. Where evidence is found, the contractor will promptly take corrective action. If the review indicates that the discrimination may extend beyond the actions reviewed, such corrective action shall include all affected persons.

d. The contractor will promptly investigate all complaints of alleged discrimination made to the contractor in connection with its obligations under this contract, will attempt to resolve such complaints, and will take appropriate corrective action within a reasonable time. If the investigation indicates that the discrimination may affect persons other than the complainant, such corrective action shall include such other persons. Upon completion of each investigation, the contractor will inform every complainant of all of their avenues of appeal.

**6. Training and Promotion:**

a. The contractor will assist in locating, qualifying, and increasing the skills of minorities and women who are applicants for employment or current employees. Such efforts should be aimed at developing full journey level status employees in the type of trade or job classification involved.

b. Consistent with the contractor's work force requirements and as permissible under Federal and State regulations, the contractor shall make full use of training programs, i.e., apprenticeship, and on-the-job training programs for the geographical area of contract performance. In the event a special provision for training is provided under this contract, this subparagraph will be superseded as indicated in the special provision. The contracting agency may reserve training positions for persons who receive welfare assistance in accordance with 23 U.S.C. 140(a).

c. The contractor will advise employees and applicants for employment of available training programs and entrance requirements for each.

d. The contractor will periodically review the training and promotion potential of employees who are minorities and women and will encourage eligible employees to apply for such training and promotion.

**7. Unions:** If the contractor relies in whole or in part upon unions as a source of employees, the contractor will use good faith efforts to obtain the cooperation of such unions to increase opportunities for minorities and women. Actions by the contractor, either directly or through a contractor's association acting as agent, will include the procedures set forth below:

a. The contractor will use good faith efforts to develop, in cooperation with the unions, joint training programs aimed toward qualifying more minorities and women for membership in the unions and increasing the skills of minorities and women so that they may qualify for higher paying employment.

b. The contractor will use good faith efforts to incorporate an EEO clause into each union agreement to the end that such union will be contractually bound to refer applicants without regard to their race, color, religion, sex, national origin, age or disability.

c. The contractor is to obtain information as to the referral practices and policies of the labor union except that to the extent such information is within the exclusive possession of the labor union and such labor union refuses to furnish such information to the contractor, the contractor shall so certify to the contracting agency and shall set forth what efforts have been made to obtain such information.

d. In the event the union is unable to provide the contractor with a reasonable flow of referrals within the time limit set forth in the collective bargaining agreement, the contractor will, through independent recruitment efforts, fill the employment vacancies without regard to race, color, religion, sex, national origin, age or disability; making full efforts to obtain qualified and/or qualifiable minorities and women. The failure of a union to provide sufficient referrals (even though it is obligated to provide exclusive referrals under the terms of a collective bargaining agreement) does not relieve the contractor from the requirements of this paragraph. In the event the union referral practice prevents the contractor from meeting the obligations pursuant to Executive Order 11246, as amended, and these special provisions, such contractor shall immediately notify the contracting agency.

**8. Reasonable Accommodation for Applicants / Employees with Disabilities:** The contractor must be familiar with the requirements for and comply with the Americans with Disabilities Act and all rules and regulations established there under. Employers must provide reasonable accommodation in all employment activities unless to do so would cause an undue hardship.

**9. Selection of Subcontractors, Procurement of Materials and Leasing of Equipment:** The contractor shall not discriminate on the grounds of race, color, religion, sex, national origin, age or disability in the selection and retention of subcontractors, including procurement of materials and leases of equipment. The contractor shall take all necessary and reasonable steps to ensure nondiscrimination in the administration of this contract.

a. The contractor shall notify all potential subcontractors and suppliers and lessors of their EEO obligations under this contract.

b. The contractor will use good faith efforts to ensure subcontractor compliance with their EEO obligations.

**10. Assurance Required by 49 CFR 26.13(b):**

a. The requirements of 49 CFR Part 26, and the State DOT's U.S. DOT-approved DBE program are incorporated by reference.

b. The contractor or subcontractor shall not discriminate on the basis of race, color, national origin, or sex in the performance of this contract. The contractor shall carry out applicable requirements of 49 CFR Part 26, in the award and administration of DOT-assisted contracts. Failure by the contractor to carry out these requirements is a material breach of this contract, which may result in the termination of this contract or such other remedy as the contracting agency deems appropriate.

**11. Records and Reports:** The contractor shall keep such records as necessary to document compliance with the EEO requirements. Such records shall be retained for a period of three years following the date of the final payment to the contractor for all contract work and shall be available at reasonable times and places for inspection by authorized representatives of the contracting agency and the FHWA.

a. The records kept by the contractor shall document the following:

(1) The number and work hours of minority and non-minority group members and women employed in each work classification on the project;

(2) The progress and efforts being made in cooperation with unions, when applicable, to increase employment opportunities for minorities and women; and

(3) The progress and efforts being made in locating, hiring, training, qualifying, and upgrading minorities and women;

b. The contractors and subcontractors will submit an annual report to the contracting agency each July for the duration of the project, indicating the number of minority, women, and non-minority group employees currently engaged in each work classification required by the contract work. This information is to be reported on [Form FHWA-1391](#). The staffing data should represent the project work force on board in all or any part of the last payroll period preceding the end of July. If on-the-job training is being required by special provision, the contractor will be required to collect and report training data. The employment data should reflect the work force on board during all or any part of the last payroll period preceding the end of July.

### **III. NONSEGREGATED FACILITIES**

This provision is applicable to all Federal-aid construction contracts and to all related construction subcontracts of \$10,000 or more.

The contractor must ensure that facilities provided for employees are provided in such a manner that segregation on the basis of race, color, religion, sex, or national origin cannot result. The contractor may neither require such segregated use by written or oral policies nor tolerate such use by employee custom. The contractor's obligation extends further to ensure that its employees are not assigned to perform their services at any location, under the contractor's control, where the facilities are segregated. The term "facilities" includes waiting rooms, work areas, restaurants and other eating areas, time clocks, restrooms, washrooms, locker rooms, and other storage or dressing areas, parking lots, drinking fountains, recreation or entertainment areas, transportation, and housing provided for employees. The contractor shall provide separate or single-user restrooms and necessary dressing or sleeping areas to assure privacy between sexes.

#### IV. DAVIS-BACON AND RELATED ACT PROVISIONS

This section is applicable to all Federal-aid construction projects exceeding \$2,000 and to all related subcontracts and lower-tier subcontracts (regardless of subcontract size). The requirements apply to all projects located within the right-of-way of a roadway that is functionally classified as Federal-aid highway. This excludes roadways functionally classified as local roads or rural minor collectors, which are exempt. Contracting agencies may elect to apply these requirements to other projects.

The following provisions are from the U.S. Department of Labor regulations in 29 CFR 5.5 “Contract provisions and related matters” with minor revisions to conform to the FHWA-1273 format and FHWA program requirements.

##### 1. Minimum wages

a. All laborers and mechanics employed or working upon the site of the work, will be paid unconditionally and not less often than once a week, and without subsequent deduction or rebate on any account (except such payroll deductions as are permitted by regulations issued by the Secretary of Labor under the Copeland Act (29 CFR part 3)), the full amount of wages and bona fide fringe benefits (or cash equivalents thereof) due at time of payment computed at rates not less than those contained in the wage determination of the Secretary of Labor which is attached hereto and made a part hereof, regardless of any contractual relationship which may be alleged to exist between the contractor and such laborers and mechanics.

Contributions made or costs reasonably anticipated for bona fide fringe benefits under section 1(b)(2) of the Davis-Bacon Act on behalf of laborers or mechanics are considered wages paid to such laborers or mechanics, subject to the provisions of paragraph 1.d. of this section; also, regular contributions made or costs incurred for more than a weekly period (but not less often than quarterly) under plans, funds, or programs which cover the particular weekly period, are deemed to be constructively made or incurred during such weekly period. Such laborers and mechanics shall be paid the appropriate wage rate and fringe benefits on the wage determination for the classification of work actually performed, without regard to skill, except as provided in 29 CFR 5.5(a)(4). Laborers or mechanics performing work in more than one classification may be compensated at the rate specified for each classification for the time actually worked therein: Provided, That the employer's payroll records accurately set forth the time spent in each classification in which work is performed. The wage determination (including any additional classification and wage rates conformed under paragraph 1.b. of this section) and the Davis-Bacon poster (WH-1321) shall be posted at all times by the contractor and its subcontractors at the site of the work in a prominent and accessible place where it can be easily seen by the workers.

b. (1) The contracting officer shall require that any class of laborers or mechanics, including helpers, which is not listed in the wage determination and which is to be employed under the contract shall be classified in conformance with the wage determination. The contracting officer shall approve an additional classification and wage rate and fringe benefits therefore only when the following criteria have been met:

(i) The work to be performed by the classification requested is not performed by a classification in the wage determination; and

(ii) The classification is utilized in the area by the construction industry; and

(iii) The proposed wage rate, including any bona fide fringe benefits, bears a reasonable relationship to the wage rates contained in the wage determination.

(2) If the contractor and the laborers and mechanics to be employed in the classification (if known), or their representatives, and the contracting officer agree on the classification and wage rate (including the amount designated for fringe benefits where appropriate), a report of the action taken shall be sent by the contracting officer to the Administrator of the Wage and Hour Division, Employment Standards Administration, U.S. Department of Labor, Washington, DC 20210. The Administrator, or an authorized representative, will approve, modify, or disapprove every additional classification action within 30 days of receipt and so advise the contracting officer or will notify the contracting officer within the 30-day period that additional time is necessary.

(3) In the event the contractor, the laborers or mechanics to be employed in the classification or their representatives, and the contracting officer do not agree on the proposed classification and wage rate (including the amount designated for fringe benefits, where appropriate), the contracting officer shall refer the questions, including the views of all interested parties and the recommendation of the contracting officer, to the Wage and Hour Administrator for determination. The Wage and Hour Administrator, or an authorized representative, will issue a determination within 30 days of receipt and so advise the contracting officer or will notify the contracting officer within the 30-day period that additional time is necessary.

(4) The wage rate (including fringe benefits where appropriate) determined pursuant to paragraphs 1.b.(2) or 1.b.(3) of this section, shall be paid to all workers performing work in the classification under this contract from the first day on which work is performed in the classification.

c. Whenever the minimum wage rate prescribed in the contract for a class of laborers or mechanics includes a fringe benefit which is not expressed as an hourly rate, the contractor shall either pay the benefit as stated in the wage determination or shall pay another bona fide fringe benefit or an hourly cash equivalent thereof.

d. If the contractor does not make payments to a trustee or other third person, the contractor may consider as part of the wages of any laborer or mechanic the amount of any costs reasonably anticipated in providing bona fide fringe benefits under a plan or program, Provided, That the Secretary of Labor has found, upon the written request of the contractor, that the applicable standards of the Davis-Bacon Act have been met. The Secretary of Labor may require the contractor to set aside in a separate account assets for the meeting of obligations under the plan or program.

## **2. Withholding**

The contracting agency shall upon its own action or upon written request of an authorized representative of the Department of Labor, withhold or cause to be withheld from the contractor under this contract, or any other Federal contract with the same prime contractor, or any other federally-assisted contract subject to Davis-Bacon prevailing wage requirements, which is held by the same prime contractor, so much of the accrued payments or advances as may be considered necessary to pay laborers and mechanics, including apprentices, trainees, and helpers, employed by the contractor or any subcontractor the full amount of wages required by the contract. In the event of failure to pay any laborer or mechanic, including any apprentice, trainee, or helper, employed or working on the site of the work, all or part of the wages required by the contract, the contracting agency may, after written notice to the contractor, take such action as may be necessary to cause the suspension of any further payment, advance, or guarantee of funds until such violations have ceased.

### 3. Payrolls and basic records

a. Payrolls and basic records relating thereto shall be maintained by the contractor during the course of the work and preserved for a period of three years thereafter for all laborers and mechanics working at the site of the work. Such records shall contain the name, address, and social security number of each such worker, his or her correct classification, hourly rates of wages paid (including rates of contributions or costs anticipated for bona fide fringe benefits or cash equivalents thereof of the types described in section 1(b)(2)(B) of the Davis-Bacon Act), daily and weekly number of hours worked, deductions made and actual wages paid. Whenever the Secretary of Labor has found under 29 CFR 5.5(a)(1)(iv) that the wages of any laborer or mechanic include the amount of any costs reasonably anticipated in providing benefits under a plan or program described in section 1(b)(2)(B) of the Davis-Bacon Act, the contractor shall maintain records which show that the commitment to provide such benefits is enforceable, that the plan or program is financially responsible, and that the plan or program has been communicated in writing to the laborers or mechanics affected, and records which show the costs anticipated or the actual cost incurred in providing such benefits. Contractors employing apprentices or trainees under approved programs shall maintain written evidence of the registration of apprenticeship programs and certification of trainee programs, the registration of the apprentices and trainees, and the ratios and wage rates prescribed in the applicable programs.

b. (1) The contractor shall submit weekly for each week in which any contract work is performed a copy of all payrolls to the contracting agency. The payrolls submitted shall set out accurately and completely all of the information required to be maintained under 29 CFR 5.5(a)(3)(i), except that full social security numbers and home addresses shall not be included on weekly transmittals. Instead the payrolls shall only need to include an individually identifying number for each employee ( e.g. , the last four digits of the employee's social security number). The required weekly payroll information may be submitted in any form desired. Optional Form WH-347 is available for this purpose from the Wage and Hour Division Web site at <http://www.dol.gov/esa/whd/forms/wh347instr.htm> or its successor site. The prime contractor is responsible for the submission of copies of payrolls by all subcontractors. Contractors and subcontractors shall maintain the full social security number and current address of each covered worker, and shall provide them upon request to the contracting agency for transmission to the State DOT, the FHWA or the Wage and Hour Division of the Department of Labor for purposes of an investigation or audit of compliance with prevailing wage requirements. It is not a violation of this section for a prime contractor to require a subcontractor to provide addresses and social security numbers to the prime contractor for its own records, without weekly submission to the contracting agency..

(2) Each payroll submitted shall be accompanied by a "Statement of Compliance," signed by the contractor or subcontractor or his or her agent who pays or supervises the payment of the persons employed under the contract and shall certify the following:

(i) That the payroll for the payroll period contains the information required to be provided under §5.5 (a)(3)(ii) of Regulations, 29 CFR part 5, the appropriate information is being maintained under §5.5 (a)(3)(i) of Regulations, 29 CFR part 5, and that such information is correct and complete;

(ii) That each laborer or mechanic (including each helper, apprentice, and trainee) employed on the contract during the payroll period has been paid the full weekly wages earned, without rebate, either directly or indirectly, and that no deductions have been made either directly or indirectly from the full wages earned, other than permissible deductions as set forth in Regulations, 29 CFR part 3;

(iii) That each laborer or mechanic has been paid not less than the applicable wage rates and fringe benefits or cash equivalents for the classification of work performed, as specified in the applicable wage determination incorporated into the contract.

(3) The weekly submission of a properly executed certification set forth on the reverse side of Optional Form WH-347 shall satisfy the requirement for submission of the "Statement of Compliance" required by paragraph 3.b.(2) of this section.

(4) The falsification of any of the above certifications may subject the contractor or subcontractor to civil or criminal prosecution under section 1001 of title 18 and section 231 of title 31 of the United States Code.

c. The contractor or subcontractor shall make the records required under paragraph 3.a. of this section available for inspection, copying, or transcription by authorized representatives of the contracting agency, the State DOT, the FHWA, or the Department of Labor, and shall permit such representatives to interview employees during working hours on the job. If the contractor or subcontractor fails to submit the required records or to make them available, the FHWA may, after written notice to the contractor, the contracting agency or the State DOT, take such action as may be necessary to cause the suspension of any further payment, advance, or guarantee of funds. Furthermore, failure to submit the required records upon request or to make such records available may be grounds for debarment action pursuant to 29 CFR 5.12.

#### **4. Apprentices and trainees**

a. Apprentices (programs of the USDOL).

Apprentices will be permitted to work at less than the predetermined rate for the work they performed when they are employed pursuant to and individually registered in a bona fide apprenticeship program registered with the U.S. Department of Labor, Employment and Training Administration, Office of Apprenticeship Training, Employer and Labor Services, or with a State Apprenticeship Agency recognized by the Office, or if a person is employed in his or her first 90 days of probationary employment as an apprentice in such an apprenticeship program, who is not individually registered in the program, but who has been certified by the Office of Apprenticeship Training, Employer and Labor Services or a State Apprenticeship Agency (where appropriate) to be eligible for probationary employment as an apprentice.

The allowable ratio of apprentices to journeymen on the job site in any craft classification shall not be greater than the ratio permitted to the contractor as to the entire work force under the registered program. Any worker listed on a payroll at an apprentice wage rate, who is not registered or otherwise employed as stated above, shall be paid not less than the applicable wage rate on the wage determination for the classification of work actually performed. In addition, any apprentice performing work on the job site in excess of the ratio permitted under the registered program shall be paid not less than the applicable wage rate on the wage determination for the work actually performed. Where a contractor is performing construction on a project in a locality other than that in which its program is registered, the ratios and wage rates (expressed in percentages of the journeyman's hourly rate) specified in the contractor's or subcontractor's registered program shall be observed.

Every apprentice must be paid at not less than the rate specified in the registered program for the apprentice's level of progress, expressed as a percentage of the journeymen hourly rate specified in the applicable wage determination. Apprentices shall be paid fringe benefits in accordance with the



provisions of the apprenticeship program. If the apprenticeship program does not specify fringe benefits, apprentices must be paid the full amount of fringe benefits listed on the wage determination for the applicable classification. If the Administrator determines that a different practice prevails for the applicable apprentice classification, fringes shall be paid in accordance with that determination.

In the event the Office of Apprenticeship Training, Employer and Labor Services, or a State Apprenticeship Agency recognized by the Office, withdraws approval of an apprenticeship program, the contractor will no longer be permitted to utilize apprentices at less than the applicable predetermined rate for the work performed until an acceptable program is approved.

b. Trainees (programs of the USDOL).

Except as provided in 29 CFR 5.16, trainees will not be permitted to work at less than the predetermined rate for the work performed unless they are employed pursuant to and individually registered in a program which has received prior approval, evidenced by formal certification by the U.S. Department of Labor, Employment and Training Administration.

The ratio of trainees to journeymen on the job site shall not be greater than permitted under the plan approved by the Employment and Training Administration.

Every trainee must be paid at not less than the rate specified in the approved program for the trainee's level of progress, expressed as a percentage of the journeyman hourly rate specified in the applicable wage determination. Trainees shall be paid fringe benefits in accordance with the provisions of the trainee program. If the trainee program does not mention fringe benefits, trainees shall be paid the full amount of fringe benefits listed on the wage determination unless the Administrator of the Wage and Hour Division determines that there is an apprenticeship program associated with the corresponding journeyman wage rate on the wage determination which provides for less than full fringe benefits for apprentices. Any employee listed on the payroll at a trainee rate who is not registered and participating in a training plan approved by the Employment and Training Administration shall be paid not less than the applicable wage rate on the wage determination for the classification of work actually performed. In addition, any trainee performing work on the job site in excess of the ratio permitted under the registered program shall be paid not less than the applicable wage rate on the wage determination for the work actually performed.

In the event the Employment and Training Administration withdraws approval of a training program, the contractor will no longer be permitted to utilize trainees at less than the applicable predetermined rate for the work performed until an acceptable program is approved.

c. Equal employment opportunity. The utilization of apprentices, trainees and journeymen under this part shall be in conformity with the equal employment opportunity requirements of Executive Order 11246, as amended, and 29 CFR part 30.

d. Apprentices and Trainees (programs of the U.S. DOT).

Apprentices and trainees working under apprenticeship and skill training programs which have been certified by the Secretary of Transportation as promoting EEO in connection with Federal-aid highway construction programs are not subject to the requirements of paragraph 4 of this Section IV. The straight time hourly wage rates for apprentices and trainees under such programs will be established by the particular programs. The ratio of apprentices and trainees to journeymen shall not be greater than permitted by the terms of the particular program.

**5. Compliance with Copeland Act requirements.** The contractor shall comply with the requirements of 29 CFR part 3, which are incorporated by reference in this contract.

**6. Subcontracts.** The contractor or subcontractor shall insert Form FHWA-1273 in any subcontracts and also require the subcontractors to include Form FHWA-1273 in any lower tier subcontracts. The prime contractor shall be responsible for the compliance by any subcontractor or lower tier subcontractor with all the contract clauses in 29 CFR 5.5.

**7. Contract termination: debarment.** A breach of the contract clauses in 29 CFR 5.5 may be grounds for termination of the contract, and for debarment as a contractor and a subcontractor as provided in 29 CFR 5.12.

**8. Compliance with Davis-Bacon and Related Act requirements.** All rulings and interpretations of the Davis-Bacon and Related Acts contained in 29 CFR parts 1, 3, and 5 are herein incorporated by reference in this contract.

**9. Disputes concerning labor standards.** Disputes arising out of the labor standards provisions of this contract shall not be subject to the general disputes clause of this contract. Such disputes shall be resolved in accordance with the procedures of the Department of Labor set forth in 29 CFR parts 5, 6, and 7. Disputes within the meaning of this clause include disputes between the contractor (or any of its subcontractors) and the contracting agency, the U.S. Department of Labor, or the employees or their representatives.

**10. Certification of eligibility.**

a. By entering into this contract, the contractor certifies that neither it (nor he or she) nor any person or firm who has an interest in the contractor's firm is a person or firm ineligible to be awarded Government contracts by virtue of section 3(a) of the Davis-Bacon Act or 29 CFR 5.12(a)(1).

b. No part of this contract shall be subcontracted to any person or firm ineligible for award of a Government contract by virtue of section 3(a) of the Davis-Bacon Act or 29 CFR 5.12(a)(1).

c. The penalty for making false statements is prescribed in the U.S. Criminal Code, 18 U.S.C. 1001.

**V. CONTRACT WORK HOURS AND SAFETY STANDARDS ACT**

The following clauses apply to any Federal-aid construction contract in an amount in excess of \$100,000 and subject to the overtime provisions of the Contract Work Hours and Safety Standards Act. These clauses shall be inserted in addition to the clauses required by 29 CFR 5.5(a) or 29 CFR 4.6. As used in this paragraph, the terms laborers and mechanics include watchmen and guards.

**1. Overtime requirements.** No contractor or subcontractor contracting for any part of the contract work which may require or involve the employment of laborers or mechanics shall require or permit any such laborer or mechanic in any workweek in which he or she is employed on such work to work in excess of forty hours in such workweek unless such laborer or mechanic receives compensation at a rate not less than one and one-half times the basic rate of pay for all hours worked in excess of forty hours in such workweek.

**2. Violation; liability for unpaid wages; liquidated damages.** In the event of any violation of the clause set forth in paragraph (1.) of this section, the contractor and any subcontractor responsible

therefor shall be liable for the unpaid wages. In addition, such contractor and subcontractor shall be liable to the United States (in the case of work done under contract for the District of Columbia or a territory, to such District or to such territory), for liquidated damages. Such liquidated damages shall be computed with respect to each individual laborer or mechanic, including watchmen and guards, employed in violation of the clause set forth in paragraph (1.) of this section, in the sum of \$10 for each calendar day on which such individual was required or permitted to work in excess of the standard workweek of forty hours without payment of the overtime wages required by the clause set forth in paragraph (1.) of this section.

**3. Withholding for unpaid wages and liquidated damages.** The FHWA or the contacting agency shall upon its own action or upon written request of an authorized representative of the Department of Labor withhold or cause to be withheld, from any moneys payable on account of work performed by the contractor or subcontractor under any such contract or any other Federal contract with the same prime contractor, or any other federally-assisted contract subject to the Contract Work Hours and Safety Standards Act, which is held by the same prime contractor, such sums as may be determined to be necessary to satisfy any liabilities of such contractor or subcontractor for unpaid wages and liquidated damages as provided in the clause set forth in paragraph (2.) of this section.

**4. Subcontracts.** The contractor or subcontractor shall insert in any subcontracts the clauses set forth in paragraph (1.) through (4.) of this section and also a clause requiring the subcontractors to include these clauses in any lower tier subcontracts. The prime contractor shall be responsible for compliance by any subcontractor or lower tier subcontractor with the clauses set forth in paragraphs (1.) through (4.) of this section.

## VI. SUBLETTING OR ASSIGNING THE CONTRACT

This provision is applicable to all Federal-aid construction contracts on the National Highway System.

1. The contractor shall perform with its own organization contract work amounting to not less than 30 percent (or a greater percentage if specified elsewhere in the contract) of the total original contract price, excluding any specialty items designated by the contracting agency. Specialty items may be performed by subcontract and the amount of any such specialty items performed may be deducted from the total original contract price before computing the amount of work required to be performed by the contractor's own organization (23 CFR 635.116).

a. The term “perform work with its own organization” refers to workers employed or leased by the prime contractor, and equipment owned or rented by the prime contractor, with or without operators. Such term does not include employees or equipment of a subcontractor or lower tier subcontractor, agents of the prime contractor, or any other assignees. The term may include payments for the costs of hiring leased employees from an employee leasing firm meeting all relevant Federal and State regulatory requirements. Leased employees may only be included in this term if the prime contractor meets all of the following conditions:

- (1) the prime contractor maintains control over the supervision of the day-to-day activities of the leased employees;
- (2) the prime contractor remains responsible for the quality of the work of the leased employees;
- (3) the prime contractor retains all power to accept or exclude individual employees from work on the project; and

(4) the prime contractor remains ultimately responsible for the payment of predetermined minimum wages, the submission of payrolls, statements of compliance and all other Federal regulatory requirements.

b. "Specialty Items" shall be construed to be limited to work that requires highly specialized knowledge, abilities, or equipment not ordinarily available in the type of contracting organizations qualified and expected to bid or propose on the contract as a whole and in general are to be limited to minor components of the overall contract.

2. The contract amount upon which the requirements set forth in paragraph (1) of Section VI is computed includes the cost of material and manufactured products which are to be purchased or produced by the contractor under the contract provisions.

3. The contractor shall furnish (a) a competent superintendent or supervisor who is employed by the firm, has full authority to direct performance of the work in accordance with the contract requirements, and is in charge of all construction operations (regardless of who performs the work) and (b) such other of its own organizational resources (supervision, management, and engineering services) as the contracting officer determines is necessary to assure the performance of the contract.

4. No portion of the contract shall be sublet, assigned or otherwise disposed of except with the written consent of the contracting officer, or authorized representative, and such consent when given shall not be construed to relieve the contractor of any responsibility for the fulfillment of the contract. Written consent will be given only after the contracting agency has assured that each subcontract is evidenced in writing and that it contains all pertinent provisions and requirements of the prime contract.

5. The 30% self-performance requirement of paragraph (1) is not applicable to design-build contracts; however, contracting agencies may establish their own self-performance requirements.

## **VII. SAFETY: ACCIDENT PREVENTION**

This provision is applicable to all Federal-aid construction contracts and to all related subcontracts.

1. In the performance of this contract the contractor shall comply with all applicable Federal, State, and local laws governing safety, health, and sanitation (23 CFR 635). The contractor shall provide all safeguards, safety devices and protective equipment and take any other needed actions as it determines, or as the contracting officer may determine, to be reasonably necessary to protect the life and health of employees on the job and the safety of the public and to protect property in connection with the performance of the work covered by the contract.

2. It is a condition of this contract, and shall be made a condition of each subcontract, which the contractor enters into pursuant to this contract, that the contractor and any subcontractor shall not permit any employee, in performance of the contract, to work in surroundings or under conditions which are unsanitary, hazardous or dangerous to his/her health or safety, as determined under construction safety and health standards (29 CFR 1926) promulgated by the Secretary of Labor, in accordance with Section 107 of the Contract Work Hours and Safety Standards Act (40 U.S.C. 3704).

3. Pursuant to 29 CFR 1926.3, it is a condition of this contract that the Secretary of Labor or authorized representative thereof, shall have right of entry to any site of contract performance to inspect or investigate the matter of compliance with the construction safety and health standards and to carry out

the duties of the Secretary under Section 107 of the Contract Work Hours and Safety Standards Act (40 U.S.C.3704).

### **VIII. FALSE STATEMENTS CONCERNING HIGHWAY PROJECTS**

This provision is applicable to all Federal-aid construction contracts and to all related subcontracts.

In order to assure high quality and durable construction in conformity with approved plans and specifications and a high degree of reliability on statements and representations made by engineers, contractors, suppliers, and workers on Federal-aid highway projects, it is essential that all persons concerned with the project perform their functions as carefully, thoroughly, and honestly as possible. Willful falsification, distortion, or misrepresentation with respect to any facts related to the project is a violation of Federal law. To prevent any misunderstanding regarding the seriousness of these and similar acts, Form FHWA-1022 shall be posted on each Federal-aid highway project (23 CFR 635) in one or more places where it is readily available to all persons concerned with the project:

18 U.S.C. 1020 reads as follows:

"Whoever, being an officer, agent, or employee of the United States, or of any State or Territory, or whoever, whether a person, association, firm, or corporation, knowingly makes any false statement, false representation, or false report as to the character, quality, quantity, or cost of the material used or to be used, or the quantity or quality of the work performed or to be performed, or the cost thereof in connection with the submission of plans, maps, specifications, contracts, or costs of construction on any highway or related project submitted for approval to the Secretary of Transportation; or

Whoever knowingly makes any false statement, false representation, false report or false claim with respect to the character, quality, quantity, or cost of any work performed or to be performed, or materials furnished or to be furnished, in connection with the construction of any highway or related project approved by the Secretary of Transportation; or

Whoever knowingly makes any false statement or false representation as to material fact in any statement, certificate, or report submitted pursuant to provisions of the Federal-aid Roads Act approved July 1, 1916, (39 Stat. 355), as amended and supplemented;

Shall be fined under this title or imprisoned not more than 5 years or both."

### **IX. IMPLEMENTATION OF CLEAN AIR ACT AND FEDERAL WATER POLLUTION CONTROL ACT**

This provision is applicable to all Federal-aid construction contracts and to all related subcontracts.

By submission of this bid/proposal or the execution of this contract, or subcontract, as appropriate, the bidder, proposer, Federal-aid construction contractor, or subcontractor, as appropriate, will be deemed to have stipulated as follows:

1. That any person who is or will be utilized in the performance of this contract is not prohibited from receiving an award due to a violation of Section 508 of the Clean Water Act or Section 306 of the Clean Air Act.

2. That the contractor agrees to include or cause to be included the requirements of paragraph (1) of this Section X in every subcontract, and further agrees to take such action as the contracting agency may direct as a means of enforcing such requirements.

## **X. CERTIFICATION REGARDING DEBARMENT, SUSPENSION, INELIGIBILITY AND VOLUNTARY EXCLUSION**

This provision is applicable to all Federal-aid construction contracts, design-build contracts, subcontracts, lower-tier subcontracts, purchase orders, lease agreements, consultant contracts or any other covered transaction requiring FHWA approval or that is estimated to cost \$25,000 or more – as defined in 2 CFR Parts 180 and 1200.

### **1. Instructions for Certification – First Tier Participants:**

a. By signing and submitting this proposal, the prospective first tier participant is providing the certification set out below.

b. The inability of a person to provide the certification set out below will not necessarily result in denial of participation in this covered transaction. The prospective first tier participant shall submit an explanation of why it cannot provide the certification set out below. The certification or explanation will be considered in connection with the department or agency's determination whether to enter into this transaction. However, failure of the prospective first tier participant to furnish a certification or an explanation shall disqualify such a person from participation in this transaction.

c. The certification in this clause is a material representation of fact upon which reliance was placed when the contracting agency determined to enter into this transaction. If it is later determined that the prospective participant knowingly rendered an erroneous certification, in addition to other remedies available to the Federal Government, the contracting agency may terminate this transaction for cause of default.

d. The prospective first tier participant shall provide immediate written notice to the contracting agency to whom this proposal is submitted if any time the prospective first tier participant learns that its certification was erroneous when submitted or has become erroneous by reason of changed circumstances.

e. The terms "covered transaction," "debarred," "suspended," "ineligible," "participant," "person," "principal," and "voluntarily excluded," as used in this clause, are defined in 2 CFR Parts 180 and 1200. "First Tier Covered Transactions" refers to any covered transaction between a grantee or subgrantee of Federal funds and a participant (such as the prime or general contract). "Lower Tier Covered Transactions" refers to any covered transaction under a First Tier Covered Transaction (such as subcontracts). "First Tier Participant" refers to the participant who has entered into a covered transaction with a grantee or subgrantee of Federal funds (such as the prime or general contractor). "Lower Tier Participant" refers any participant who has entered into a covered transaction with a First Tier Participant or other Lower Tier Participants (such as subcontractors and suppliers).

f. The prospective first tier participant agrees by submitting this proposal that, should the proposed covered transaction be entered into, it shall not knowingly enter into any lower tier covered transaction with a person who is debarred, suspended, declared ineligible, or voluntarily excluded from

participation in this covered transaction, unless authorized by the department or agency entering into this transaction.

g. The prospective first tier participant further agrees by submitting this proposal that it will include the clause titled "Certification Regarding Debarment, Suspension, Ineligibility and Voluntary Exclusion-Lower Tier Covered Transactions," provided by the department or contracting agency, entering into this covered transaction, without modification, in all lower tier covered transactions and in all solicitations for lower tier covered transactions exceeding the \$25,000 threshold.

h. A participant in a covered transaction may rely upon a certification of a prospective participant in a lower tier covered transaction that is not debarred, suspended, ineligible, or voluntarily excluded from the covered transaction, unless it knows that the certification is erroneous. A participant is responsible for ensuring that its principals are not suspended, debarred, or otherwise ineligible to participate in covered transactions. To verify the eligibility of its principals, as well as the eligibility of any lower tier prospective participants, each participant may, but is not required to, check the Excluded Parties List System website (<https://www.epls.gov/>), which is compiled by the General Services Administration.

i. Nothing contained in the foregoing shall be construed to require the establishment of a system of records in order to render in good faith the certification required by this clause. The knowledge and information of the prospective participant is not required to exceed that which is normally possessed by a prudent person in the ordinary course of business dealings.

j. Except for transactions authorized under paragraph (f) of these instructions, if a participant in a covered transaction knowingly enters into a lower tier covered transaction with a person who is suspended, debarred, ineligible, or voluntarily excluded from participation in this transaction, in addition to other remedies available to the Federal Government, the department or agency may terminate this transaction for cause or default.

\* \* \* \* \*

## 2. Certification Regarding Debarment, Suspension, Ineligibility and Voluntary Exclusion – First Tier Participants:

a. The prospective first tier participant certifies to the best of its knowledge and belief, that it and its principals:

(1) Are not presently debarred, suspended, proposed for debarment, declared ineligible, or voluntarily excluded from participating in covered transactions by any Federal department or agency;

(2) Have not within a three-year period preceding this proposal been convicted of or had a civil judgment rendered against them for commission of fraud or a criminal offense in connection with obtaining, attempting to obtain, or performing a public (Federal, State or local) transaction or contract under a public transaction; violation of Federal or State antitrust statutes or commission of embezzlement, theft, forgery, bribery, falsification or destruction of records, making false statements, or receiving stolen property;

(3) Are not presently indicted for or otherwise criminally or civilly charged by a governmental entity (Federal, State or local) with commission of any of the offenses enumerated in paragraph (a)(2) of this certification; and

(4) Have not within a three-year period preceding this application/proposal had one or more public transactions (Federal, State or local) terminated for cause or default.

b. Where the prospective participant is unable to certify to any of the statements in this certification, such prospective participant shall attach an explanation to this proposal.

## **2. Instructions for Certification - Lower Tier Participants:**

(Applicable to all subcontracts, purchase orders and other lower tier transactions requiring prior FHWA approval or estimated to cost \$25,000 or more - 2 CFR Parts 180 and 1200)

a. By signing and submitting this proposal, the prospective lower tier is providing the certification set out below.

b. The certification in this clause is a material representation of fact upon which reliance was placed when this transaction was entered into. If it is later determined that the prospective lower tier participant knowingly rendered an erroneous certification, in addition to other remedies available to the Federal Government, the department, or agency with which this transaction originated may pursue available remedies, including suspension and/or debarment.

c. The prospective lower tier participant shall provide immediate written notice to the person to which this proposal is submitted if at any time the prospective lower tier participant learns that its certification was erroneous by reason of changed circumstances.

d. The terms "covered transaction," "debarred," "suspended," "ineligible," "participant," "person," "principal," and "voluntarily excluded," as used in this clause, are defined in 2 CFR Parts 180 and 1200. You may contact the person to which this proposal is submitted for assistance in obtaining a copy of those regulations. "First Tier Covered Transactions" refers to any covered transaction between a grantee or subgrantee of Federal funds and a participant (such as the prime or general contract). "Lower Tier Covered Transactions" refers to any covered transaction under a First Tier Covered Transaction (such as subcontracts). "First Tier Participant" refers to the participant who has entered into a covered transaction with a grantee or subgrantee of Federal funds (such as the prime or general contractor). "Lower Tier Participant" refers any participant who has entered into a covered transaction with a First Tier Participant or other Lower Tier Participants (such as subcontractors and suppliers).

e. The prospective lower tier participant agrees by submitting this proposal that, should the proposed covered transaction be entered into, it shall not knowingly enter into any lower tier covered transaction with a person who is debarred, suspended, declared ineligible, or voluntarily excluded from participation in this covered transaction, unless authorized by the department or agency with which this transaction originated.

f. The prospective lower tier participant further agrees by submitting this proposal that it will include this clause titled "Certification Regarding Debarment, Suspension, Ineligibility and Voluntary Exclusion-Lower Tier Covered Transaction," without modification, in all lower tier covered transactions and in all solicitations for lower tier covered transactions exceeding the \$25,000 threshold.



g. A participant in a covered transaction may rely upon a certification of a prospective participant in a lower tier covered transaction that is not debarred, suspended, ineligible, or voluntarily excluded from the covered transaction, unless it knows that the certification is erroneous. A participant is responsible for ensuring that its principals are not suspended, debarred, or otherwise ineligible to participate in covered transactions. To verify the eligibility of its principals, as well as the eligibility of any lower tier prospective participants, each participant may, but is not required to, check the Excluded Parties List System website (<https://www.epls.gov/>), which is compiled by the General Services Administration.

h. Nothing contained in the foregoing shall be construed to require establishment of a system of records in order to render in good faith the certification required by this clause. The knowledge and information of participant is not required to exceed that which is normally possessed by a prudent person in the ordinary course of business dealings.

i. Except for transactions authorized under paragraph e of these instructions, if a participant in a covered transaction knowingly enters into a lower tier covered transaction with a person who is suspended, debarred, ineligible, or voluntarily excluded from participation in this transaction, in addition to other remedies available to the Federal Government, the department or agency with which this transaction originated may pursue available remedies, including suspension and/or debarment.

\* \* \* \* \*

**Certification Regarding Debarment, Suspension, Ineligibility and Voluntary Exclusion--Lower Tier Participants:**

1. The prospective lower tier participant certifies, by submission of this proposal, that neither it nor its principals is presently debarred, suspended, proposed for debarment, declared ineligible, or voluntarily excluded from participating in covered transactions by any Federal department or agency.

2. Where the prospective lower tier participant is unable to certify to any of the statements in this certification, such prospective participant shall attach an explanation to this proposal.

\* \* \* \* \*

**XI. CERTIFICATION REGARDING USE OF CONTRACT FUNDS FOR LOBBYING**

This provision is applicable to all Federal-aid construction contracts and to all related subcontracts which exceed \$100,000 (49 CFR 20).

1. The prospective participant certifies, by signing and submitting this bid or proposal, to the best of his or her knowledge and belief, that:

a. No Federal appropriated funds have been paid or will be paid, by or on behalf of the undersigned, to any person for influencing or attempting to influence an officer or employee of any Federal agency, a Member of Congress, an officer or employee of Congress, or an employee of a Member of Congress in connection with the awarding of any Federal contract, the making of any Federal grant, the making of any Federal loan, the entering into of any cooperative agreement, and the extension, continuation, renewal, amendment, or modification of any Federal contract, grant, loan, or cooperative agreement.

b. If any funds other than Federal appropriated funds have been paid or will be paid to any person for influencing or attempting to influence an officer or employee of any Federal agency, a Member of Congress, an officer or employee of Congress, or an employee of a Member of Congress in connection with this Federal contract, grant, loan, or cooperative agreement, the undersigned shall complete and submit Standard Form-LLL, "Disclosure Form to Report Lobbying," in accordance with its instructions.

2. This certification is a material representation of fact upon which reliance was placed when this transaction was made or entered into. Submission of this certification is a prerequisite for making or entering into this transaction imposed by 31 U.S.C. 1352. Any person who fails to file the required certification shall be subject to a civil penalty of not less than \$10,000 and not more than \$100,000 for each such failure.

3. The prospective participant also agrees by submitting its bid or proposal that the participant shall require that the language of this certification be included in all lower tier subcontracts, which exceed \$100,000 and that all such recipients shall certify and disclose accordingly.

**EXHIBIT B****TITLE VI CONTRACTOR ASSURANCES**

During the performance of this Contract, the contractor, for itself, its assignees and successors in interest (hereinafter referred to as the "Contractor") agrees as follows:

**1. Compliance with Regulations:** The Contractor shall comply with the regulations relative to nondiscrimination in federally assisted programs of the United States Department of Transportation (hereinafter, "USDOT"), Title 49, Code of Federal Regulations, Part 21, as they may be amended from time to time (hereinafter referred to as the "Regulations"), which are herein incorporated by reference and made a part of this contract.

**2. Nondiscrimination:** The Contractor, with regard to the work performed by it during the Contract, shall not discriminate on the grounds of race, color, national origin, sex, age, or disability in the selection and retention of subcontractors, including procurements of materials and leases of equipment. The Contractor shall not participate either directly or indirectly in the discrimination prohibited by Subsection 5 of the Regulations, including employment practices when the Contract covers a program set forth in Appendix B of the Regulations.

**3. Solicitations for Subcontracts, Including Procurements of Materials and Equipment:**

In all solicitations either by competitive bidding or negotiation made by the Contractor for work to be performed under a subcontract, including procurements of materials or leases of equipment, each potential subcontractor or supplier shall be notified by the Contractor of the Contractor's obligations under this contract and the Regulations relative to nondiscrimination on the grounds of race, color, national origin, sex, age, or disability.

**4. Information and Reports:** The Contractor shall provide all information and reports required by the Regulations or directives issued pursuant thereto and shall permit access to its books, records, accounts, other sources of information, and its facilities as may be determined by the Connecticut Department of Transportation (ConnDOT) or the Funding Agency (FHWA, FTA and FAA) to be pertinent to ascertain compliance with such Regulations, orders, and instructions. Where any information required of a Contractor is in the exclusive possession of another who fails or refuses to furnish this information, the Contractor shall so certify to ConnDOT or the Funding Agency, as appropriate, and shall set forth what efforts it has made to obtain the information.

**5. Sanctions for Noncompliance:** In the event of the Contractor's noncompliance with the nondiscrimination provisions of this Contract, the ConnDOT shall impose such sanctions as it or the Funding Agency may determine to be appropriate, including, but not limited to:

- A. Withholding contract payments until the Contractor is in-compliance; and/or
- B. Cancellation, termination, or suspension of the Contract, in whole or in part.

**6. Incorporation of Provisions:** The Contractor shall include the provisions of paragraphs 1 through 5 in every subcontract, including procurements of materials and leases of equipment, unless exempt by the Regulations or directives issued pursuant thereto. The Contractor shall take such action with respect to any subcontract or procurement as the ConnDOT or the Funding Agency may -direct as a means of enforcing such provisions including sanctions for noncompliance. Provided, however, that in the event a Contractor becomes involved in, or is threatened with, litigation with a subcontractor or supplier as a result of such direction, the Contractor may request the ConnDOT to enter into such litigation to protect the interests of the Funding Agency, and, in addition, the Contractor may request the United States to enter into such litigation to protect the interests of the United States

**EXHIBIT C****CONTRACTOR WORKFORCE UTILIZATION (FEDERAL EXECUTIVE ORDER 11246) /  
EQUAL EMPLOYMENT OPPORTUNITY  
(Federal - FHWA)****1. Project Workforce Utilization Goals:**

These goals are applicable to all the Contractor's construction work (whether or not it is Federal or Federally assisted or funded) performed in the covered area. If the contractor performs construction work in a geographical area located outside of the covered area, it shall apply the goals established for the geographical area where the work is actually performed.

Whenever the Contractor, or any Subcontractor at any tier, subcontracts a portion of the work involving any construction trade, it shall physically include in each subcontract in excess of \$10,000 the provisions of these specifications which contain the applicable goals for minority and female participation.

The goals for minority and female utilization are expressed in percentage terms for the contractor's aggregate work-force in each trade on all construction work in the covered area, are referenced in the attached Appendix A.

**2. Executive Order 11246**

The Contractor's compliance with Executive Order 11246 and 41-CFR Part 60-4 shall be based on its implementation of the specific affirmative action obligations required by the specifications set forth in 41 CFR 60-4.3(A) and its efforts to meet the goals established for the geographical area where the contract is to be performed. The hours of minority and female employment and training must be substantially uniform throughout the length of the contract, and in each trade, and the contractor shall make a good faith effort to employ minorities and women evenly on each of its projects. The transfer of minority or female employees or trainees from contractor to contractor or from project to project for the sole purpose of meeting the contractor's goals shall be a violation of the contract, the Executive Order and the regulations in 41 CFR Part 60-4. Compliance with the goals will be measured against the total work hour performed.

If the Contractor is participating (pursuant to 41 CFR 60-4.5) in a Hometown Plan approved by the U.S. Department of Labor in the covered area either individually or through an association, its affirmative action obligations on all work in the Plan area (including goals and timetables) shall be in accordance with that Plan for those trades which have unions participating in the Plan. Contractors must be able to demonstrate their participation in and compliance with the provisions of any such Hometown Plan. Each Contractor or Subcontractor participating in an approved Plan is individually required to comply with its obligations under the EEO clause, and to make a good faith effort to achieve each goal under the Plan in each trade in which it has employees. The overall good faith performance by other Contractors or subcontractors toward a goal in an approved Pan does not excuse any covered Contractor's or subcontractor's failure to take good faith efforts to achieve the plan goals and timetables.

The Contractor shall implement the specific affirmative action standards provided in a through p of these specifications. The goals set forth in the solicitation from which this contract resulted are expressed as percentages of the total hours of employment and training of minority and

female utilization the Contractor should reasonably be able to achieve in each construction trade in which it has employees in the covered area. Covered Construction contractors performing construction work in geographical areas where they do not have a federal or federally assisted construction contract shall apply the minority and female goals established for the geographical area where the work is being performed. Goals are published periodically in the Federal Register in notice form and such notices may be obtained from any Office of Federal Contract Compliance Programs (OFCCP) Office or from Federal procurement contracting officers. The Contractor is expected to make substantially uniform progress in meeting its goals in each craft during the period specified.

Neither the provisions of any collective bargaining agreement, nor the failure by a union with whom the Contractor has a collective bargaining agreement, to refer either minorities or women shall excuse the Contractor's obligations under these specifications, Executive Order 11246, or the regulations promulgated pursuant hereto.

In order for the nonworking training hours of apprentices and trainees to be counted in meeting the goals, such apprentices and trainees must be employed by the Contractor during the training period, and the Contractor must have made a commitment to employ the apprentices and trainees at the completion of their training, subject to the availability of employment opportunities. Trainees must be trained pursuant to training programs approved by the U.S. Department of Labor.

The Contractor shall take specific affirmative actions to ensure equal employment opportunity. The evaluation of the Contractor's compliance with these specifications shall be based upon its effort to achieve maximum results from its actions. The Contractor shall document these efforts fully, and shall implement affirmative action steps at least as extensive as the following:

- a. Ensure and maintain a working environment free of harassment, intimidation, and coercion at all sites; and in all facilities at which the Contractor's employees are assigned to work. The Contractor, where possible, will assign two or more women to each construction project. The Contractor shall specifically ensure that all foremen, superintendents, and other on-site supervisory personnel are aware of and carry out the Contractor's obligation to maintain such a working environment, with specific attention to minority or female individuals working at such sites or in such facilities.
- b. Establish and maintain a current list of minority and female recruitment sources, provide written notification to minority and female recruitment sources and to community organizations when the Contractor or its unions have employment opportunities available, and maintain a record of the organizations' responses.
- c. Maintain a current file of the names, addresses and telephone numbers of each minority and female off the street applicant and minority or female referral from a union, a recruitment source or community organization and of what action was taken with respect to each such individual. If such individual was sent to the union hiring hall for referral and was not referred back to the Contractor by the union or, if referred, not employed by the Contractor, this shall be documented in the file with the reason thereafter; along with whatever additional actions the Contractor may have taken.
- d. Provide immediate written notification to the Director when the Union or Unions with which the Contractor has a collective bargaining agreement has not referred to the Contractor a minority person or women sent by the Contractor, or when the Contractor has other

information that the Union referral process has impeded the Contractor's efforts to meet its obligations.

- e. Develop on-the-job training opportunities and/or participate in training programs for the area which expressly include minorities and women, including upgrading programs and apprenticeship and trainee programs relevant to the Contractor's employment needs, especially those programs funded or approved by the Department of Labor. The Contractor shall provide notice of these programs to the sources compiled under b above.
- f. Disseminate the Contractor's EEO policy by providing notice of the policy to unions and training programs and requesting their cooperation in assisting the Contractor in meeting its EEO obligations; by including it in any policy manual and collective bargaining agreement; by publicizing it in the company newspaper, annual report, etc.; by specific review of the policy with all management personnel and with all minority and female employees at least once a year; and by posting the company EEO Policy on bulletin boards accessible to all employees at each location where construction work is performed.
- g. Review, at least annually, the company EEO Policy and affirmative action obligations under these specifications with all employees having any responsibility for hiring, assignment, layoff, termination or other employment, decisions including specific Foreman, etc. prior to the initiation of construction work at any job site. A written record shall be made and maintained identifying the time and place of these meetings, persons attending, subject matter discussed, and disposition of the subject matter.
- h. Disseminate the Contractor's EEO Policy externally by including it in any advertising in the news media, specifically including minority and female news media, and providing written notification to and discussing the Contractor's EEO policy with other Contractors and subcontractors with whom the Contractor does or anticipates doing business.
- i. Direct its recruitment efforts, both oral and written, to minority female and community organizations, to schools with minority and female students and to minority and female recruitment and training organizations serving the Contractor's recruitment area and employment needs. Not later than one month prior to the date for the acceptance of applications for apprenticeship or other training by any recruitment source, the contractor shall send written notification to organizations such as the above, describing the openings, screening procedures and tests to be used in the selection process.
- j. Encourage present minority and female employees to recruit other minority persons and women and, where reasonable, provide after school, summer and vacation employment to minority and female youth both on the site and in other areas of a Contractor's work-force.
- k. Validate all tests and other selection requirements where there is an obligation to do so under 41 CFR Part 60-3.
- l. Conduct, at least annually, an inventory and evaluation at least of all minority and female personnel for promotional opportunities and encourage these employees to seek or to prepare for, through appropriate training, etc., such opportunities.
- m. Ensure that seniority practices, job classifications, work assignments and other personnel practices, do not have a discriminatory effect by continually monitoring all personnel and

employment related activities to ensure that the EEO policy and the Contractor's obligations under these specifications are being carried out.

- n. Ensure that all facilities and company activities are non-segregated except that separate or single user toilet and necessary changing facilities shall be provided to assure privacy between the sexes.
- o. Document and maintain a record of all solicitations of offers for subcontracts from minority and female construction contractors and suppliers, including circulation of solicitations to minority and female contractor associations and other business associations.
- p. Conduct a review at least annually of all supervisors' adherence to and performance under the Contractor's EEO policies and affirmative action obligations.

Contractors are encouraged to participate in voluntary associations which assist in fulfilling one or more of their affirmative action obligations (a through p). The efforts of a contractor association, joint contractor union, contractor community, or other similar group of which the contractor is a member and participant, may be asserted as fulfilling any one or more of its obligations under a through p of these specifications provided that the contractor actively participates in the group, makes every effort to assure that the group has a positive impact on the employment of minorities and women in the industry, ensures that the concrete benefits of the program are reflected in the Contractor's minority and female work-force participation, makes a good faith effort to meet with individual goals and timetables, and can provide access to documentation which demonstrates the effectiveness of actions taken on behalf of the Contractor. The obligation to comply, however, is the Contractor's and failure of such a group to fulfill an obligation shall not be a defense for the Contractor's noncompliance.

A single goal for minorities and a separate single goal for women have been established. The Contractor, however, is required to provide equal employment opportunity and to take affirmative action for all minority groups, both male and female, and all women, both minority and non-minority. Consequently, the Contractor may be in violation of Executive Order 11246 if a particular group is employed in a substantially disparate manner, (for example, even though the Contractor has achieved its goals for women generally, the Contractor may be in violation of the Executive Order if a specific minority group of women is under utilized).

The Contractor shall not use the goals and timetables or affirmative action standards to discriminate against any person because of race, color, religion, sex, or national origin.

The Contractor shall not enter into any Subcontract with any person or firm debarred from Government contracts pursuant to Executive Order 11246.

The Contractor shall carry out such sanctions and penalties for violation of these specifications and of the Equal Opportunity Clause, including suspension, termination and cancellation of existing subcontracts as may be imposed or ordered pursuant to Executive Order 11246, as amended, and its implementing regulations by the Office of Federal Contract Compliance Programs. Any Contractor who fails to carry out such sanctions and penalties shall be in violation of these specifications and Executive Order 11246, as amended.

The Contractor, in fulfilling its obligations under these specifications, shall implement specific affirmative action steps, at least as extensive as those standards prescribed in these

specifications, so as to achieve maximum results from its efforts to ensure equal employment opportunity. If the Contractor fails to comply with the requirements of the Executive Order, the implementing regulations, or these specifications, the Director shall proceed in accordance with 41 CFR 60-4.8.

The Contractor shall designate a responsible official to monitor all employment related activity to ensure that the company EEO policy is being carried out, to submit reports relating to the provisions hereof as may be required by the Government and to keep records. Records shall at least include for each employee the name, address, telephone numbers, construction trade, union affiliation if any, employee identification number when assigned, social security number, race, sex, status, (e.g. mechanic, apprentice, trainee, helper, or laborer) dates of changes in status, hours worked per week in the indicated trade, rate of pay, and locations at which the work was performed. Records shall be maintained in an easily understandable and retrievable form; however, to the degree that existing records satisfy this requirement, contractors shall not be required to maintain separate records.

Nothing herein provided shall be construed as a limitation upon the application of their laws which establish different standards of compliance or upon the application of requirements for the hiring of local or other area residents (e.g. those under the Public Works Employment Act of 1977 and the Community Development Block Grant Program).

The Director of the Office of Federal Contract Compliance Programs, from time to time, shall issue goals and timetables for minority and female utilization which shall be based on appropriate workforce, demographic or other relevant data and which shall cover construction projects or construction contracts performed in specific geographical areas. The goals, which shall be applicable to each construction trade in a covered contractor's or timetables, shall be published as notices in the Federal Register, and shall be inserted by the Contracting officers and applicants, as applicable, in the Notice required by 41 CFR 60-4.2.



**FEDERALLY FUNDED OR ASSISTED PROJECTS****APPENDIX A****(Labor Market Goals)****Standard Metropolitan Statistical Area (SMSA)****Female****Minority**

<b>Bridgeport – Stamford – Norwalk – Danbury</b>	<b>10.2%</b>
<b>6.9%</b>	

Bethel	Bridgeport	Brookfield	Danbury
Darien	Derby	Easton	Fairfield
Greenwich	Milford	Monroe	New Canaan
New Fairfield	Newton	Norwalk	Redding
Shelton	Stamford	Stratford	Trumbull
Weston	Westport	Wilton	

<b>Hartford – Bristol – New Britain</b>	<b>6.9%</b>
<b>6.9%</b>	

Andover	Avon	Berlin	Bloomfield
Bolton	Bristol	Burlington	Canton
Colchester	Columbia	Coventry	Cromwell
East Granby	East Hampton	East Hartford	East Windsor
Ellington	Enfield	Farmington	Glastonbury
Granby	Hartford	Hebron	Manchester
Marlborough	New Britain	New Hartford	Newington
Plainville	Plymouth	Portland	Rocky Hill
Simsbury	South Windsor	Southington	Stafford
Suffield	Tolland	Vernon	West Hartford
Wethersfield	Willington	Windsor	Windsor Locks

<b>New Haven – Waterbury – Meriden</b>	<b>9.0%</b>
<b>6.9%</b>	

Beacon Falls	Bethany	Branford	Cheshire
Clinton	East Haven	Guilford	Hamden
Madison	Meriden	Middlebury	Naugatuck
New Haven	North Branford	North Haven	Orange
Prospect	Southbury	Thomaston	Wallingford
Waterbury	Watertown	West Haven	Wolcott
Woodbridge	Woodbury		

<b>New London – Norwich</b>	<b>4.5%</b>
<b>6.9%</b>	

Bozrah	East Lyme	Griswold	Groton
Ledyard	Lisbon	Montville	New London
Norwich	Old Lyme	Old Saybrook	Preston
Sprague	Stonington	Waterford	

**Non SMSA****Female****Minority**

<b>Litchfield – Windham</b>			<b>5.9%</b>
<b>6.9%</b>			
Abington	Ashford	Ballouville	Bantam
Barkhamsted	Bethlehem	Bridgewater	Brooklyn
Canaan	Canterbury	Central Village	Cahplin
Colebrook	Cornwall	Cornwall Bridge	Danielson
Dayville	East Canaan	East Killingly	East Woodstock
Eastford	Falls Village	Gaylordsville	Goshen
Grosvenor Dale	Hampton	Harwinton	Kent
Killigly	Lakeside	Litchfield	Moosup
Morris	New Milford	New Preston	New Preston Marble Dale
Norfolk	North Canaan	No. Grosvenordale	North Windham
Oneco	Pequabuck	Pine Meadow	Plainfield
Pleasant Valley	Pomfret	Pomfret Center	Putnam
Quinebaug	Riverton	Rogers	Roxbury
Salisbury	Scotland	Sharon	South Kent
South Woodstock	Sterling	Taconic	Terryville
Thompson	Torrington	Warren	Warrenville
Washington	Washington Depot	Wauregan	West Cornwall
Willimantic	Winchester	Winchester Center	Windham
Winsted	Woodstock	Woodstock Valley	

**EXHIBIT D****Health Insurance Portability and Accountability Act of 1996 (“HIPAA”).**

- (a) If the Contactor is a Business Associate under the requirements of the Health Insurance Portability and Accountability Act of 1996 (“HIPAA”), the Contractor must comply with all terms and conditions of this Section of the Contract. If the Contractor is not a Business Associate under HIPAA, this Section of the Contract does not apply to the Contractor for this Contract.
- (b) The Contractor is required to safeguard the use, publication and disclosure of information on all applicants for, and all clients who receive, services under the Contract in accordance with all applicable federal and state law regarding confidentiality, which includes but is not limited to HIPAA, more specifically with the Privacy and Security Rules at 45 C.F.R. Part 160 and Part 164, subparts A, C, and E; and
- (c) The State of Connecticut Agency named on page 1 of this Contract (hereinafter the “Department”) is a “covered entity” as that term is defined in 45 C.F.R. § 160.103; and
- (d) The Contractor, on behalf of the Department, performs functions that involve the use or disclosure of “individually identifiable health information,” as that term is defined in 45 C.F.R. § 160.103; and
- (e) The Contractor is a “business associate” of the Department, as that term is defined in 45 C.F.R. § 160.103; and
- (f) The Contractor and the Department agree to the following in order to secure compliance with the HIPAA, the requirements of Subtitle D of the Health Information Technology for Economic and Clinical Health Act (hereinafter the HITECH Act), (Pub. L. 111-5, sections 13400 to 13423), and more specifically with the Privacy and Security Rules at 45 C.F.R. Part 160 and Part 164, subparts A, C, and E.
- (g) Definitions
  - (1) “Breach shall have the same meaning as the term is defined in section 13400 of the HITECH Act (42 U.S.C. §17921(1))
  - (2) “Business Associate” shall mean the Contractor.
  - (3) “Covered Entity” shall mean the Department of the State of Connecticut named on page 1 of this Contract.
  - (4) “Designated Record Set” shall have the same meaning as the term “designated record set” in 45 C.F.R. § 164.501.
  - (5) “Electronic Health Record” shall have the same meaning as the term is defined in section 13400 of the HITECH Act (42 U.S.C. §17921(5))

- (6) "Individual" shall have the same meaning as the term "individual" in 45 C.F.R. § 160.103 and shall include a person who qualifies as a personal representative as defined in 45 C.F.R. § 164.502(g).
  - (7) "Privacy Rule" shall mean the Standards for Privacy of Individually Identifiable Health Information at 45 C.F.R. part 160 and parts 164, subparts A and E.
  - (8) "Protected Health Information" or "PHI" shall have the same meaning as the term "protected health information" in 45 C.F.R. § 160.103, limited to information created or received by the Business Associate from or on behalf of the Covered Entity.
  - (9) "Required by Law" shall have the same meaning as the term "required by law" in 45 C.F.R. § 164.103.
  - (10) "Secretary" shall mean the Secretary of the Department of Health and Human Services or his designee.
  - (11) "More stringent" shall have the same meaning as the term "more stringent" in 45 C.F.R. § 160.202.
  - (12) "This Section of the Contract" refers to the HIPAA Provisions stated herein, in their entirety.
  - (13) "Security Incident" shall have the same meaning as the term "security incident" in 45 C.F.R. § 164.304.
  - (14) "Security Rule" shall mean the Security Standards for the Protection of Electronic Protected Health Information at 45 C.F.R. part 160 and parts 164, subpart A and C.
  - (15) "Unsecured protected health information" shall have the same meaning as the term as defined in section 13402(h)(1)(A) of HITECH. Act. (42 U.S.C. §17932(h)(1)(A)).
- (h) Obligations and Activities of Business Associates.
- (1) Business Associate agrees not to use or disclose PHI other than as permitted or required by this Section of the Contract or as Required by Law.
  - (2) Business Associate agrees to use appropriate safeguards to prevent use or disclosure of PHI other than as provided for in this Section of the Contract.
  - (3) Business Associate agrees to use administrative, physical and technical safeguards that reasonably and appropriately protect the confidentiality, integrity, and availability of electronic protected health information that it creates, receives, maintains, or transmits on behalf of the Covered Entity.
  - (4) Business Associate agrees to mitigate, to the extent practicable, any harmful effect that is known to the Business Associate of a use or disclosure of PHI by Business Associate in violation of this Section of the Contract.

- (5) Business Associate agrees to report to Covered Entity any use or disclosure of PHI not provided for by this Section of the Contract or any security incident of which it becomes aware.
- (6) Business Associate agrees to insure that any agent, including a subcontractor, to whom it provides PHI received from, or created or received by Business Associate, on behalf of the Covered Entity, agrees to the same restrictions and conditions that apply through this Section of the Contract to Business Associate with respect to such information.
- (7) Business Associate agrees to provide access, at the request of the Covered Entity, and in the time and manner agreed to by the parties, to PHI in a Designated Record Set, to Covered Entity or, as directed by Covered Entity, to an Individual in order to meet the requirements under 45 C.F.R. § 164.524.
- (8) Business Associate agrees to make any amendments to PHI in a Designated Record Set that the Covered Entity directs or agrees to pursuant to 45 C.F.R. § 164.526 at the request of the Covered Entity, and in the time and manner agreed to by the parties.
- (9) Business Associate agrees to make internal practices, books, and records, including policies and procedures and PHI, relating to the use and disclosure of PHI received from, or created or received by, Business Associate on behalf of Covered Entity, available to Covered Entity or to the Secretary in a time and manner agreed to by the parties or designated by the Secretary, for purposes of the Secretary determining Covered Entity's compliance with the Privacy Rule.
- (10) Business Associate agrees to document such disclosures of PHI and information related to such disclosures as would be required for Covered Entity to respond to a request by an Individual for an accounting of disclosures of PHI in accordance with 45 C.F.R. § 164.528 and section 13405 of the HITECH Act (42 U.S.C. § 17935) and any regulations promulgated thereunder.
- (11) Business Associate agrees to provide to Covered Entity, in a time and manner agreed to by the parties, information collected in accordance with clause h. (10) of this Section of the Contract, to permit Covered Entity to respond to a request by an Individual for an accounting of disclosures of PHI in accordance with 45 C.F.R. § 164.528 and section 13405 of the HITECH Act (42 U.S.C. § 17935) and any regulations promulgated thereunder. Business Associate agrees at the Covered Entity's direction to provide an accounting of disclosures of PHI directly to an individual in accordance with 45 C.F.R. § 164.528 and section 13405 of the HITECH Act (42 U.S.C. § 17935) and any regulations promulgated thereunder.
- (12) Business Associate agrees to comply with any state or federal law that is more stringent than the Privacy Rule.
- (13) Business Associate agrees to comply with the requirements of the HITECH Act relating to privacy and security that are applicable to the Covered Entity and with the requirements of 45 C.F.R. sections 164.504(e), 164.308, 164.310, 164.312, and 164.316.

- (14) In the event that an individual requests that the Business Associate (a) restrict disclosures of PHI; (b) provide an accounting of disclosures of the individual's PHI; or (c) provide a copy of the individual's PHI in an electronic health record, the Business Associate agrees to notify the covered entity, in writing, within two business days of the request.
- (15) Business Associate agrees that it shall not, directly or indirectly, receive any remuneration in exchange for PHI of an individual without (1) the written approval of the covered entity, unless receipt of remuneration in exchange for PHI is expressly authorized by this Contract and (2) the valid authorization of the individual, except for the purposes provided under section 13405(d)(2) of the HITECH Act,(42 U.S.C. § 17935(d)(2)) and in any accompanying regulations
- (16) Obligations in the Event of a Breach
- A. The Business Associate agrees that, following the discovery of a breach of unsecured protected health information, it shall notify the Covered Entity of such breach in accordance with the requirements of section 13402 of HITECH (42 U.S.C. 17932(b) and the provisions of this Section of the Contract.
- B. Such notification shall be provided by the Business Associate to the Covered Entity without unreasonable delay, and in no case later than 30 days after the breach is discovered by the Business Associate, except as otherwise instructed in writing by a law enforcement official pursuant to section 13402 (g) of HITECH (42 U.S.C. 17932(g)) . A breach is considered discovered as of the first day on which it is, or reasonably should have been, known to the Business Associate. The notification shall include the identification and last known address, phone number and email address of each individual (or the next of kin of the individual if the individual is deceased) whose unsecured protected health information has been, or is reasonably believed by the Business Associate to have been, accessed, acquired, or disclosed during such breach.
- C. The Business Associate agrees to include in the notification to the Covered Entity at least the following information:
1. A brief description of what happened, including the date of the breach and the date of the discovery of the breach, if known.
  2. A description of the types of unsecured protected health information that were involved in the breach (such as full name, Social Security number, date of birth, home address, account number, or disability code).
  3. The steps the Business Associate recommends that individuals take to protect themselves from potential harm resulting from the breach.
  4. A detailed description of what the Business Associate is doing to investigate the breach, to mitigate losses, and to protect against any further breaches.
  5. Whether a law enforcement official has advised either verbally or in writing the Business Associate that he or she has determined that notification or notice to

individuals or the posting required under section 13402 of the HITECH Act would impede a criminal investigation or cause damage to national security and; if so, include contact information for said official.

- D. Business Associate agrees to provide appropriate staffing and have established procedures to ensure that individuals informed by the Covered Entity of a breach by the Business Associate have the opportunity to ask questions and contact the Business Associate for additional information regarding the breach. Such procedures shall include a toll-free telephone number, an e-mail address, a posting on its Web site and a postal address. Business Associate agrees to include in the notification of a breach by the Business Associate to the Covered Entity, a written description of the procedures that have been established to meet these requirements. Costs of such contact procedures will be borne by the Contractor.
  - E. Business Associate agrees that, in the event of a breach, it has the burden to demonstrate that it has complied with all notifications requirements set forth above, including evidence demonstrating the necessity of a delay in notification to the Covered Entity.
- (i) Permitted Uses and Disclosure by Business Associate.
- (1) General Use and Disclosure Provisions Except as otherwise limited in this Section of the Contract, Business Associate may use or disclose PHI to perform functions, activities, or services for, or on behalf of, Covered Entity as specified in this Contract, provided that such use or disclosure would not violate the Privacy Rule if done by Covered Entity or the minimum necessary policies and procedures of the Covered Entity.
  - (2) Specific Use and Disclosure Provisions
    - (A) Except as otherwise limited in this Section of the Contract, Business Associate may use PHI for the proper management and administration of Business Associate or to carry out the legal responsibilities of Business Associate.
    - (B) Except as otherwise limited in this Section of the Contract, Business Associate may disclose PHI for the proper management and administration of Business Associate, provided that disclosures are Required by Law, or Business Associate obtains reasonable assurances from the person to whom the information is disclosed that it will remain confidential and used or further disclosed only as Required by Law or for the purpose for which it was disclosed to the person, and the person notifies Business Associate of any instances of which it is aware in which the confidentiality of the information has been breached.
    - (C) Except as otherwise limited in this Section of the Contract, Business Associate may use PHI to provide Data Aggregation services to Covered Entity as permitted by 45 C.F.R. § 164.504(e)(2)(i)(B).
- (j) Obligations of Covered Entity.

- (1) Covered Entity shall notify Business Associate of any limitations in its notice of privacy practices of Covered Entity, in accordance with 45 C.F.R. § 164.520, or to the extent that such limitation may affect Business Associate's use or disclosure of PHI.
  - (2) Covered Entity shall notify Business Associate of any changes in, or revocation of, permission by Individual to use or disclose PHI, to the extent that such changes may affect Business Associate's use or disclosure of PHI.
  - (3) Covered Entity shall notify Business Associate of any restriction to the use or disclosure of PHI that Covered Entity has agreed to in accordance with 45 C.F.R. § 164.522, to the extent that such restriction may affect Business Associate's use or disclosure of PHI.
- (k) Permissible Requests by Covered Entity. Covered Entity shall not request Business Associate to use or disclose PHI in any manner that would not be permissible under the Privacy Rule if done by the Covered Entity, except that Business Associate may use and disclose PHI for data aggregation, and management and administrative activities of Business Associate, as permitted under this Section of the Contract.
- (l) Term and Termination.
- (1) Term. The Term of this Section of the Contract shall be effective as of the date the Contract is effective and shall terminate when the information collected in accordance with clause h. (10) of this Section of the Contract is provided to the Covered Entity and all of the PHI provided by Covered Entity to Business Associate, or created or received by Business Associate on behalf of Covered Entity, is destroyed or returned to Covered Entity, or, if it is infeasible to return or destroy PHI, protections are extended to such information, in accordance with the termination provisions in this Section.
  - (2) Termination for Cause Upon Covered Entity's knowledge of a material breach by Business Associate, Covered Entity shall either:
    - (A) Provide an opportunity for Business Associate to cure the breach or end the violation and terminate the Contract if Business Associate does not cure the breach or end the violation within the time specified by the Covered Entity; or
    - (B) Immediately terminate the Contract if Business Associate has breached a material term of this Section of the Contract and cure is not possible; or
    - (C) If neither termination nor cure is feasible, Covered Entity shall report the violation to the Secretary.
  - (3) Effect of Termination
    - (A) Except as provided in (l)(2) of this Section of the Contract, upon termination of this Contract, for any reason, Business Associate shall return or destroy all PHI received from Covered Entity, or created or received by Business Associate on behalf of Covered Entity. Business Associate shall also provide the information collected in accordance with clause h. (10) of this Section of the Contract to the Covered Entity



within ten business days of the notice of termination. This provision shall apply to PHI that is in the possession of subcontractors or agents of Business Associate. Business Associate shall retain no copies of the PHI.

(B) In the event that Business Associate determines that returning or destroying the PHI is infeasible, Business Associate shall provide to Covered Entity notification of the conditions that make return or destruction infeasible. Upon documentation by Business Associate that return or destruction of PHI is infeasible, Business Associate shall extend the protections of this Section of the Contract to such PHI and limit further uses and disclosures of PHI to those purposes that make return or destruction infeasible, for as long as Business Associate maintains such PHI. Infeasibility of the return or destruction of PHI includes, but is not limited to, requirements under state or federal law that the Business Associate maintains or preserves the PHI or copies thereof.

(m) Miscellaneous Provisions.

- (1) Regulatory References. A reference in this Section of the Contract to a section in the Privacy Rule means the section as in effect or as amended.
- (2) Amendment. The Parties agree to take such action as is necessary to amend this Section of the Contract from time to time as is necessary for Covered Entity to comply with requirements of the Privacy Rule and the Health Insurance Portability and Accountability Act of 1996, Pub. L. No. 104-191.
- (3) Survival. The respective rights and obligations of Business Associate shall survive the termination of this Contract.
- (4) Effect on Contract. Except as specifically required to implement the purposes of this Section of the Contract, all other terms of the Contract shall remain in force and effect.
- (5) Construction. This Section of the Contract shall be construed as broadly as necessary to implement and comply with the Privacy Standard. Any ambiguity in this Section of the Contract shall be resolved in favor of a meaning that complies, and is consistent with, the Privacy Standard.
- (6) Disclaimer. Covered Entity makes no warranty or representation that compliance with this Section of the Contract will be adequate or satisfactory for Business Associate's own purposes. Covered Entity shall not be liable to Business Associate for any claim, civil or criminal penalty, loss or damage related to or arising from the unauthorized use or disclosure of PHI by Business Associate or any of its officers, directors, employees, contractors or agents, or any third party to whom Business Associate has disclosed PHI contrary to the provisions of this Contract or applicable law. Business Associate is solely responsible for all decisions made, and actions taken, by Business Associate regarding the safeguarding, use and disclosure of PHI within its possession, custody or control.

(7) Indemnification. The Business Associate shall indemnify and hold the Covered Entity harmless from and against any and all claims, liabilities, judgments, fines, assessments, penalties, awards and any statutory damages that may be imposed or assessed pursuant to HIPAA, as amended or the

HITECH Act, including, without limitation, attorney's fees, expert witness fees, costs of investigation, litigation or dispute resolution, and costs awarded thereunder, relating to or arising out of any violation by the Business Associate and its agents, including subcontractors, of any obligation of Business Associate and its agents, including subcontractors, under this section of the contract, under HIPAA, the HITECH Act, the Privacy Rule and the Security Rule.

## Notice to Executive Branch State Contractors and Prospective State Contractors of Campaign Contribution and Solicitation Limitations

This notice is provided under the authority of Connecticut General Statutes §9-612(g)(2), as amended by P.A. 10-1, and is for the purpose of informing state contractors and prospective state contractors of the following law (*italicized words are defined on the reverse side of this page*).

### CAMPAIGN CONTRIBUTION AND SOLICITATION LIMITATIONS

No *state contractor, prospective state contractor, principal of a state contractor or principal of a prospective state contractor*, with regard to a *state contract or state contract solicitation* with or from a state agency in the executive branch or a quasi-public agency or a holder, or principal of a holder of a valid prequalification certificate, shall make a contribution to (i) an exploratory committee or candidate committee established by a candidate for nomination or election to the office of Governor, Lieutenant Governor, Attorney General, State Comptroller, Secretary of the State or State Treasurer, (ii) a political committee authorized to make contributions or expenditures to or for the benefit of such candidates, or (iii) a party committee (which includes town committees).

In addition, no holder or principal of a holder of a valid prequalification certificate, shall make a contribution to (i) an exploratory committee or candidate committee established by a candidate for nomination or election to the office of State senator or State representative, (ii) a political committee authorized to make contributions or expenditures to or for the benefit of such candidates, or (iii) a party committee.

On and after January 1, 2011, no state contractor, prospective state contractor, principal of a state contractor or principal of a prospective state contractor, with regard to a state contract or state contract solicitation with or from a state agency in the executive branch or a quasi-public agency or a holder, or principal of a holder of a valid prequalification certificate, shall **knowingly solicit** contributions from the state contractor's or prospective state contractor's employees or from a *subcontractor or principals of the subcontractor* on behalf of (i) an exploratory committee or candidate committee established by a candidate for nomination or election to the office of Governor, Lieutenant Governor, Attorney General, State Comptroller, Secretary of the State or State Treasurer, (ii) a political committee authorized to make contributions or expenditures to or for the benefit of such candidates, or (iii) a party committee.

### DUTY TO INFORM

State contractors and prospective state contractors are required to inform their principals of the above prohibitions, as applicable, and the possible penalties and other consequences of any violation thereof.

### PENALTIES FOR VIOLATIONS

Contributions or solicitations of contributions made in violation of the above prohibitions may result in the following civil and criminal penalties:

**Civil penalties**—Up to \$2,000 or twice the amount of the prohibited contribution, whichever is greater, against a principal or a contractor. Any state contractor or prospective state contractor which fails to make reasonable efforts to comply with the provisions requiring notice to its principals of these prohibitions and the possible consequences of their violations may also be subject to civil penalties of up to \$2,000 or twice the amount of the prohibited contributions made by their principals.

**Criminal penalties**—Any knowing and willful violation of the prohibition is a Class D felony, which may subject the violator to imprisonment of not more than 5 years, or not more than \$5,000 in fines, or both.

### CONTRACT CONSEQUENCES

In the case of a state contractor, contributions made or solicited in violation of the above prohibitions may result in the contract being voided.

In the case of a prospective state contractor, contributions made or solicited in violation of the above prohibitions shall result in the contract described in the state contract solicitation not being awarded to the prospective state contractor, unless the State Elections Enforcement Commission determines that mitigating circumstances exist concerning such violation.

The State shall not award any other state contract to anyone found in violation of the above prohibitions for a period of one year after the election for which such contribution is made or solicited, unless the State Elections Enforcement Commission determines that mitigating circumstances exist concerning such violation.

Additional information may be found on the website of the State Elections Enforcement Commission, [www.ct.gov/seec](http://www.ct.gov/seec). Click on the link to "Lobbyist/Contractor Limitations."

## DEFINITIONS

“State contractor” means a person, business entity or nonprofit organization that enters into a state contract. Such person, business entity or nonprofit organization shall be deemed to be a state contractor until December thirty-first of the year in which such contract terminates. “State contractor” does not include a municipality or any other political subdivision of the state, including any entities or associations duly created by the municipality or political subdivision exclusively amongst themselves to further any purpose authorized by statute or charter, or an employee in the executive or legislative branch of state government or a quasi-public agency, whether in the classified or unclassified service and full or part-time, and only in such person’s capacity as a state or quasi-public agency employee.

“Prospective state contractor” means a person, business entity or nonprofit organization that (i) submits a response to a state contract solicitation by the state, a state agency or a quasi-public agency, or a proposal in response to a request for proposals by the state, a state agency or a quasi-public agency, until the contract has been entered into, or (ii) holds a valid prequalification certificate issued by the Commissioner of Administrative Services under section 4a-100. “Prospective state contractor” does not include a municipality or any other political subdivision of the state, including any entities or associations duly created by the municipality or political subdivision exclusively amongst themselves to further any purpose authorized by statute or charter, or an employee in the executive or legislative branch of state government or a quasi-public agency, whether in the classified or unclassified service and full or part-time, and only in such person’s capacity as a state or quasi-public agency employee.

“Principal of a state contractor or prospective state contractor” means (i) any individual who is a member of the board of directors of, or has an ownership interest of five per cent or more in, a state contractor or prospective state contractor, which is a business entity, except for an individual who is a member of the board of directors of a nonprofit organization, (ii) an individual who is employed by a state contractor or prospective state contractor, which is a business entity, as president, treasurer or executive vice president, (iii) an individual who is the chief executive officer of a state contractor or prospective state contractor, which is not a business entity, or if a state contractor or prospective state contractor has no such officer, then the officer who duly possesses comparable powers and duties, (iv) an officer or an employee of any state contractor or prospective state contractor who has *managerial or discretionary responsibilities with respect to a state contract*, (v) the spouse or a *dependent child* who is eighteen years of age or older of an individual described in this subparagraph, or (vi) a political committee established or controlled by an individual described in this subparagraph or the business entity or nonprofit organization that is the state contractor or prospective state contractor.

“State contract” means an agreement or contract with the state or any state agency or any quasi-public agency, let through a procurement process or otherwise, having a value of fifty thousand dollars or more, or a combination or series of such agreements or contracts having a value of one hundred thousand dollars or more in a calendar year, for (i) the rendition of services, (ii) the furnishing of any goods, material, supplies, equipment or any items of any kind, (iii) the construction, alteration or repair of any public building or public work, (iv) the acquisition, sale or lease of any land or building, (v) a licensing arrangement, or (vi) a grant, loan or loan guarantee. “State contract” does not include any agreement or contract with the state, any state agency or any quasi-public agency that is exclusively federally funded, an education loan, a loan to an individual for other than commercial purposes or any agreement or contract between the state or any state agency and the United States Department of the Navy or the United States Department of Defense.

“State contract solicitation” means a request by a state agency or quasi-public agency, in whatever form issued, including, but not limited to, an invitation to bid, request for proposals, request for information or request for quotes, inviting bids, quotes or other types of submittals, through a competitive procurement process or another process authorized by law waiving competitive procurement.

“Managerial or discretionary responsibilities with respect to a state contract” means having direct, extensive and substantive responsibilities with respect to the negotiation of the state contract and not peripheral, clerical or ministerial responsibilities.

“Dependent child” means a child residing in an individual’s household who may legally be claimed as a dependent on the federal income tax of such individual.

“Solicit” means (A) requesting that a contribution be made, (B) participating in any fund-raising activities for a candidate committee, exploratory committee, political committee or party committee, including, but not limited to, forwarding tickets to potential contributors, receiving contributions for transmission to any such committee or bundling contributions, (C) serving as chairperson, treasurer or deputy treasurer of any such committee, or (D) establishing a political committee for the sole purpose of soliciting or receiving contributions for any committee. Solicit does not include: (i) making a contribution that is otherwise permitted by Chapter 155 of the Connecticut General Statutes; (ii) informing any person of a position taken by a candidate for public office or a public official, (iii) notifying the person of any activities of, or contact information for, any candidate for public office; or (iv) serving as a member in any party committee or as an officer of such committee that is not otherwise prohibited in this section.

“Subcontractor” means any person, business entity or nonprofit organization that contracts to perform part or all of the obligations of a state contractor’s state contract. Such person, business entity or nonprofit organization shall be deemed to be a subcontractor until December thirty first of the year in which the subcontract terminates. “Subcontractor” does not include (i) a municipality or any other political subdivision of the state, including any entities or associations duly created by the municipality or political subdivision exclusively amongst themselves to further any purpose authorized by statute or charter, or (ii) an employee in the executive or legislative branch of state government or a quasi-public agency, whether in the classified or unclassified service and full or part-time, and only in such person’s capacity as a state or quasi-public agency employee.

“Principal of a subcontractor” means (i) any individual who is a member of the board of directors of, or has an ownership interest of five per cent or more in, a subcontractor, which is a business entity, except for an individual who is a member of the board of directors of a nonprofit organization, (ii) an individual who is employed by a subcontractor, which is a business entity, as president, treasurer or executive vice president, (iii) an individual who is the chief executive officer of a subcontractor, which is not a business entity, or if a subcontractor has no such officer, then the officer who duly possesses comparable powers and duties, (iv) an officer or an employee of any subcontractor who has managerial or discretionary responsibilities with respect to a subcontract with a state contractor, (v) the spouse or a dependent child who is eighteen years of age or older of an individual described in this subparagraph, or (vi) a political committee established or controlled by an individual described in this subparagraph or the business entity or nonprofit organization that is the subcontractor.

**EXHIBIT F**

(federal wage rate package will be inserted here for final executed contract only. Refer to NTC – Federal Wage Determinations )

**EXHIBIT G**

(state wages will be inserted here)

Project: Rehabilitation Of Bridge Number 00196 I95/US Route 1

**Minimum Rates and Classifications  
for Heavy/Highway Construction**

ID#: H 25241

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

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

Project Number:

Project Town: Branford

FAP Number: 0952(118)

State Number: 14-185

Project: Rehabilitation Of Bridge Number 00196 I95/US Route 1

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**CLASSIFICATION**

**Hourly Rate**

**Benefits**

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01) Asbestos/Toxic Waste Removal Laborers: Asbestos removal and encapsulation (except its removal from mechanical systems which are not to be scrapped), toxic waste removers, blasters. **\*\*See Laborers Group 5 and 7\*\***

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1) Boilermaker	33.79	34% + 8.96
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1a) Bricklayer, Cement Masons, Cement Finishers, Plasterers, Stone Masons	33.48	31.66
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2) Carpenters, Piledrivermen	32.60	25.34
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**As of:** Wednesday, September 12, 2018

Project: Rehabilitation Of Bridge Number 00196 I95/US Route 1

2a) Diver Tenders	32.60	25.34
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3) Divers	41.06	25.34
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03a) Millwrights	33.14	25.74
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4) Painters: (Bridge Construction) Brush, Roller, Blasting (Sand, Water, etc.), Spray	49.75	21.05
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4a) Painters: Brush and Roller	33.62	21.05
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4b) Painters: Spray Only	36.62	21.05
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4c) Painters: Steel Only	35.62	21.05
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Project: Rehabilitation Of Bridge Number 00196 I95/US Route 1

4d) Painters: Blast and Spray	36.62	21.05
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4e) Painters: Tanks, Tower and Swing	35.62	21.05
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5) Electrician (Trade License required: E-1,2 L-5,6 C-5,6 T-1,2 L-1,2 V-1,2,7,8,9)	37.50	27.91+3% of gross wage
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6) Ironworkers: Ornamental, Reinforcing, Structural, and Precast Concrete Erection	35.47	35.14 + a
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7) Plumbers (Trade License required: (P-1,2,6,7,8,9 J-1,2,3,4 SP-1,2) and Pipefitters (Including HVAC Work) (Trade License required: S-1,2,3,4,5,6,7,8 B-1,2,3,4 D-1,2,3,4 G-1, G-2, G-8, G-9)	42.62	31.21
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---LABORERS----

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8) Group 1: Laborer (Unskilled), Common or General, acetylene burner, concrete specialist	30.05	20.10
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Project: Rehabilitation Of Bridge Number 00196 I95/US Route 1

9) Group 2: Chain saw operators, fence and guard rail erectors, pneumatic tool operators, powdermen	30.30	20.10
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10) Group 3: Pipelayers	30.55	20.10
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11) Group 4: Jackhammer/Pavement breaker (handheld); mason tenders (cement/concrete), catch basin builders, asphalt rakers, air track operators, block paver, curb setter and forklift operators	30.55	20.10
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12) Group 5: Toxic waste removal (non-mechanical systems)	32.05	20.10
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13) Group 6: Blasters	31.80	20.10
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Group 7: Asbestos/lead removal, non-mechanical systems (does not include leaded joint pipe)	31.05	20.10
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Group 8: Traffic control signalmen	16.00	20.10
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Project: Rehabilitation Of Bridge Number 00196 I95/US Route 1

Group 9: Hydraulic Drills	29.30	18.90
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---LABORERS (TUNNEL CONSTRUCTION, FREE AIR). Shield Drive and  
Liner Plate Tunnels in Free Air.----

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13a) Miners, Motormen, Mucking Machine Operators, Nozzle Men, Grout Men, Shaft & Tunnel Steel & Rodmen, Shield & Erector, Arm Operator, Cable Tenders	32.22	20.10 + a
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13b) Brakemen, Trackmen	31.28	20.10 + a
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---CLEANING, CONCRETE AND CAULKING TUNNEL----

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14) Concrete Workers, Form Movers, and Strippers	31.28	20.10 + a
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15) Form Erectors	31.60	20.10 + a
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Project: Rehabilitation Of Bridge Number 00196 I95/US Route 1

---ROCK SHAFT LINING, CONCRETE, LINING OF SAME AND TUNNEL  
IN FREE AIR:----

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16) Brakemen, Trackmen, Tunnel Laborers, Shaft Laborers	31.28	20.10 + a
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17) Laborers Topside, Cage Tenders, Bellman	31.17	20.10 + a
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18) Miners	32.22	20.10 + a
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---TUNNELS, CAISSON AND CYLINDER WORK IN COMPRESSED  
AIR: ----

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18a) Blaster	38.53	20.10 + a
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19) Brakemen, Trackmen, Groutman, Laborers, Outside Lock Tender, Gauge Tenders	38.34	20.10 + a
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*As of:* Wednesday, September 12, 2018

Project: Rehabilitation Of Bridge Number 00196 I95/US Route 1

20) Change House Attendants, Powder Watchmen, Top on Iron Bolts	36.41	20.10 + a
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21) Mucking Machine Operator	39.11	20.10 + a
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---TRUCK DRIVERS---(\*see note below)

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Two axle trucks	29.13	23.33 + a
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Three axle trucks; two axle ready mix	29.23	23.33 + a
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Three axle ready mix	29.28	23.33 + a
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Four axle trucks, heavy duty trailer (up to 40 tons)	29.33	23.33 + a
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Project: Rehabilitation Of Bridge Number 00196 I95/US Route 1

Four axle ready-mix	29.38	23.33 + a
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Heavy duty trailer (40 tons and over)	29.58	23.33 + a
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Specialized earth moving equipment other than conventional type on-the road trucks and semi-trailer (including Euclids)	29.38	23.33 + a
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---POWER EQUIPMENT OPERATORS---		
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Group 1: Crane handling or erecting structural steel or stone, hoisting engineer (2 drums or over), front end loader (7 cubic yards or over), Work Boat 26 ft. & Over, Tunnel Boring Machines. (Trade License Required)	39.55	24.05 + a
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Group 2: Cranes (100 ton rate capacity and over); Excavator over 2 cubic yards; Piledriver (\$3.00 premium when operator controls hammer); Bauer Drill/Caisson. (Trade License Required)	39.23	24.05 + a
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Group 3: Excavator/Backhoe under 2 cubic yards; Cranes (under 100 ton rated capacity), Gradall; Master Mechanic; Hoisting Engineer (all types of equipment where a drum and cable are used to hoist or drag material regardless of motive power of operation), Rubber Tire Excavator (Drott-1085 or similar); Grader Operator; Bulldozer Fine Grade (slopes, shaping, laser or GPS, etc.). (Trade License Required)	38.49	24.05 + a
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Project: Rehabilitation Of Bridge Number 00196 I95/US Route 1

Group 4: Trenching Machines; Lighter Derrick; Concrete Finishing Machine; CMI Machine or Similar; Koehring Loader (Skooper)	38.10	24.05 + a
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Group 5: Specialty Railroad Equipment; Asphalt Paver; Asphalt Spreader; Asphalt Reclaiming Machine; Line Grinder; Concrete Pumps; Drills with Self Contained Power Units; Boring Machine; Post Hole Digger; Auger; Pounder; Well Digger; Milling Machine (over 24" Mandrell)	37.51	24.05 + a
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Group 5 continued: Side Boom; Combination Hoe and Loader; Directional Driller.	37.51	24.05 + a
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Group 6: Front End Loader (3 up to 7 cubic yards); Bulldozer (rough grade dozer).	37.20	24.05 + a
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Group 7: Asphalt Roller; Concrete Saws and Cutters (ride on types); Vermeer Concrete Cutter; Stump Grinder; Scraper; Snooper; Skidder; Milling Machine (24" and Under Mandrel).	36.86	24.05 + a
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Group 8: Mechanic, Grease Truck Operator, Hydroblaster, Barrier Mover, Power Stone Spreader; Welder; Work Boat under 26 ft.; Transfer Machine.	36.46	24.05 + a
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Group 9: Front End Loader (under 3 cubic yards), Skid Steer Loader regardless of attachments (Bobcat or Similar); Fork Lift, Power Chipper; Landscape Equipment (including hydroseeder).	36.03	24.05 + a
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Project: Rehabilitation Of Bridge Number 00196 I95/US Route 1

Group 10: Vibratory Hammer, Ice Machine, Diesel and Air Hammer, etc. 33.99 24.05 + a

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Group 11: Conveyor, Earth Roller; Power Pavement Breaker (whiphammer), Robot Demolition Equipment. 33.99 24.05 + a

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Group 12: Wellpoint Operator. 33.93 24.05 + a

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Group 13: Compressor Battery Operator. 33.35 24.05 + a

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Group 14: Elevator Operator; Tow Motor Operator (Solid Tire No Rough Terrain). 32.21 24.05 + a

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Group 15: Generator Operator; Compressor Operator; Pump Operator; Welding Machine Operator; Heater Operator. 31.80 24.05 + a

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Group 16: Maintenance Engineer/Oiler 31.15 24.05 + a

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Project: Rehabilitation Of Bridge Number 00196 I95/US Route 1

Group 17: Portable asphalt plant operator; portable crusher plant operator; portable concrete plant operator.	35.46	24.05 + a
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Group 18: Power Safety Boat; Vacuum Truck; Zim Mixer; Sweeper; (minimum for any job requiring CDL license).	33.04	24.05 + a
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\*\*NOTE: SEE BELOW

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

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20) Lineman, Cable Splicer, Technician	48.19	6.5% + 22.00
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21) Heavy Equipment Operator	42.26	6.5% + 19.88
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22) Equipment Operator, Tractor Trailer Driver, Material Men	40.96	6.5% + 19.21
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Project: Rehabilitation Of Bridge Number 00196 I95/US Route 1

23) Driver Groundmen	26.50	6.5% + 9.00
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23a) Truck Driver	40.96	6.5% + 17.76
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---LINE CONSTRUCTION---

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24) Driver Groundmen	30.92	6.5% + 9.70
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25) Groundmen	22.67	6.5% + 6.20
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26) Heavy Equipment Operators	37.10	6.5% + 10.70
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27) Linemen, Cable Splicers, Dynamite Men	41.22	6.5% + 12.20
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Project: Rehabilitation Of Bridge Number 00196 I95/US Route 1

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

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Project: Rehabilitation Of Bridge Number 00196 I95/US Route 1

*Welders: Rate for craft to which welding is incidental.*

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

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

***ALL Cranes: When crane operator is operating equipment that requires a fully licensed crane operator to operate he receives an extra \$4.00 premium in addition to the hourly wage rate and benefit contributions:***

***1) Crane handling or erecting structural steel or stone; hoisting engineer (2 drums or over)***

***2) Cranes (100 ton rate capacity and over) Bauer Drill/Caisson***

***3) Cranes (under 100 ton rated capacity)***

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

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

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

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

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

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

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

*~~Connecticut General Statute Section 31-55a: Annual Adjustments to wage rates by contractors doing state work ~~*

*The Prevailing wage rates applicable to this project are subject to annual adjustments each July 1st for the duration of the project.*

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

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

*The annual adjustments will be posted on the Department of Labor's Web page: [www.ct.gov/dol](http://www.ct.gov/dol).*

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

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

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

**As of:** Wednesday, September 12, 2018

Project: Rehabilitation Of Bridge Number 00196 I95/US Route 1

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

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

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

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

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

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

*As of:* Wednesday, September 12, 2018

Connecticut Department of Labor  
Wage and Workplace Standards Division  
FOOTNOTES

Please Note: If the “Benefits” listed on the schedule for the following occupations includes a letter(s) (+ a or + a+b for instance), refer to the information below.

Benefits to be paid at the appropriate prevailing wage rate for the listed occupation.

If the “Benefits” section for the occupation lists only a dollar amount, disregard the information below.

**Bricklayers, Cement Masons, Cement Finishers, Concrete Finishers, Stone Masons**  
(Building Construction) and  
(Residential- Hartford, Middlesex, New Haven, New London and Tolland Counties)

- a. Paid Holiday: Employees shall receive 4 hours for Christmas Eve holiday provided the employee works the regularly scheduled day before and after the holiday. Employers may schedule work on Christmas Eve and employees shall receive pay for actual hours worked in addition to holiday pay.

**Elevator Constructors: Mechanics**

- a. Paid Holidays: New Year’s Day, Memorial Day, Independence Day, Labor Day, Veterans’ Day, Thanksgiving Day, Christmas Day, plus the Friday after Thanksgiving.
- b. Vacation: Employer contributes 8% of basic hourly rate for 5 years or more of service or 6% of basic hourly rate for 6 months to 5 years of service as vacation pay credit.

**Glaziers**

- a. Paid Holidays: Labor Day and Christmas Day.

**Power Equipment Operators**  
(Heavy and Highway Construction & Building Construction)

- a. Paid Holidays: New Year’s Day, Good Friday, Memorial day, Independence Day, Labor Day, Thanksgiving Day and Christmas Day, provided the employee works 3 days during the week in which the holiday falls, if scheduled, and if scheduled, the working day before and the working day after the holiday. Holidays falling on Saturday may be observed on Saturday, or if the employer so elects, on the preceding Friday.

### **Ironworkers**

- a. Paid Holiday: Labor Day provided employee has been on the payroll for the 5 consecutive work days prior to Labor Day.

### **Laborers (Tunnel Construction)**

- a. Paid Holidays: New Year's Day, Memorial Day, Independence Day, Labor Day, Thanksgiving Day and Christmas Day. No employee shall be eligible for holiday pay when he fails, without cause, to work the regular work day preceding the holiday or the regular work day following the holiday.

### **Roofers**

- a. Paid Holidays: July 4<sup>th</sup>, Labor Day, and Christmas Day provided the employee is employed 15 days prior to the holiday.

### **Sprinkler Fitters**

- a. Paid Holidays: Memorial Day, July 4th, Labor Day, Thanksgiving Day and Christmas Day, provided the employee has been in the employment of a contractor 20 working days prior to any such paid holiday.

### **Truck Drivers**

(Heavy and Highway Construction & Building Construction)

- a. Paid Holidays: New Year's Day, Memorial Day, Independence Day, Labor Day, Thanksgiving Day, Christmas day, and Good Friday, provided the employee has at least 31 calendar days of service and works the last scheduled day before and the first scheduled day after the holiday, unless excused.

## **Information Bulletin** ***Occupational Classifications***

The Connecticut Department of Labor has the responsibility to properly determine "job classification" on prevailing wage projects covered under C.G.S. Section 31-53(d).

***Note: This information is intended to provide a sample of some occupational classifications for guidance purposes only. It is not an all-inclusive list of each occupation's duties. This list is being provided only to highlight some areas where a contractor may be unclear regarding the proper classification. If unsure, the employer should seek guidelines for CTDOL.***

**Below are additional clarifications of specific job duties performed for certain classifications:**

- **ASBESTOS WORKERS**

Applies all insulating materials, protective coverings, coatings and finishes to all types of mechanical systems.

- **ASBESTOS INSULATOR**

Handle, install apply, fabricate, distribute, prepare, alter, repair, dismantle, heat and frost insulation, including penetration and fire stopping work on all penetration fire stop systems.

- **BOILERMAKERS**

Erects hydro plants, incomplete vessels, steel stacks, storage tanks for water, fuel, etc. Builds incomplete boilers, repairs heat exchanges and steam generators.

- **BRICKLAYERS, CEMENT MASONS, CEMENT FINISHERS, MARBLE MASONS, PLASTERERS, STONE MASONS, PLASTERERS. STONE MASONS, TERRAZZO WORKERS, TILE SETTERS**

Lays building materials such as brick, structural tile and concrete cinder, glass, gypsum, terra cotta block. Cuts, tools and sets marble, sets stone, finishes concrete, applies decorative steel, aluminum and plastic tile, applies cements, sand, pigment and marble chips to floors, stairways, etc.



- **CARPENTERS, MILLWRIGHTS. PILEDRIVERMEN. LATHERS. RESILEINT FLOOR LAYERS, DOCK BUILDERS, DIKERS, DIVER TENDERS**

Constructs, erects, installs and repairs structures and fixtures of wood, plywood and wallboard. Installs, assembles, dismantles, moves industrial machinery. Drives piling into ground to provide foundations for structures such as buildings and bridges, retaining walls for earth embankments, such as cofferdams. Fastens wooden, metal or rockboard lath to walls, ceilings and partitions of buildings, acoustical tile layer, concrete form builder. Applies firestopping materials on fire resistive joint systems only. Installation of curtain/window walls only where attached to wood or metal studs. Installation of insulated material of all types whether blown, nailed or attached in other ways to walls, ceilings and floors of buildings. Assembly and installation of modular furniture/furniture systems. Free-standing furniture is not covered. This includes free standing: student chairs, study top desks, book box desks, computer furniture, dictionary stand, atlas stand, wood shelving, two-position information access station, file cabinets, storage cabinets, tables, etc.

- **LABORER, CLEANING**

- The clean up of any construction debris and the general (heavy/light) cleaning, including sweeping, wash down, mopping, wiping of the construction facility and its furniture, washing, polishing, and dusting.

- **DELIVERY PERSONNEL**

- If delivery of supplies/building materials is to one common point and stockpiled there, prevailing wages are not required. If the delivery personnel are involved in the distribution of the material to multiple locations within the construction site then they would have to be paid prevailing wages for the type of work performed: laborer, equipment operator, electrician, ironworker, plumber, etc.

- An example of this would be where delivery of drywall is made to a building and the delivery personnel distribute the drywall from one "stockpile" location to further sub-locations on each floor. Distribution of material around a construction site is the job of a laborer or tradesman, and not a delivery personnel.

- **ELECTRICIANS**

Install, erect, maintenance, alteration or repair of any wire, cable, conduit, etc., which generates, transforms, transmits or uses electrical energy for light, heat, power or other purposes, including the Installation or maintenance of telecommunication, LAN wiring or computer equipment, and low voltage wiring. ***\*License required per Connecticut General Statutes: E-1,2 L-5,6 C-5,6 T-1,2 L-1,2 V-1,2,7,8,9.***

- **ELEVATOR CONSTRUCTORS**

Install, erect, maintenance and repair of all types of elevators, escalators, dumb waiters and moving walks. *\*License required by Connecticut General Statutes: R-1,2,5,6.*

- **FORK LIFT OPERATOR**

Laborers Group 4) Mason Tenders - operates forklift solely to assist a mason to a maximum height of nine (9) feet only.

Power Equipment Operator Group 9 - operates forklift to assist any trade, and to assist a mason to a height over nine (9) feet.

- **GLAZIERS**

Glazing wood and metal sash, doors, partitions, and 2 story aluminum storefronts. Installs glass windows, skylights, store fronts and display cases or surfaces such as building fronts, interior walls, ceilings and table tops and metal store fronts. Installation of aluminum window walls and curtain walls is the "joint" work of glaziers and ironworkers, which require equal composite workforce.

- **IRONWORKERS**

Erection, installation and placement of structural steel, precast concrete, miscellaneous iron, ornamental iron, metal curtain wall, rigging and reinforcing steel. Handling, sorting, and installation of reinforcing steel (rebar). Metal bridge rail (traffic), metal bridge handrail, and decorative security fence installation. Installation of aluminum window walls and curtain walls is the "joint" work of glaziers and ironworkers which require equal composite workforce.

- **INSULATOR**

- Installing fire stopping systems/materials for "Penetration Firestop Systems": transit to cables, electrical conduits, insulated pipes, sprinkler pipe penetrations, ductwork behind radiation, electrical cable trays, fire rated pipe penetrations, natural polypropylene, HVAC ducts, plumbing bare metal, telephone and communication wires, and boiler room ceilings.

- **LABORERS**

Acetylene burners, asphalt rakers, chain saw operators, concrete and power buggy operator, concrete saw operator, fence and guard rail erector (except metal bridge rail (traffic), decorative security fence (non-metal)).

installation.), hand operated concrete vibrator operator, mason tenders, pipelayers (installation of storm drainage or sewage lines on the street only), pneumatic drill operator, pneumatic gas and electric drill operator, powermen and wagon drill operator, air track operator, block paver, curb setters, blasters, concrete spreaders.

- **PAINTERS**

Maintenance, preparation, cleaning, blasting (water and sand, etc.), painting or application of any protective coatings of every description on all bridges and appurtenances of highways, roadways, and railroads. Painting, decorating, hardwood finishing, paper hanging, sign writing, scenic art work and drywall hhg for any and all types of building and residential work.

- **LEAD PAINT REMOVAL**

- Painter's Rate

1. Removal of lead paint from bridges.
2. Removal of lead paint as preparation of any surface to be repainted.
3. Where removal is on a Demolition project prior to reconstruction.

- Laborer's Rate

1. Removal of lead paint from any surface NOT to be repainted.
2. Where removal is on a *TOTAL* Demolition project only.

- **PLUMBERS AND PIPEFITTERS**

Installation, repair, replacement, alteration or maintenance of all plumbing, heating, cooling and piping. ***\*License required per Connecticut General Statutes: P-1,2,6,7,8,9 J-1,2,3,4 SP-1,2 S-1,2,3,4,5,6,7,8 B-1,2,3,4 D-1,2,3,4.***

- **POWER EQUIPMENT OPERATORS**

Operates several types of power construction equipment such as compressors, pumps, hoists, derricks, cranes, shovels, tractors, scrapers or motor graders, etc. Repairs and maintains equipment. ***\*License required, crane operators only, per Connecticut General Statutes.***

- **ROOFERS**

Covers roofs with composition shingles or sheets, wood shingles, slate or asphalt and gravel to waterproof roofs, including preparation of surface. (demolition or removal of any type of roofing and or clean-up of any and all areas where a roof is to be relaid.)

- **SHEETMETAL WORKERS**

Fabricate, assembles, installs and repairs sheetmetal products and equipment in such areas as ventilation, air-conditioning, warm air heating, restaurant equipment, architectural sheet metal work, sheetmetal roofing, and aluminum gutters. Fabrication, handling, assembling, erecting, altering, repairing, etc. of coated metal material panels and composite metal material panels when used on building exteriors and interiors as soffits, fascia, louvers, partitions, canopies, cornice, column covers, awnings, beam covers, cladding, sun shades, lighting troughs, spires, ornamental roofing, metal ceilings, mansards, copings, ornamental and ventilation hoods, vertical and horizontal siding panels, trim, etc. The sheet metal classification also applies to the vast variety of coated metal material panels and composite metal material panels that have evolved over the years as an alternative to conventional ferrous and non-ferrous metals like steel, iron, tin, copper, brass, bronze, aluminum, etc. Fabrication, handling, assembling, erecting, altering, repairing, etc. of architectural metal roof, standing seam roof, composite metal roof, metal and composite bathroom/toilet partitions, aluminum gutters, metal and composite lockers and shelving, kitchen equipment, and walk-in coolers. To include testing and air –balancing ancillary to installation and construction.

- **SPRINKLER FITTERS**

Installation, alteration, maintenance and repair of fire protection sprinkler systems.

***\*License required per Connecticut General Statutes: F-1,2,3,4.***

- **TILE MARBLE AND TERRAZZO FINISHERS**

Assists and tends the tile setter, marble mason and terrazzo worker in the performance of their duties.

- **TRUCK DRIVERS**

~How to pay truck drivers delivering asphalt is under REVISION~

Truck Drivers are required to be paid prevailing wage for time spent "working" directly on the site. These drivers remain covered by the prevailing wage for any time spent transporting between the actual construction location and facilities (such as fabrication, plants, mobile factories, batch plant, borrow pits, job headquarters, tool yards, etc.) dedicated exclusively, or nearly so, to performance of the contract or project, which are so located in proximity to the actual construction location that it is reasonable to include them. ***\*License required, drivers only, per Connecticut General Statutes.***

***For example:***

- Material men and deliverymen are not covered under prevailing wage as long as they are not directly involved in the construction process. If, they unload the material, they would then be covered by prevailing wage for the classification they are performing work in: laborer, equipment operator, etc.
- Hauling material off site is not covered provided they are not dumping it at a location outlined above.
- Driving a truck on site and moving equipment or materials on site would be considered covered work, as this is part of the construction process.

➤ *Any questions regarding the proper classification should be directed to:*  
*Public Contract Compliance Unit*  
*Wage and Workplace Standards Division*  
*Connecticut Department of Labor*  
*200 Folly Brook Blvd, Wethersfield, CT 06109*  
*(860) 263-6543.*

# Statute 31-55a

Last Updated: June 02, 2008

You are here: [DOL Web Site](#) ▶ [Wage and Workplace Issues](#) ▶ Statute 31-55a

## - Special Notice -

To All State and Political Subdivisions, Their Agents, and Contractors

Connecticut General Statute 31-55a - Annual adjustments to wage rates by contractors doing state work.

*Each contractor that is awarded a contract on or after October 1, 2002, for (1) the construction of a state highway or bridge that falls under the provisions of section 31-54 of the general statutes, or (2) the construction, remodeling, refinishing, refurbishing, rehabilitation, alteration or repair of any public works project that falls under the provisions of section 31-53 of the general statutes shall contact the Labor Commissioner on or before July first of each year, for the duration of such contract, to ascertain the prevailing rate of wages on an hourly basis and the amount of payment or contributions paid or payable on behalf of each mechanic, laborer or worker employed upon the work contracted to be done, and shall make any necessary adjustments to such prevailing rate of wages and such payment or contributions paid or payable on behalf of each such employee, effective each July first.*

- The prevailing wage rates applicable to any contract or subcontract awarded on or after October 1, 2002 are subject to annual adjustments each July 1st for the duration of any project which was originally advertised for bids on or after October 1, 2002.
- Each contractor affected by the above requirement shall pay the annual adjusted prevailing wage rate that is in effect each July 1st, as posted by the Department of Labor.
- It is the *contractor's* responsibility to obtain the annual adjusted prevailing wage rate increases directly from the Department of Labor's Web Site. The annual adjustments will be posted on the Department of Labor Web page: [www.ctdol.state.ct.us](http://www.ctdol.state.ct.us). For those without internet access, please contact the division listed below.
- The Department of Labor will continue to issue the initial prevailing wage rate schedule to the Contracting Agency for the project. All subsequent annual adjustments will be posted on our Web Site for contractor access.

Any questions should be directed to the Contract Compliance Unit, Wage and Workplace

Standards Division, Connecticut Department of Labor, 200 Folly Brook Blvd.,  
Wethersfield, CT 06109 at (860)263-6790.

[Workplace Laws](#)

Published by the Connecticut Department of Labor, Project Management Office

November 29, 2006

**Notice**  
**To All Mason Contractors and Interested Parties**  
**Regarding Construction Pursuant to Section 31-53 of the**  
**Connecticut General Statutes (Prevailing Wage)**

The Connecticut Labor Department Wage and Workplace Standards Division is empowered to enforce the prevailing wage rates on projects covered by the above referenced statute.

Over the past few years the Division has withheld enforcement of the rate in effect for workers who operate a forklift on a prevailing wage rate project due to a potential jurisdictional dispute.

The rate listed in the schedules and in our Occupational Bulletin (see enclosed) has been as follows:

**Forklift Operator:**

- **Laborers (Group 4) Mason Tenders** - operates forklift solely to assist a mason to a maximum height of nine feet only.
- **Power Equipment Operator (Group 9)** - operates forklift to assist any trade and to assist a mason to a height over nine feet.

The U.S. Labor Department conducted a survey of rates in Connecticut but it has not been published and the rate in effect remains as outlined in the above Occupational Bulletin.

***Since this is a classification matter and not one of jurisdiction, effective January 1, 2007 the Connecticut Labor Department will enforce the rate on each schedule in accordance with our statutory authority.***

Your cooperation in filing appropriate and accurate certified payrolls is appreciated.



# **Informational Bulletin**

## **THE 10-HOUR OSHA CONSTRUCTION SAFETY AND HEALTH COURSE**

(applicable to public building contracts entered into *on or after July 1, 2007*, where the total cost of all work to be performed is at least \$100,000)

- (1) This requirement was created by Public Act No. 06-175, which is codified in Section 31-53b of the Connecticut General Statutes (pertaining to the prevailing wage statutes);
- (2) The course is required for public building construction contracts (projects funded in whole or in part by the state or any political subdivision of the state) entered into on or after July 1, 2007;
- (3) It is required of private employees (not state or municipal employees) and apprentices who perform manual labor for a general contractor or subcontractor on a public building project where the total cost of all work to be performed is at least \$100,000;
- (4) The ten-hour construction course pertains to the ten-hour Outreach Course conducted in accordance with federal OSHA Training Institute standards, and, for telecommunications workers, a ten-hour training course conducted in accordance with federal OSHA standard, 29 CFR 1910.268;
- (5) The internet website for the federal OSHA Training Institute is [http://www.osha.gov/fso/ote/training/edcenters/fact\\_sheet.html](http://www.osha.gov/fso/ote/training/edcenters/fact_sheet.html);
- (6) The statutory language leaves it to the contractor and its employees to determine who pays for the cost of the ten-hour Outreach Course;
- (7) Within 30 days of receiving a contract award, a general contractor must furnish proof to the Labor Commissioner that all employees and apprentices performing manual labor on the project will have completed such a course;
- (8) Proof of completion may be demonstrated through either: (a) the presentation of a *bona fide* student course completion card issued by the federal OSHA Training Institute; *or* (2) the presentation of documentation provided to an employee by a trainer certified by the Institute pending the actual issuance of the completion card;
- (9) Any card with an issuance date more than 5 years prior to the commencement date of the construction project shall not constitute proof of compliance;

- (10) Each employer shall affix a copy of the construction safety course completion card to the certified payroll submitted to the contracting agency in accordance with Conn. Gen. Stat. § 31-53(f) on which such employee's name first appears;
- (11) Any employee found to be in non-compliance shall be subject to removal from the worksite if such employee does not provide satisfactory proof of course completion to the Labor Commissioner by the fifteenth day after the date the employee is determined to be in noncompliance;
- (12) Any such employee who is determined to be in noncompliance may continue to work on a public building construction project for a maximum of fourteen consecutive calendar days while bringing his or her status into compliance;
- (13) The Labor Commissioner may make complaint to the prosecuting authorities regarding any employer or agent of the employer, or officer or agent of the corporation who files a false certified payroll with respect to the status of an employee who is performing manual labor on a public building construction project;
- (14) The statute provides the minimum standards required for the completion of a safety course by manual laborers on public construction contracts; any contractor can exceed these minimum requirements; and
- (15) Regulations clarifying the statute are currently in the regulatory process, and shall be posted on the CTDOL website as soon as they are adopted in final form.
- (16) Any questions regarding this statute may be directed to the Wage and Workplace Standards Division of the Connecticut Labor Department via the internet website of <http://www.ctdol.state.ct.us/wgwkstnd/wgemenu.htm>; or by telephone at (860)263-6790.

**THE ABOVE INFORMATION IS PROVIDED EXCLUSIVELY AS AN EDUCATIONAL RESOURCE, AND IS NOT INTENDED AS A SUBSTITUTE FOR LEGAL INTERPRETATIONS WHICH MAY ULTIMATELY ARISE CONCERNING THE CONSTRUCTION OF THE STATUTE OR THE REGULATIONS.**

**Sec. 31-53b. Construction safety and health course. Proof of completion required for employees on public building projects. Enforcement. Regulations.** (a) Each contract entered into on or after July 1, 2007, for the construction, remodeling, refinishing, refurbishing, rehabilitation, alteration or repair of any public building project by the state or any of its agents, or by an political subdivision of the state or any of its agents, where the total cost of all work to be performed by all contractors and subcontractors in connection with the contract is at least one hundred thousand dollars, shall contain a provision requiring that, not later than thirty days after the date such contract is awarded, each contractor furnish proof to the Labor Commissioner that all employees performing manual labor on or in such public building, pursuant to such contract, have completed a course of at least ten hours in duration in construction safety and health approved by the federal Occupational Safety and Health Administration or, in the case of telecommunications employees, have completed at least ten hours of training in accordance with 29 CFR 1910.268.

(b) Any employee required to complete a construction safety and health course required under subsection (a) of this section who has not completed the course shall be subject to removal from the worksite if the employee does not provide documentation of having completed such course by the fifteenth day after the date the employee is found to be in noncompliance. The Labor Commissioner or said commissioner's designee shall enforce this section.

(c) Not later than January 1, 2007, the Labor Commissioner shall adopt regulations, in accordance with the provisions of chapter 54, to implement the provisions of subsections (a) and (b) of this section. Such regulations shall require that the ten-hour construction safety and health courses required under subsection (a) of this section be conducted in accordance with federal Occupational Safety and Health Administration Training Institute standards, or in accordance with 29 CFR 1910.268, as appropriate. The Labor Commissioner shall accept as sufficient proof of compliance with the provisions of subsection (a) or (b) of this section a student course completion card issued by the federal Occupational Safety and Health Administration Training Institute, or such other proof of compliance said commissioner deems appropriate, dated no earlier than five years before the commencement date of such public works project.

(d) For the purposes of this section, "public building" means a structure, paid for in whole or in part with state funds, within a roof and within exterior walls or fire walls, designed for the housing, shelter, enclosure and support or employment of people, animals or property of any kind, including, but not limited to, sewage treatment plants and water treatment plants, "Public building" does not include site work, roads or bridges, rail lines, parking lots or underground water, sewer or drainage systems including pump houses or other utility systems.

CONNECTICUT DEPARTMENT OF LABOR  
WAGE AND WORKPLACE STANDARDS DIVISION

**CONTRACTORS WAGE CERTIFICATION FORM**

I, \_\_\_\_\_ of \_\_\_\_\_  
Officer, Owner, Authorized Rep. Company Name

do hereby certify that the \_\_\_\_\_  
Company Name

\_\_\_\_\_  
Street

\_\_\_\_\_  
City

and all of its subcontractors will pay all workers on the

\_\_\_\_\_  
Project Name and Number

\_\_\_\_\_  
Street and City

the wages as listed in the schedule of prevailing rates required for such project (a copy of which is attached hereto).

\_\_\_\_\_  
Signed

Subscribed and sworn to before me this \_\_\_\_\_ day of \_\_\_\_\_, 2004.

\_\_\_\_\_  
Notary Public

 Return to:

Connecticut Department of Labor  
Wage & Workplace Standards Division  
200 Folly Brook Blvd.  
Wethersfield, CT 06109