

## **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 26, 2015  
FEDERAL AID PROJECT NO. 0566(112)  
STATE PROJECT NO. 32-130

RECONSTRUCTION OF ROUTE 31

Town of Coventry  
Federal Aid Project No. 0566(112)

The State of Connecticut, Department of Transportation, Standard Specifications for Roads, Bridges and Incidental Construction, Form 816, 2004, as revised by the Supplemental Specifications dated January 2015 (otherwise referred to collectively as "ConnDOT Form 816") is hereby made part of this contract, as modified by the Special Provisions contained herein. The State of Connecticut Department of Transportation's "Construction Contract Bidding and Award Manual" ("Manual"), May 14, 2010 edition or latest issue, 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 upon request from the Transportation Manager of Contracts. The Special Provisions relate in particular to the RECONSTRUCTION OF ROUTE 31 in the Town of Coventry.

**CONTRACT TIME AND LIQUIDATED DAMAGES**

Four Hundred Sixty (460) calendar days will be allowed for completion of the work on this project and the liquidated damages charge to apply will be Two Thousand Seven Hundred Dollars (\$2,700.00) per calendar day.

## **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 12:01 am, the day before the bid, the subject project(s) being bid will be removed from the Q and A Website, Projects Advertised Section, at which time questions can no longer be submitted through the Q and A Website. 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 - 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.

Check Applicable WD# (DOT Use Only)	WD#	Construction Type	Counties
X	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.

## **NOTICE TO CONTRACTOR - VOLUNTARY PARTNERING**

The Connecticut Department of Transportation (ConnDOT) intends to encourage the foundation of a cohesive partnership with the Contractor and its principal subcontractors on this project. This partnership will be structured to draw on the strengths of each organization to identify and achieve reciprocal goals. The objectives are effective and efficient contract performance and completion within budget, on schedule, and in accordance with plans and specifications.

This partnership will be bilateral in makeup, and participation will be totally voluntary. Any cost associated with effectuating this partnering will be agreed to by both parties and will be shared equally.

To implement this partner initiative, the Contractor and ConnDOT will meet and plan a partnering development seminar/team building workshop. At this planning session arrangements will be made to determine attendees at the workshop, agenda of the workshop, duration and location. Persons required to be in attendance will be the ConnDOT District Engineer and key project personnel, the Contractor's on-site project manager and key supervision personnel of both the prime and principal subcontractors. The project design engineers and key local government personnel will also be required to have Regional/District and Corporate/State level managers on the project team.

Follow-up workshops will be held periodically throughout the duration of the Contract as agreed by the Contractor and ConnDOT.

The establishment of a partnership charter on a project will not change the legal relationship of the parties to the Contract nor relieve either party from any of the terms of the Contract.

ConnDOT and the Contractor will jointly select a facilitator to conduct the partnering workshops. The Contractor will obtain the services of the chosen facilitator and ConnDOT will reimburse the Contractor for fifty percent (50%) of the costs agreed to between ConnDOT and the Contractor.

## **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.

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

The attached project specific utility work schedule 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 I .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- Schedules and Reports) 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.

**UTILITY WORK SCHEDULE**

CTDOT Project Number: 32-130	Town: Newington CT.
Project Description:	
CTDOT Utilities Engineer: Greg Chhabra	
Phone: 860-594-3268	Email: Greg.Chhabra@CT.gov

Utility Company: Charter Communications	
Prepared By: Eric Anderson	Date Prepared: 5/21/2014
Phone: 860-303-4001	Email: eric.anderson@charter.com

**Scope of Work**

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.

Charter will follow CL+P to all temporary and permanent attachments we will shift to new poles as necessary our construction will start at Pole 33 with straight shifts and end at Pole #21 We will only perform work required for this project.

**Special Considerations and Constraints**

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..

No Special Considerations





rev. 5/20/2013		UTILITY WORK SCHEDULE	
CTDOT Project Number:	032-130	Town:	COVENTRY
Project Description: RECONSTRUCTION OF ROUTE 31			
CTDOT Utilities Engineer: GREG CHHABRA			
Phone:	860.594.3268	Email:	GregChhabra@ct.gov
Utility Company: AT&T			
Prepared By:	JOHN PLIKUS	Date Prepared:	7/13/2014
Phone:	860.450.2793	Email:	jp2939@att.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>Loc.2 P#4665(temp), Sta.17+20',20' WSW(approx.), Install 3-Extension Arms.</p> <p>Loc.3 P#4666(temp), Sta.18+30',24' SW(approx.), Install 3-Extension Arms.</p> <p>Loc.9 P#26S, Sta.23+40',20' NNE(approx.), Install 1- 10m DWN Guy.</p> <p>Loc.9 P#26, Sta.23+40' ,15' SSW to P26S,Sta.23+40',20'NNE(approx.), Install 1- 10m OH Guy.</p> <p>Loc.10 P#25S, Sta.24+40',80' NNE(approx.), Install 1- 10m DWN Guy.</p> <p>Loc.10 P#25, Sta.24+40' ,15' SSW to P25S,Sta.24+40',80'NNE(approx.), Install 1- 10m OH Guy.</p> <p>Loc.1 P#32, Sta.16+57',20' NNE to Loc.6 P#28,Sta.20+75',15'SSW, Place 10m Strand.</p> <p>Loc.1 P#32, Sta.16+57',20' NNE to Loc.6 P#28,Sta.20+75',15'SSW,Place 10m Strand &amp; BKMA-1200.</p> <p>Loc.1 P#32, Sta.16+57',20' NNE to Loc.6 P#28,Sta.20+75',15'SSW,Place 10m Strand &amp; BKMA-300.</p> <p>Loc.6 P#28, Sta.20+75',15' SSW to Loc.8 P#27,Sta.22+10',25'SSW, Place BKMP-100.</p> <p>Loc.6 P#28, Sta.20+75',15' SSW Place BKMA-100 Stub.</p> <p>Loc.2 P#31, Sta.17+25',25' SW(approx.), Place 10m DWN Guy.</p> <p>Loc.4 P#30, Sta.18+95',25' SW to P30S, Sta.18+95',70'SW (approx.), Install 1- 10m OH Guy.</p> <p>Loc.4 P#30S, Sta.18+95',70' SW(approx.), Install 1- 10m DWN Guy.</p> <p>Loc.6 P#28, Sta.20+75', 15'SW to Loc.7 P#4547S, Sta.21+95', 40'NE(approx), Install 1-10m OH Guy.</p> <p>Loc.7 P#4547, Sta.21+95',15'SW to Loc.7 P#4547S,Sta.21+95',40'NE(approx),Install 1-10mOH Guy.</p> <p>Loc.7 P#4547S, Sta.21+95', 40'NE (approx), Install 2- 10m DWN Guy. <span style="float: right;">Loc.2</span></p> <p>P#4665(temp), Sta.17+20',20' WSW(approx.), Remove 3-Extension Arms.</p> <p>Loc.3 P#4666(temp), Sta.18+30',24' SW(approx.), Remove 3-Extension Arms. <span style="float: right;">Loc.1</span></p> <p>P#32, Sta.16+57',20' NNE to Loc.6 P#28,Sta.20+75',15'SSW, Remove 10m Strand.</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..			
AT&T will schedule its construction as it's workload permits, the DOT will schedule other utilities attached to the pole line (Power Co., CATV, etc... and all State or Municipal owned cables and fixtures). This UWS has been completed using only Preliminary Design Plans. No mark out of edge of road, or construction limits provided and may be subject to change.			

Scope of Work (cont.)032-130

Loc.1 P#32, Sta.16+57',20' NNE to Loc.6 P#28,Sta.20+75',15'SSW, RMV 10m Strand & BKMA-900.  
Loc.1 P#32, Sta.16+57',20' NNE to Loc.6 P#28,Sta.20+75',15'SSW, RMV 10m Strand & BKMA-300.  
Loc.6 P#28, Sta.20+75',15' SSW to Loc.8 P#27,Sta.22+10',25'SSW, RMV BKMS-100.  
Loc.1 P#32, Sta.16+57',20' NNE to Loc.6 P#28,Sta.20+75',15'SSW, RMV 10m Strand & BKTA-300.  
Loc.6 P#28, Sta.20+75',15' SSW, Remove BKMA-100 15' Stub.  
Loc.6 P#28, Sta.20+75',15' SSW, Remove BKMA-100 10' Stub.  
Loc.6 P#28, Sta.20+75',15' SSW, Remove BKMA-50 15' Stub.  
Loc.6 P#28, Sta.20+75',15' SSW, Remove BKMA-300 15' Stub.  
Loc.4 P#30, Sta.18+95',20' SW(approx.), Remove 1- 10m DWN Guy.  
Loc.6 P#28S, Sta.20+75',22' NNE(approx.), Remove 1- 10m DWN Guy.  
Loc.6 P#28, Sta. 20+75', 15' SSW to P28S, Sta.20+75',22'NNE(approx.), Remove 1- 10m OH Guy.  
Loc.9 P#26S, Sta.23+40',20' NNE(approx.), Remove 1- 10m DWN Guy.  
Loc.9 P#26, Sta.23+40',15' SSW to P26S,Sta.23+40',20'NNE(approx.), Remove 1- 10m OH Guy.  
Loc.10 P#25S, Sta.24+40',80' NNE(approx.), Remove 1- 10m DWN Guy.  
Loc.10 P#25, Sta.24+40',15' SSW to P25S,Sta.24+40',80'NNE(approx.), Remove 1- 10m OH Guy.

## UTILITY WORK SCHEDULE

CTDOT Project Number: CTDOT # 032-130

Utility Company: AT&T

Prepared By: John Plikus

Total Calendar Days: 49

### 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)
Sta.17+20',20'WSW	Place three Extension Arms and shift Copper and Fiber Cables	CL&P to place P4665, and Other Utilities work completion required.	1.0 days
Sta.18+30',24'SW	Place three Extension Arms and shift Copper and Fiber Cables	CL&P to place P4666, and Other Utilities work completion required.	1.0 days
Sta.23+40'	Place 1- 10M OH Guy at CL&P Pole #26 to Pole#26S & 1-10M Down Guy at CL&P Pole #26S, Shift All Cables	Other Utilities work completion required.	2.0 days
Sta.24+40'	Place 1- 10M OH Guy at CL&P Pole #25 to Pole#25S & 1-10M Down Guy at CL&P Pole #25S, Shift All Cables	Other Utilities work completion required.	2.0 days
Sta.25+70'	Shift All Fiber and Copper Cables at CL&P Pole # 24	Other Utilities work completion required.	1.0 day
Sta.27+00'	Shift All Fiber and Copper Cables at CL&P Pole # 23	Other Utilities work completion required.	1.0 day
Sta.27+90'	Shift All Fiber and Copper Cables at CL&P Pole # 22	Other Utilities work completion required.	1.0 day
Sta.29+35'	Shift All Fiber and Copper Cables at CL&P Pole # 21	Other Utilities work completion required.	1.0 day
Sta.30+45'	Shift All Fiber and Copper Cables at CL&P Pole # 20	Other Utilities work completion required.	1.0 day
Sta.16+57'-20+75'	Place 10M Strand & BKMA-1200 Copper Cable	Other Utilities work completion required.	3.0 days
Sta.16+57'-20+75'	Place 10M Strand & BKMA-300 Copper Cable	Other Utilities work completion required.	3.0 days

## UTILITY WORK SCHEDULE

CTDOT Project Number: 032-130

Utility Company: AT&T

Prepared By: John Plikus

Total Calendar Days: 49

### 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)
Sta.16+57'-20+75'	Place 10M Strand & Shift Fiber Cables onto New Strand	Other Utilities work completion required.	2.5 days
Sta.21+95'-22+10'	Place BKMP-100 Copper Cable	Other Utilities work completion required.	1.0 day
Sta.21+95'	Place BKMA-100 Copper Cable Stub	Other Utilities work completion required.	0.5 day
Sta.21+95'	Place 2-10M OH Guy at CL&P Pole #28 to Pole#28S & 2-10M Down Guy at CL&P Pole #26S, Shift All Cables	Other Utilities work completion required.	2.5 days
Sta.16+57'	Splice in All New Cables and Cut Out All Existing Cables	Other Utilities work completion required.	5.0 days
Sta.21+95'	Splice in All New Cables and Cut Out All Existing Cables	Other Utilities work completion required.	6.0 days
Sta.22+10'	Splice in All New Cables and Cut Out All Existing Cables	Other Utilities work completion required.	1.0 day
Sta.18+95'	Place 1-10M OH Guy at CL&P Pole #30 to Pole#30S & 1-10M Down Guy at CL&P Pole #30S	Other Utilities work completion required.	1.0 day
Sta.17+25'	Place 1-10M Down Guy at CL&P Pole #31	Other Utilities work completion required.	0.5 day
Sta.16+57'-20+75'	Remove BKMA-300 Aerial Cable/10M Strand	Other Utilities work completion required.Completion AT&T Aerial Work	2.0 days
Sta.16+57'-20+75'	Remove BKMA-900 Aerial Cable/10M Strand	Other Utilities work completion required.Completion AT&T Aerial Work	2.0 days

## UTILITY WORK SCHEDULE

CTDOT Project Number: 032-130

Utility Company: AT&T

Prepared By: John Plikus

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### 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)
Sta.16+57'-20+75'	Remove BKTA-300 Aerial Cable/6M Strand	Other Utilities work completion required.Completion AT&T Aerial Work	2.5 days
Sta.20+75'-21+95'	Remove 10M Strand	Other Utilities work completion required.Completion AT&T Aerial Work	1.0 day
Sta.20+75'	Remove 2-BKMA-100 & 2-BKMA-300 Copper Cable Stubs	Other Utilities work completion required.Completion AT&T Aerial Work	1.0 day
Sta.21+95'-22+10'	Remove BKMS-100 Aerial Cable	Other Utilities work completion required.Completion AT&T Aerial Work	0.5 days
Sta.18+95'	Remove 10M Down Guy	Other Utilities work completion required.Completion AT&T Aerial Work	0.5 days
Sta.20+75'	Remove 1-10M OH Guy at CL&P Pole #28 to Pole#28S & 1-10M Down Guy at CL&P Pole #28S	Other Utilities work completion required.Completion AT&T Aerial Work	0.5 days
Sta.23+40'	Remove 1-10M OH Guy at CL&P Pole #26 to Pole#26S & 1-10M Down Guy at CL&P Pole #26S	Other Utilities work completion required.Completion AT&T Aerial Work	0.5 days
Sta.24+40'	Place 1-10M OH Guy at CL&P Pole #25 to Pole#25S & 1-10M Down Guy at CL&P Pole #25S	Other Utilities work completion required.Completion AT&T Aerial Work	0.5 days
Sta.17+20',20'WSW	Remove three Extension Arms and shift Fiber Cables	Other Utilities work completion required.Completion AT&T Aerial Work	0.5 days
Sta.18+30',24'SW	Remove three Extension Arms and shift Fiber Cables	Other Utilities work completion required.Completion AT&T Aerial Work	0.5 days

## **NOTICE TO CONTRACTOR - RIGHTS OF WAY RESTRICTIONS**

The Contractor is hereby advised that at the time of advertising for bids not all the property may be acquired by the State. A complete listing of the affected properties and the anticipated dates that they will become available is hereinafter provided. The Contractor is further advised that limitations, as enumerated herein below, are imposed which may interfere with the physical construction of the project. Following are statements which will set forth the restrictions on the right of entrance to property and conditions governing construction of the project.

1) The Contractor shall not occupy properties that are unacquired, perform any work thereon, or inhibit access thereto until the properties have been acquired and right of possession has been obtained. If the Contractor is allowed to proceed with the physical construction of the project, no action will be taken that will result in unnecessary inconvenience such as the discontinuance of utilities, the prevention of ingress and egress to the property, or will result in disproportionate injury or any action coercive in nature to occupants of residences (businesses, farms, or non-profit organization) who have not yet moved from the right-of-way.

2) It should be anticipated that each of the properties listed herein may be considered to have an effect upon construction operations.

3) The Contractor shall be aware that extensions of time will be granted, if necessary, for delays in construction operations caused by properties being unacquired beyond the estimated time period.

The following is a complete listing of properties which have not been acquired as of August 26, 2015 with the anticipated dates such properties will be acquired.

Serial No.	Type	Name	Location
11	Land	Teleflex Ct-Devices Incorporated (Title Est. by January 13, 2016)	Sta. 21 + 50± to Sta. 23 + 00± Right baseline Present Main Street (Ct Route 31)
12	Land	Town of Coventry (Title Est. by January 13, 2016)	Sta. 23 + 00+- to Sta. 23+10+- Right baseline Present Main Street (Ct. Route 31) & Sta. 26+ 40+- to Sta. 26+50+- Right baseline Present Main Street (Ct Route 31)
13	Land	Four T. Realty, LLC (Title Est. by January 13, 2016)	Sta. 23+ 10+- to Sta. 23 + 90+- Right baseline Present Main Street ( Ct Route 31)
14	Land	Country Village, LLC (Title Est. by January 13, 2016)	Sta. 23+90+_ to Sta. 25+60+_ Right baseline Present Main Street (Ct Route 31)
15	Easement	Ueli Jucker (Title Est. by January 13, 2016)	Sta. 25+73+- to Sta. 26+ 50+- Right baseline Present Main Street (Ct Route 31)

GENERAL

**NOTICE TO CONTRACTOR - EXISTING STONE CURBING**

All existing stone curbing that is removed from the existing roadway during the execution of the project shall become the property of the Town of Coventry and shall be delivered to the Town of Coventry's Public Works Garage at 100 Olsen Road in Coventry on Mondays through Fridays from 7 am to 2:30 pm. The Contractor shall give the Town at least one day's notice of the arrival of the curbing by calling 860-742-6588 during the hours listed above. There is no separate payment for this effort.

## **NOTICE TO CONTRACTOR - SANITARY SEWER**

### **Sequence of Operations**

#### **PHASE A**

1. Install Doghouse SMH @ 24+60. Test and bring online.
  - a. Existing sewer main will be live or a temporary bypass pump will be required.
2. Install proposed sewer main work to 23+32. Test and bring online.
  - a. Install proposed sewer main work to 21+95. Test and bring online.
  - b. Connect sewer main at 23+87
  - c. Provide temporary lateral for #1265.
  - d. Provide temporary lateral for #1275 utilizing a temporary connection to the lateral at #1265.
  - e. Partially Install lateral for #1254 (in back of parking lot)
  - f. Partially Install lateral for #1260
3. Install proposed sewer main work to 21+95. Test and bring online.
  - a. Connect #1275.
  - b. Provide temporary connection to #1264.
4. Setup Monument Hill bypass pumping.
5. Install temporary bypass 10" sewer 21+95 to 21+62. Connect 8" from Monument Hill to temporary bypass. Test and bring online.
6. Disconnect Monument Hill Bypass pumping, but maintain infrastructure for re-use.
7. Setup Main Street bypass pumping area #1. Existing SMH 19+50R to existing SMH23+35L.
8. Finish temporary 10" bypass sewer to 21+42. Test and bring on line.
9. Disconnect and abandon Main Street bypass pumping area #1.
10. Install proposed sewer main work to 17+75. Test and bring online.
  - a. Include 20' partial segment toward existing SMH at 17+75R.
  - b. Install lateral for #1276 ( Not connected to sewer)
  - c. Connect #1284.
  - d. Partially install lateral for #1295 Main Street.
  - e. Install lateral for Boyton Parcel
11. Setup Main Street bypass pumping area #2 from existing SMH 15+73L to proposed SMH 17+92L.
12. Install proposed sewer work to Doghouse SMH 16+70L. Test and bring online.
13. Disconnect and abandon Main Street bypass pump area #2.
14. Setup Teleflex bypass pumping area #3 from upstream SMH 17+50 R to existing SMH SMH 18+62
15. Install proposed sewer work to completion at and through 17+75R. Test and bring online.
16. Disconnect and abandon Teleflex bypass pumping area #3.
17. Connect sewer lateral for #1295 Main Street.
18. Reconnect Monument Hill bypass area #1 pumping.

19. Connect 8” Monument Hill sewer main to proposed SMH 21+80. Test and bring online.  
Abandon temporary 10” sewer bypass.
20. Disconnect and abandon Monument Hill bypass pumping.
21. Connect sewer lateral for #1260, Etchells and Bidwell Village.
  - a. Setup bypass pumping for Bidwell Village sewer as required.

#### PHASE B

1. Finalize #1265 lateral at time of open pond work.

#### PHASE C

1. Install sewer laterals at #1349 and #1365 Main Street.

#### PHASE D

1. Install Lake Street sewer main and laterals.

## **NOTICE TO CONTRACTOR - ENVIRONMENTAL PERMITS**

The federal and state environmental permits listed below have been secured for the reconstruction of a portion of Route 31 in Coventry, Connecticut.

- CT DEEP Inland Wetlands and Watercourses Permit
- CT DEEP Flood Management Certification
- CT DEEP 401 Water Quality Certification
- General Permit for the Discharge of Stormwater and Dewatering Activities Associated with Construction Activities (with associated SWPCP document)
- U.S. Army Corps of Engineers Section 404 Connecticut General Permit Category 2

Copies of each permit is included in the contract documents. It is the Contractor's responsibility to read and be familiar with each of the project specific permits, as well as the General Permit language covering stormwater and dewatering activities. Full compliance with each of the permits and all conditions cited in the permits is required. The project plans referenced by the permits have been approved and must be adhered to. Any necessary deviations in construction must be reviewed with the Resident Engineer and Connecticut DOT environmental planning personnel as permit amendments may be required.

Additional non-environmental permits may have been secured and are not tracked in this document. However, the Contractor will be responsible for complying with these conditions as well.

## **NOTICE TO CONTRACTOR - GENERAL PERMIT FOR STORMWATER DISCHARGE**

This notice is provided to summarize some of the requirements of the Connecticut Department of Energy and Environmental Protection's General Permit for the Discharge of Stormwater and Dewatering Wastewaters associated with Construction Activities (Permit) issued on August 21, 2013, effective October 01, 2013. In no way, does this Notice alleviate the Contractor from understanding and complying with all the requirements and conditions of the Permit.

The Stormwater Pollution Control Plan (SWPCP) addresses pollution caused by soil erosion and sedimentation during construction as well as the long term post-maintenance use of the facility after construction is completed. The Contractor and all subcontractors will be required to sign a certified statement to comply with all applicable conditions of the SWPCP. There will be no additional payment for the Contractor to sign the certification statement and no additional payment for the Contractor to comply with the conditions of the SWPCP.

### **Erosion and Sedimentation Controls - Structural Measures:**

When construction activities will result in the disturbance of a total of 1 acre or more of land regardless of phasing, the Connecticut Department of Transportation (Department) will incorporate a Stormwater Registration and SWPCP as part of the Contract documents in order to insure compliance with all conditions of this Permit. The Permit's 'Construction activities' means activities including but not limited to clearing and grubbing, grading, excavation, and dewatering.

Unless specifically outlined in the Contract Plans and/or SWPCP, the Contractor is not allowed to disturb more than two (2) acres of erodible material per discharge point at any one time regardless of phasing. If the Contractor elects to deviate from the Contract Plans and/or SWPCP to disturb more than two (2) acres of erodible material per discharge point at any one time regardless of phasing, the Contractor must provide a sequenced staging plan outlining the proposed disturbed activities. In all cases, the Contractor must meet the following conditions:

- *If the area of disturbance is maintained less than two (2) acres per discharge point*, the Contractor may disturb additional areas if and only if the previously disturbed areas are temporarily or permanently stabilized immediately using acceptable measures such as the standard controls which are provided in the SWPCP or as shown on the Contract Plans.
- *If the construction activities create an area of disturbance between (2) acres and (5) acres per discharge point*, the Contractor must submit to the Engineer a revised SWPCP for review and approval. The SWPCP must include locations of the temporary sedimentation trap per discharge point with a capacity to contain 134 cubic yards per acre of material in accordance with the 2002 Connecticut Guidelines for Erosion and Sediment Control (Guidelines). The Contractor shall provide an inspection and maintenance plan for the temporary sedimentation trap as part of the amended SWPCP.

- *If the area of disturbance has a potential to reach more than five (5) acres per discharge point*, the Contactor must submit to the Engineer a revised SWPCP for review and approval. The SWPCP must include locations of the temporary sediment basin designed and installed in accordance with the Guidelines. The Contractor shall provide an inspection and maintenance plan for the temporary sediment basin as part of the amended SWPCP.

#### **Other Controls – Washout Areas:**

Unless specifically outlined in the Contract Plans and/or SWPCP, the Contractor will be required to identify a designated washout area(s) to collect concrete, paint and other materials from applicators, containers, vehicles and equipment. There shall be no surface discharge of washout wastewaters from this area. In addition to the above, the following conditions must be met:

- Washout shall be conducted outside of any buffers and at least 50 feet from any stream, wetland or sensitive resource.
- Washout shall be conducted in an entirely self-contained system.
- Designated washout areas are to be clearly flagged.
- All washwater is to be directed into a container or pit designed that no overflows can occur during a rainfall event or snowmelt.
- Hardened concrete is considered “Waste Disposal” and is to be removed from the project and disposed of at an approved facility.

#### **Routine Inspections:**

At a minimum, the Contractor along with a qualified inspector (provided by the permittee) shall inspect, at minimum, the following: disturbed areas of the construction activity that have not been finally stabilized; all erosion and sedimentation control measures; all structural control measures; soil stockpile areas; washout areas and locations where vehicles enter or exit the site at least once a week and within 24 hours at the end of a storm event that is equal to or exceeds 0.5 inches. If a potential source of pollution is identified, pollution preventive measures shall be implemented within 24 hours and the SWPCP must be amended within three calendar days.

#### **Keeping Plans Current:**

If the Contractor requires a modification to the SWPCP, it shall be in accordance with the Guidelines and the 2004 Connecticut Stormwater Quality Manual or amended. The Department shall approve or reject the modification to the SWPCP and notify the Contractor in writing as to any revisions or additional information required for approval. No damage for delays will be granted to the Contractor based on time taken by the Department to review the Contractor’s proposal, or to apply for or secure the Permit amendment, modification or revision as per Section 1.10 - Environmental Compliance, of the Standard Specifications for Roads, Bridges, and Incidental Construction Form 816 and any Supplements thereto.

Date 01/29/14

At no time shall the Contractor proceed with the proposed SWPCP amendment, modification, or revision unless the Engineer approves, in writing, the Contractor's request. The permittee shall amend the SWPCP whenever there is a change in Contractors or subcontractors at the site, or a change in design, construction, operation, or maintenance at the site which has the potential for the discharge of pollutants. In all cases as described above, the amended SWPCP shall adhere to and comply with Section 1.10 - Environmental Compliance, of the Standard Specifications for Roads, Bridges and Incidental Construction Form 816 and any Supplements thereto. No additional payment will be made for any Permit amendment, modification, or revision which alters the Contract Plans, SWPCP, and/or estimated quantities as a result of the Department's approval of the modifications to the Contract by the Contractor. Changes or variations to the Contract Plans and/or SWPCP by the Contractor shall not result in any additional cost to the State.

In order for the Contractor to meet the requirements set forth in the SWPCP, the Contractor shall comply with additional erosion and sedimentation control provisions included in the project or as identified in the Guidelines.

## **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 total petroleum hydrocarbons (TPH), volatile organic compounds (VOCs), semi-volatile organic compounds (SVOCs), and RCRA-8 metals in soils within proposed construction areas at concentrations above the Connecticut Department of Energy and Environmental Protection (CT DEEP) Remediation Standard Regulations (RSRs). Based on these findings, six (6) Areas of Environmental Concern (AOECs) and four (4) Low-Level Areas of Environmental Concern (LLAOECs) have been identified within the proposed Project Limits. Groundwater within the Project Limits is also impacted VOCs, SVOCs, and TPH above applicable RSR numeric criteria. The presence of the compounds at these concentrations will require material-handling measures for soils and groundwater beyond those required for normal construction operations and will be restricted to the methods described herein.

The Contractor is hereby notified that controlled materials 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/LLAOECs. 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.**

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

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. 0101128A – Securing, Construction, and Dismantling of a Waste Stockpile and Treatment Area
- Item No. 0101117A – Controlled Materials Handling
- Item No. 0202315A – Disposal of Controlled Materials
- 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/LLAOECs to collect soil and groundwater samples (if necessary), and to observe site conditions for the State. **The waste stockpile area (WSA) indicated on the plans is to be used exclusively for temporary stockpiling of excavated materials from within project AOECs/surplus material from within project LLAOECs for determination of disposal classification.**

All suitable material excavated from the AOECs may be reused within the AOEC from which it was excavated as fill/backfill, in accordance with the following conditions: (1) such soil is deemed to be structurally suitable as fill by the Engineer; (2) such soil is not placed below the water table; (3) the CT DEEP groundwater classification of the area where the soil is to be reused as fill does not preclude said use; and (4) such soil is not placed in an area subject to erosion. Soils within the LLAOECs are to be reused on site prior to the use of other soils and/or fill such that no excess soils requiring off-site disposal are generated from the LLAOECs.

Information pertaining to the results of the environmental investigations discussed can be found in the documents listed below. These documents shall be available for review at the Office of Contracts, 2800 Berlin Turnpike, Newington, Connecticut.

- Task 210: Subsurface Site Investigation - ConnDOT Reconstruction of Route 31, Coventry, CT; prepared by Diversified Technology Consultants, Inc., dated February 2007.

**NOTICE TO CONTRACTOR - UNANTICIPATED DISCOVERY OF CULTURAL RESOURCES**

If historic properties are unexpectedly encountered during Project construction, the contractor will immediately cease all construction activities in the immediate vicinity that may reasonably be assumed to affect the historic properties. Any historic property discoveries shall to the extent possible be protected in situ to allow for consultation among the Parties and the Tribes. The historic properties may be preserved in situ or mitigated on a case-by-case basis in consultation with the Parties and the Tribes. No artifacts are to be removed from the site unless approved by all parties. Notwithstanding anything to the contrary herein, the curation and disposition of any cultural resources shall be consistent with 36 C.F.R. Part 79 and other applicable law. If human remains are unexpectedly encountered during Project construction, the remains will be treated in a respectful manner and in accordance with the respective laws of the State of Connecticut (Connecticut General Statutes, Chapter 184a Section 10-388) and State of Connecticut Department of Transportation, Supp Form 816 January 2010 Abstract: Standard Specifications for Roads, [www.ct.gov/dot/cwp/view.asp?a=1385&q=455784](http://www.ct.gov/dot/cwp/view.asp?a=1385&q=455784).

**NOTICE TO CONTRACTOR - SECTION 4.06 AND M.04 MIX DESIGNATION EQUIVALENCY AND PG BINDER EQUIVALENCY**

Sections 4.06 and M.04 have been replaced in their entirety with the Special Provisions included as part of this contract. These Special Provisions reflect changes in mix designations for various types of hot-mix asphalt (HMA) and include the removal of mixes designed and governed by the Marshall Mix Design method. The following table is to be used to associate mix designations noted on the plans with those in the contract specifications and related documents. Mix designations on each row are equivalent and refer to a single mix, which shall be subject to the requirements of the Section 4.06 and M.04 Special Provisions for the Official Mix Designation in the leftmost column of the corresponding row in the table.

**Mix Designation Equivalency Table**

<b>Official Mix Designation</b>	<b>Equivalent Mix Designation (a)</b>	<b>Equivalent Mix Designation (b)</b>
(c)	Superpave 1.5 inch	Superpave 37.5 mm
<b>HMA S1</b>	Superpave 1.0 inch	Superpave 25.0 mm
<b>HMA S0.5</b>	Superpave 0.5 inch	Superpave 12.5 mm
<b>HMA S0.375</b>	Superpave 0.375 inch	Superpave 9.5 mm
<b>HMA S0.25</b>	Superpave 0.25 inch	Superpave 6.25 mm
(c)	Superpave #4	Superpave #4
<b>HMA S0.5 (d)</b>	Bituminous Concrete Class 1 (e)	Bituminous Concrete Class 1 (e)
<b>HMA S0.375 (d)</b>	Bituminous Concrete Class 2 where it is specified in lifts 1.25 or thicker (e)	Bituminous Concrete Class 2 where it is specified in lifts 1.25 or thicker (e)
<b>HMA S0.25 (d)</b>	Bituminous Concrete Class 2 where it is specified in lifts 1.0 inches to less than 1.25 inches (e); Bituminous Concrete Class 12 (e)	Bituminous Concrete Class 2 where it is specified in lifts 1.0 inches to less than 1.25 inches (e); Bituminous Concrete Class 12 (e)
<b>HMA S1 (d)</b>	Bituminous Concrete Class 4 (e)	Bituminous Concrete Class 4 (e)
<b>Curb Mix</b>	Bituminous Concrete Class 3	Bituminous Concrete Class 3

**Notes**

(a) This mix designation is generally included with projects where the English measurement system is used. The mix designation may contain both the English measurement system

designation and the SI (metric) measurement system designation, one of which would be in parenthesis.

**(b)** This mix designation is generally included with projects where the SI (metric) measurement system is used. The mix designation may contain both the English measurement system designation and the SI measurement system designation, one of which would be in parenthesis.

**(c)** This mix is no longer in use except by contract-specific Special Provision; if this mix is called for in the Plans but no such Special Provision is included for this contract a suitable substitute must be approved by the Engineer.

**(d)** Unless approved by the Engineer, the Superpave Design Level for the Official Mix Designation bituminous concrete replacing a Marshall mix called for in the plans or other contract documents shall be Design Level 2 for mixes used on mainline or shoulders of state-maintained roadways and Design Level 1 elsewhere, including but not limited to driveways or sidewalks.

**(e)** All mixes designed under the Marshall mix-design method are no longer covered by the 4.06 Special Provision. Wherever they appear in Contract plans and documents they shall be substituted by the “Official Mix Designation” in the same row of the Mix Designation Equivalency Table. Unless approved by the Engineer, the Superpave Design Level shall be Level 1.

**PG Binder Designation Equivalency Table**

<b>Official Binder Designation</b>	<b>Equivalent Binder Designation</b>	<b>Use</b>
PG 64S-22	PG 64-22	Hot-Mix Asphalt (HMA S* pay items and pay items using HMA S* materials) <b>(a),(b)</b>
PG 64E-22	PG 76-22	Polymer-Modified Asphalt (PMA S* pay items and pay items using HMA S* materials) <b>(a),(b)</b>

**Notes**

- (a)** Use the Mix Designation Equivalency Table above to identify the Official Mix Designation for materials using the Marshall mix design method, i.e. “Bituminous Concrete Class \*.”
- (b)** Refer to the NTC – Superpave Design Level for the Superpave Design Level to use for each mix on a project. The PG Binder Designation Equivalency Table can be used to obtain the Official Binder Designation for each mix identified in the NTC – Superpave Design Level.

**NOTICE TO CONTRACTOR - SUPERPAVE DESIGN LEVEL INFORMATION**

Hot-Mix Asphalt (HMA) and Polymer-Modified Asphalt (PMA) constructed according to the Superpave mix-design system are required to attain a Superpave Design Level and are required to use a Performance Graded (PG) binder. The Superpave Design Levels required for this project are listed in Table 1. The required PG binder is indicated for each mix with an “X” in the appropriate box in Table 1.

**TABLE 1 – Superpave Design Level and Performance Graded (PG) Binder**

Mix Designation	PG Binder		Route31 Coventry	Route	Route	Route	Route
	PG 64S-22	PG 64E-22	Design Level	Design Level	Design Level	Design Level	Design Level
HMA S0.25	-	-	-	-	-	-	-
HMA S0.375	-	-	-	-	-	-	-
HMA S0.5	X	-	X	-	-	-	-
HMA S1	X	-	X	-	-	-	-
PMA S0.25	-	-	-	-	-	-	-
PMA S0.375	-	-	-	-	-	-	-
PMA S0.5	-	-	-	-	-	-	-
PMA S1	-	-	-	-	-	-	-

Note: Please note that PMA mix designations typically use PG 64E-22 and HMA mix designations use PG 64S-22

**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 1.06 - CONTROL OF MATERIALS**

### **Article 1.06.07 - Certified Test Reports and Materials Certificates:**

1) For the materials in the following 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.

Decorative Light Standards  
Conductors  
Anchor Bolts

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

Decorative Light Standards  
Service Items  
Conductors  
Luminaires  
Conduit  
Anchor Bolts  
Cable  
Handholes  
Rigid Metal Conduit

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

### **Article 1.07.08 - Use of Explosives:**

*Delete the last paragraph from the section and replace it with the following:*

**1.07.08:** The Contractor shall notify each utility with facilities in the proximity to the site of the Contractor's intention to use explosives and such notice shall be given sufficiently in advance of any blasting to enable such affected parties to take steps to prevent such blasting from injuring persons or property. Such notice shall not relieve the Contractor from responsibility for damage resulting from its blasting operations.

The Contractor shall provide a pre-blast condition survey as described below:

Prior to start of blasting work, the Contractor shall conduct a pre-blast condition survey of all existing structures and conditions on the site, adjacent to the site, or in the vicinity of the site. This survey shall extend to such structures or conditions as may be affected by the Contractor's construction operations. As a minimum, condition surveys shall be performed on all structures within 500 feet of anticipated blasting areas. The Contractor is responsible for the following:

1. Coordinate activities, issue notices, obtain clearances and provide whatever photographic and secretarial assistance is necessary to accomplish the survey.
2. Give notice, in writing, to the owner of the property concerned and tenants of the property. Advise in notice, the dates on which surveys are to be made so that they may have representatives present during the examination. Provide copies of all notices to the Engineer.
3. The survey shall consist of a description of the interior and exterior conditions of the various structures examined. Descriptions shall locate any existing cracks, damage or other defects existing, and shall include such information so as to make it possible to determine the effect, if any, of the construction operations on the defect. Where significant cracks or damage exist, or for defects too complicated to describe in words, photographs or videos shall be taken and made part of the record.
4. The survey shall include a test of all private wells in the area. Water quality tests shall be obtained so that a baseline condition may be developed.

The Contractor's record of the pre-blast condition survey shall consist of written documentation and photographs of the conditions identified, or a good quality videotape survey with appropriate audio description of conditions and defects. Prior to start of work, one copy of the Contractor's record of conditions survey shall be submitted to the Engineer for review and retention.

Upon completion of all blasting work, the Contractor shall make an examination similar to the pre-construction survey of any properties, structures, and conditions where complaints of damage have been received or damage claims have been filed. Notice shall be given to all

interested parties so that they may be present during the final examination. Records of the final examination shall be distributed the same as the original preconstruction survey.

The pre-blast condition survey does not relieve the Contractor from responsibility for damage resulting from its blasting operations.

**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.”

**SECTION 1.08 - PROSECUTION AND PROGRESS**

**Article 1.08.04 - Limitation of Operations:** is supplemented by the following:

**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 allowed to perform any work that will interfere with described operations on all project roadways as follows:

**ROUTE 31**

Monday through Friday between 3:00 p.m. and 7:00 p.m.

**ALL OTHER ROADWAYS**

Monday through Friday between 3:00 p.m. and 7:00 p.m.

**OTHER RESTRICTIONS**

The Contractor will not be allowed to perform active construction anywhere within the project area during the following periods:

Monday through Friday between Midnight and 6:00 AM and between 8:00 PM and Midnight  
All day Saturday  
All day Sunday

\* \* \* \* \*

**STAGE CONSTRUCTION**

**Stage Construction of Box Culverts, 48” RCP, Headwalls, and Sluiceway**

The Contractor shall stage construct this drainage system in accordance with the Stage Construction Plans.

**Roadway Reconstruction Route 31**

The contractor shall construct the Drainage and Box Culvert System as indicated above and further described in the project and the removal of rock from station 17+/- to 21+/- as first order work.

The contractor shall maintain drainage of the roadway by utilizing the existing drainage systems, the proposed drainage systems or some combination thereof. The catch basin tops for the proposed drainage system, unless called for in the plans, shall not be installed until roadway paving. The catch basin structures shall be adequately covered and be of sufficient strength to accommodate normal traffic loadings. When all of the drainage systems have been installed, the Contractor can proceed with the reconstruction of the roadway.

During the allowable period, the Contractor shall excavate a reasonable length of existing roadway full width and install permanent processed aggregate base to the permanent locations and elevations as shown on the cross sections. The full width of the roadway shall be constructed during each allowable period. The Contractor shall provide the supporting processed aggregate base for the number of lanes and the prescribed widths as dictated in the Special Provision "Maintenance and Protection of Traffic".

All temporary connections to abutting driveways and existing roadways must be accomplished in a satisfactory manner prior to the end of the work day/night. Excavation and installation of processed aggregate base must be accomplished full width for the proposed roadway. Catch basin tops shall be installed at this time.

On the next to last day of the work week, the Contractor shall ensure that all processed aggregate base work has been completed from the previous three workdays and ready for the placement of the first course of bituminous concrete pavement.

On the last day of the workweek (usually considered to be Friday), the Contractor shall install a sufficient number of intermediate courses of bituminous concrete pavement for that length of roadway that was prepared during the past four workdays. The final course of pavement shall not be installed at this time. Temporary pavement markings shall be installed on the intermediate course of bituminous concrete pavement mentioned above in accordance with Article 9.71.03 as contained in the Special Provision "Maintenance and Protection of Traffic".

When the installation of all the intermediate courses of bituminous concrete pavement is completed for the entire roadway and after all curbing has been set, the Contractor shall install the final course of bituminous concrete pavement. Final pavement markings shall be installed on the final course of bituminous concrete pavement in accordance with Article 9.71.03 as contained in the Special Provision "Maintenance and Protection of Traffic".

### **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.

### **OTHER LIMITATIONS**

The field installation of a signing pattern shall constitute interference with existing traffic operations and shall not be allowed except during the allowable periods.

If there is more than one alternating one-way traffic operation at one time, then there shall be at least 500 feet between signing patterns.

No bituminous roadway, with the exception of transition areas, shall be open to traffic unless the appropriate pavement markings have been installed. The transition areas shall have pavement markings applied immediately upon opening to traffic.

Longitudinal dropdowns greater than 3 inches will not be allowed during those periods when the maximum number of lanes of through traffic is required. The Contractor shall temporarily provide a 4:1 traversable slope of suitable material in those areas where a longitudinal dropdown exists. The cost of furnishing, installing and removing this material shall be included in the contract lump sum for "Maintenance and Protection of Traffic."

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 (worknight). All transverse height differentials on all roadway surfaces shall be tapered to negate any "bump" to traffic as specified elsewhere in this contract or as approved by the Engineer. Material for this taper shall be as approved by the Engineer.

All protective systems and traffic control devices as called for by the contract or ordered by the Engineer must be on-hand and available in sufficient quantity for immediate installation prior to any stage change.

### **UTILITY POLES**

It is the intentions of CL&P to replace and relocate almost every utility pole between Stone House Road (Route 275) and the easterly project limit. The approximate proposed locations of the relocated poles are shown on the For Information Only – CL&P Utility Plans. Relocation of the utility poles is a time consuming effort that needs to be coordinated very closely with the reconstruction of the roadway and the other utilities. Preliminary discussions have taken place between ConnDOT and CL&P and a suggested staging plan has been developed. The general outline of that plan is as follows:

- As soon as possible, ideally before the start of construction, Utility pole numbers 20 through 28, plus 4557, 4557S, 4665, and 28S, temporary poles 4665 and 4666 should be installed and 31 should be removed by CL&P. The location of the existing poles are generally within the future roadway pavement and getting them relocated as soon as possible is very important.
- Roadway reconstruction should start at the east end of the project and work toward the west.
- Once traffic on the westerly end of the project has been shifted onto the new northerly alignment utility poles 29 through 31 can be relocated.
- In existing or proposed sidewalk areas, a forty-eight-inch minimum clear path shall be provided between the existing or new pole and the back of walkway, curb or other obstruction to allow the passage of pedestrians and wheelchairs.
- Sidewalks and paved snow shelves (Concrete Masonry Grid Pavers) shall not be poured in the vicinity of the utility poles until the new pole installed and the old pole removed.

## **SECTION 1.10 - ENVIRONMENTAL COMPLIANCE**

### Article 1.10.03 -- Water Pollution Control: **BEST MANAGEMENT PRACTICES**

*Add the following after Best Management Practice Number 14.*

15. The Contractor is hereby notified that the location of the project occurs within a public watershed, well head protection area, aquifer protection area (APA), or sole source aquifer (SSA). The Contractor is hereby notified that the location of 32-130 occurs within one of these sensitive areas. The protected areas encompass the area of contribution and recharge for the protected resource, as depicted on the graphical map. Please note that the Office of Environmental Planning will provide the graphical map to the District for the Contractor after the project has been awarded and is not intended for public viewing and is not subject to requests under the Freedom of Information Act. As a result of this location, special requirements must be followed for cleaning machinery, storage of materials, and servicing/fueling equipment.

1. All Contractors and their employees must be informed of the sensitive area that they are working in. No pollutants may be discharged that could have adverse effects on the public drinking water supply. Any fuel or other hazardous chemical spills must be reported immediately to the DEEP Oil and Chemical Spills Unit at (860) 424-3338, the Department of Public Health's Drinking Water Division at 860-509-7333, and The Connecticut Water Company at (860) 597-6497.

When working within the Pootatuck SSA in Newtown or within the Pawcatuck SSA in North Stonington which also encompasses areas in Sterling, Stonington and Voluntown, Mr. Jeff Butensky from the Environmental Protection Agency (EPA) must be contacted at (617) 918-1665. Mr. Robert Adler from the EPA may also be contacted at (617) 918-1396 if a project is near the Rhode Island state border.

2. Contractors must adhere to specialized cleanup procedures while working within the watershed, well head protection area, APA or SSA. No cleaning of any machinery shall be performed within one hundred feet (100') of any water body within the sensitive area.
  - a. Specifically for cleanup associated with the pavers and material transfer vehicles (MTV), the Contractor must move the machine off line onto a tarp. The tarp must be in an acceptable condition so as to prevent liquids and solids from passing through to the ground beneath. The cleanup area shall have oil absorbent pads placed on the tarp. The pavers and MTV

shall be cleaned over the absorbent pads in a manner that will allow the pads to collect any liquids that are used for cleanup.

- b. Specifically for cleanup associated with dump trucks, a liquid tight five gallon pail shall be placed at each corner of the dump body below the lower hinges to capture any materials generated during the cleanup.
3. All materials generated during the cleanup procedures shall be removed off-site at the end of each day and disposed of in a manner consistent with all applicable laws and regulations. These materials shall not be buried outside of the roadway limits.
4. Servicing and fueling of equipment shall be conducted outside of a public watershed area, APA, SSA, and/or well head protection area.
  - a. If equipment cannot be serviced and refueled outside of the watershed area, well head protection area, APA, or SSA then the Contractor shall utilize the proper spoils handling areas that are identified on the plans.
  - b. Servicing and fueling of equipment is not permitted within a 500 foot radius of a non-community well and within a 1000 foot radius of a community well.
  - c. Any fuel and/or hazardous materials that must be kept within these sensitive areas during working hours shall be stored in an enclosed spill proof container.
  - d. Spill containment systems must be utilized during fueling operations, and shall be manufactured by Sentry Lite Berms, Collapse-a-tainer, or approved equal. It shall have a minimum capacity of 80-gallons and shall be made of plastic or vinyl which is inert to all fuel types.
  - e. Fuel spill remediation kits shall be stored on-site so that spills may be contained and cleaned quickly.
5. Construction staging and laydown areas are prohibited within a watershed area, APA, and/or well head protection area. The Contractor shall submit to the Engineer the desired location of trailer(s), construction staging/laydown areas, containment systems, and sedimentation control systems for review and approval prior to the start of construction.
6. Millings may be re-used as asphalt material. Disposal of excess millings must be performed off-site in a manner consistent with all applicable laws and regulations. At no time can millings be dumped or buried outside of the roadway limits.

## **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 and placement of a non-segregated, smooth and dense bituminous concrete mixture brought to proper grade and cross section. This section shall also include the method and construction of longitudinal joints. The Contractor shall furnish ConnDOT with a Quality Control Plan (QCP) as described in Article 4.06.03.

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

Bituminous Concrete: A concrete material that uses a bituminous material (typically asphalt) as the binding agent and stone and sand as the principal aggregate components. Bituminous concrete may also contain any of a number of additives engineered to modify specific properties and/or behavior of the concrete material. For the purposes of this Specification, references to bituminous concrete apply to all of its sub-categories, for instance those defined on the basis of production and placement temperatures, such as hot-mix asphalt (HMA) or warm-mix asphalt (WMA), or those defined on the basis of composition, such as those containing polymer-modified asphalt (PMA).

Course: A lift or multiple lifts comprised of the same bituminous concrete mixture placed as part of the pavement structure.

Density Lot: All material placed in a single lift and as defined in Article 4.06.03.

Disintegration: Wearing away or fragmentation of the pavement. Disintegration will be evident in the following forms: Polishing, weathering-oxidizing, scaling, spalling, raveling, potholes or loss of material.

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

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

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

Polymer Modified Asphalt (PMA): A bituminous concrete mixture containing a polymer modified asphalt binder in accordance with contract specifications. All PMA mixtures shall incorporate a qualified warm mix technology.

Production Lot: All material placed during a continuous daily paving operation.

Quality Assurance (QA): All those planned and systematic actions necessary to provide confidence that a product or facility will perform as designed.

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): A bituminous concrete mixture that can be produced and placed at reduced temperatures than HMA using a qualified additive or technology.

**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. Bituminous Concrete plant QCP requirements are defined in Section M.04.

**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 Section M.04 and Project Specifications. CRCG and RAS shall not be used in the surface course.

**4.06.03—Construction Methods:**

**1. Material Documentation:** All vendors producing bituminous concrete must have their truck-weighting scales, storage scales, and mixing plant automated to provide a detailed ticket.

Delivery tickets shall include the following information:

- a. State of Connecticut printed on ticket.
- b. Name of producer, identification of plant, and specific storage bin (silo) if used.
- c. Date and time of day.

- d. Mixture Designation; Mix type and level Curb mixtures for machine-placed curbing must state "curb mix only".
- e. If RAP is used, the plant printouts shall include the RAP dry weight, percentage and daily moisture content.
- f. If RAS is used, the plant printouts shall include the RAS dry weight and percentage daily moisture content.
- g. The delivery ticket for all mixes produced with Warm Mix Technology must indicate the additive name, and the injection rate (water or additive) incorporated at the HMA plant. The delivery ticket for all mixes produced with pre-blended WMA additive must indicate the name of the WMA Technology.
- h. Net weight of mixture loaded into truck (When RAP and/or RAS is used the moisture content shall be excluded from mixture net weight).
- i. Gross weight (Either equal to the net weight plus the tare weight or the loaded scale weight).
- j. Tare weight of truck – Daily scale weight.
- k. Project number, purchase order number, name of Contractor (if Contractor other than Producer).
- l. Truck number for specific identification of truck.
- m. Individual aggregate, Recycled Materials, and virgin asphalt high/target/low weights. For drum plants and silo loadings, the plant printouts shall be produced at 5 minute intervals maintained by the vendor for a period of three years after the completion of the project.
- n. For every mixture designation the running daily total delivered and sequential load number.

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

The Contractor must notify the Engineer immediately if, during the production day, there is a malfunction of the weighing or recording system in the automated plant or truck-weighing scales. Manually written tickets containing all required information will be allowed for one hour, but for no longer, provided that each load is weighed on State-approved scales. At the Engineer's sole discretion, trucks may be approved to leave the plant if a State inspector is present to monitor weighing. If such a malfunction is not fixed within forty-eight hours, mixture will not be approved to leave the plant until the system is fixed to the Engineer's satisfaction. No damages will be considered should the State be unable to provide an inspector at the plant.

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

**2. Transportation of Mixture:** Trucks 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 of all vehicles and allowable weights transporting mixture.

The State reserves the right to check the gross and tare weight of any delivery truck. A variation of 0.4 percent or less in the gross or tare weight shown on the delivery ticket and the certified scale weight shall be considered evidence that the weight shown on the delivery ticket is correct. 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 take action to correct discrepancy to the satisfaction of the Engineer.

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

The mixture shall be transported from the mixing plant in trucks that have previously been cleaned of all foreign material and that have no gaps through which mixture might inadvertently escape. The Contractor shall take care in loading trucks uniformly so that segregation is minimized. Loaded trucks shall be tightly covered with waterproof covers acceptable to the Engineer. Mesh covers are prohibited. The front and rear of the cover must be fastened to minimize air infiltration. The Contractor shall assure that all trucks are in conformance with this specification. Trucks found not to be in conformance shall not be allowed to be loaded until re-inspected to the satisfaction of the Engineer.

Truck body coating and cleaning agents must not have a deleterious effect on the transported mixture. The use of solvents or fuel oil, in any concentration, is strictly prohibited for the coating of the inside of truck bodies. When acceptable coating or agents are applied, truck bodies shall be raised immediately prior to loading to remove any excess agent in an environmentally acceptable manner.

**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 strictly prohibited as a release agent or cleaner on any paving equipment (i.e., rollers, pavers, transfer devices, etc.).

Refueling of equipment is prohibited in any location on the paving project where fuel might come in contact with bituminous concrete mixtures already placed or to be placed. Solvents for use in cleaning mechanical equipment or hand tools shall be stored clear of areas paved or to be paved. Before any such equipment and tools are cleaned, they shall be moved off the paved or to be paved area; and they shall not be returned for use until after they have been allowed to dry.

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. Rollers types shall include steel-wheeled, pneumatic or a combination thereof and may be capable of operating in a static or dynamic mode. Rollers that operate in a dynamic mode shall have drums that use a vibratory or oscillatory system or combination of. The vibratory system achieves compaction through vertical amplitude forces. Rollers with this system shall be equipped with indicators that provide the operator with amplitude, frequency and speed settings/readouts to measure the impacts per foot during the compaction process. The oscillatory system achieves compaction through horizontal shear forces. Rollers with this system 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 self-propelled and 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, adjusting ballast and tire inflation pressure as required. The Contractor shall furnish evidence 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 approved lighting fixtures of equivalent light output characteristics. Lighting shall maximize the illumination on each task and minimize glare to passing traffic. The Contractor shall provide generators on rollers and pavers of the type, size, and wattage, to adequately furnish electric power to operate the specified lighting equipment. The lighting options and minimum number of fixtures are listed in Tables 4.06-1 and 4.06-2:

**TABLE 4.06-1: Paver Lighting**

<b>Option</b>	<b>Fixture Configuration</b>	<b>Fixture Quantity</b>	<b>Requirement</b>
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: Roller Lighting**

<b>Option</b>	<b>Fixture Configuration*</b>	<b>Fixture Quantity</b>	<b>Requirement</b>
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. A surface course is defined as the total thickness of the same bituminous concrete mix that extends up to and includes the final wearing surface whether it is placed in a single or multiple lifts, and regardless of any time delays between lifts.

The MTV must be a self-propelled vehicle specifically designed for the purpose of delivering the bituminous concrete mixture from the delivery truck 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 to be used.
- The individual axle weights and axle spacing for each separate piece of paving equipment (haul vehicle, MTV and paver).
- A working drawing showing the axle spacing in combination with all three 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 acceptance by the Engineer. The 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: A permanent transition is defined as any transition that remains as a permanent part of the work. All permanent transitions, leading and trailing ends shall meet the following length requirements:

- a) Posted speed limit is greater than 35 MPH: 30 feet per inch of vertical change (thickness)
- b) Posted speed limit is 35 MPH or less: 15 feet per inch of vertical change (thickness).
- c) Bridge Overpass and underpass transition length will be 75 feet either
  - (1) Before and after the bridge expansion joint, or
  - (2) Before or after the parapet face of the overpass.

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 bituminous concrete, the underlying base course shall be brought to the plan grade and cross section within the allowable tolerance. Immediately before placing the mixture, the area to be surfaced shall be cleaned by sweeping or by other means acceptable to the Engineer. The bituminous concrete mixture shall not be placed whenever the surface is wet or frozen. The Engineer will verify the mix temperature by means of a probe or infrared type of thermometer. A probe type thermometer, verified by the Department on an annual basis, must be used in order to reject a load of mixture based on temperatures outside the range stated in the placement QCP.

Placement: The bituminous concrete 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 mix, 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 daily, 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 uniform 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 total thickness of the lift of mixture exceeds that shown on the plans beyond the tolerances shown in Table 4.06-3, the longitudinal limits of such variation including locations and intervals of the measurements will be documented by the Engineer for use in calculating an adjustment in accordance with Article 4.06.04.

**TABLE 4.06-3: Thickness Tolerances**

<b>Mixture Designation</b>	<b>Lift Tolerance</b>
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 of each lift, the longitudinal limits of such variation including locations and intervals of the measurements will be documented by the Engineer for use in calculating the adjustment in Article 4.06.04.
- c) Delivered Weight of Mixture - When the delivery ticket shows that the truck exceeds the allowable gross weight for the vehicle type the quantity of tons representing the overweight amount will be documented by the Engineer for use in calculating an adjustment in accordance with Article 4.06.04.

Transverse Joints: All transverse joints shall be formed by saw-cutting a sufficient distance back from the previous run, existing bituminous concrete pavement or bituminous concrete driveways to expose the full thickness of the lift. A brush of tack coat shall be used on any cold joint immediately prior to additional bituminous concrete mixture being placed.

Tack Coat Application: Immediately before application, the area to be tacked shall be cleaned by sweeping or by other means acceptable to the Engineer. A thin uniform coating of tack coat shall be applied to the pavement immediately before overlaying and be allowed sufficient time to break (set) prior to any paving equipment or haul vehicles driving on it. All surfaces in contact with the bituminous concrete that have been in place longer than 3 calendar days shall have an application of tack coat. The tack coat shall be applied by a non-gravity 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.

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 1/2) 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.

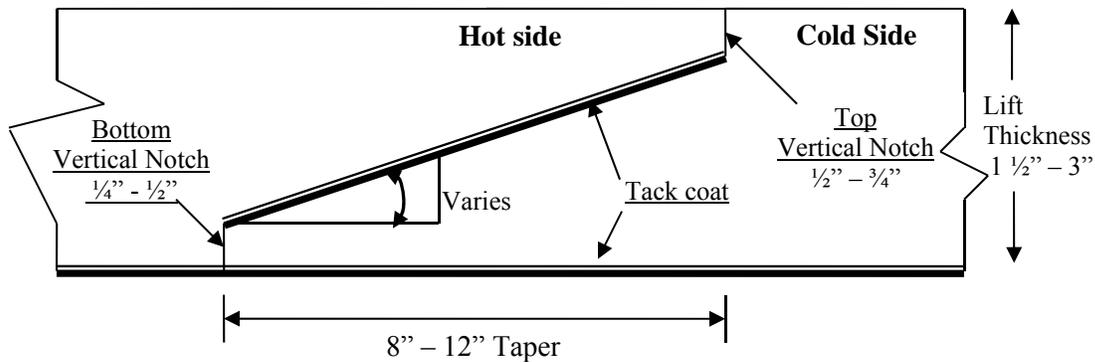
These allowances will not relieve the Contractor from meeting pavement compaction requirements.

Surface Requirements: The pavement surface of any lift shall meet the following requirements for smoothness and uniformity. Any irregularity of the surface exceeding these requirements shall be corrected by the Contractor.

- a) Smoothness- Each lift of the surface course shall not vary more than  $\frac{1}{4}$  inch from a Contractor-supplied 10 foot straightedge. For all other lifts of bituminous concrete, the tolerance shall be  $\frac{3}{8}$  inch. Such tolerance will apply to all paved areas.
- b) Uniformity- The paved surface of the mat and joints shall not exhibit segregation, rutting, cracking, disintegration, flushing or vary in composition as determined by the Engineer.

**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  $1\frac{1}{2}$  and 3 inches, except for S1mixes. Method II Butt Joint (see Figure 4.06-2) shall be used for lifts less than  $1\frac{1}{2}$  inches or greater than 3 inches, and S1mixes. During placement of multiple lifts of bituminous concrete, 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  $\frac{1}{4}$  of an 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.

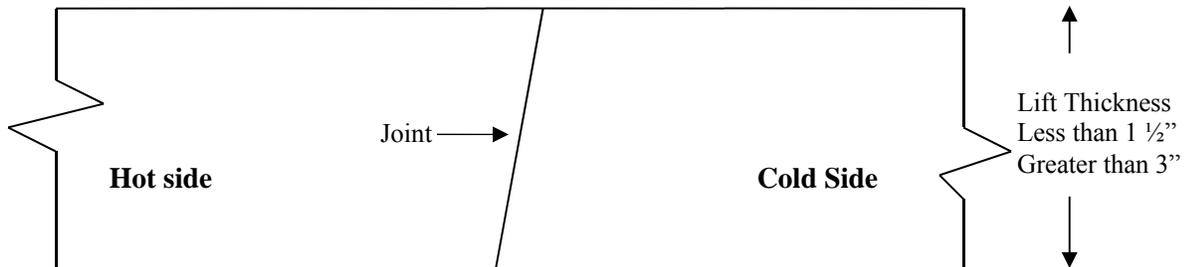
The pavement surface under the wedge joint must have an application of tack coat material. Prior to placing the completing pass (hot side), an application of tack coat must be applied to the exposed surface of the tapered section; regardless of time elapsed between paver passes. The in-place time allowance described in Sub article 4.06.03-7 does not apply to joint construction.

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:**

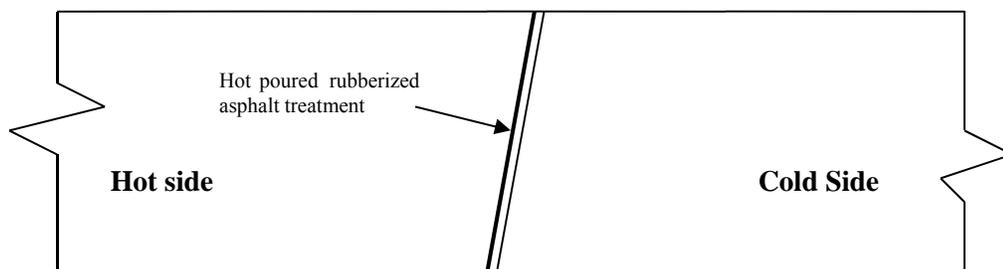


**FIGURE 4.06-2: Butt Joint**

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 bituminous concrete 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:

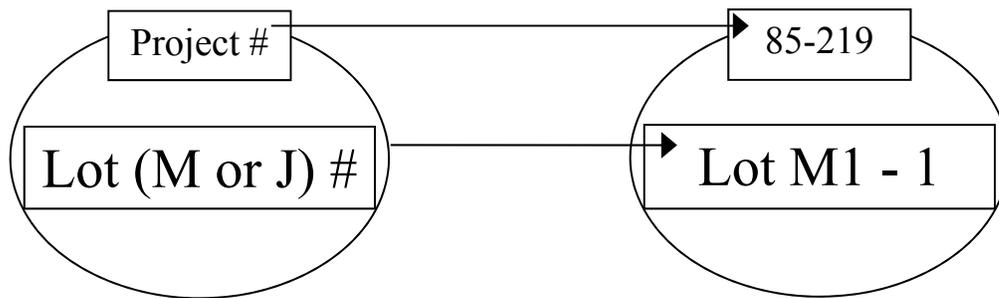
- Bituminous concrete mixes shall not be placed when the air or sub base temperature is below 40°F regardless of the season.
- Should paving operations be scheduled during the Extended Season, the Contractor must submit an Extended Season Paving Plan for the project that addresses minimum delivered mix 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. Density Testing of Bituminous Concrete Utilizing Core Samples:** This procedure describes the frequency and the method the Contractor shall use to obtain pavement cores for acceptance from the project.

Coring shall be performed on each lift specified to a thickness of one and one-half (1 ½) inches or more. All material placed in a lift shall be compacted to the degree specified in Tables 4.06-9 and 4.06-10. The density of each core will be determined using the production lot’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. Bituminous concrete HMA S1 mixes are excluded from the longitudinal joint density requirements.

The Contractor shall extract cores (4 or 6 inch diameter for S0.25, S0.375 and S0.5 mixes, 6 inch diameter for S1.0 mixtures -wet sawed) from sampling locations determined by the Engineer. The Engineer must witness the extraction and labeling of cores, as well as the filling of the core holes. The cores shall be labeled by the Contractor with the project number, lot number, and sub-lot number on the top surface of the core. When labeling the core lot number, include whether the core is from a mat lot or joint lot by using an “M” for a mat core and “J” for a joint core. For example, a core from the first sub-lot of the first mat lot shall be labeled with “Lot M1 – 1”. The first number refers to the lot and the second number refers to the sub-lot. Refer to Figure 4.06-4. The side of the cores shall be labeled with the core lot number and date placed. The project inspector shall fill out a MAT-109 containing the same information to accompany the cores. The Contractor shall deliver the cores and MAT-109 to the Department’s Central Testing Lab in a safe manner to ensure no damage occurs to the cores. The Contractor shall use a container approved by the Engineer. In general the container shall consist of an attached lid container made out of plastic 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 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. The Central Lab will break the security seal and take possession of the cores upon receipt.



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

Frequency of sampling is in accordance with the following tables:

**TABLE 4.06-4: Testing Requirement for Bridge Density Lot**

Length of Each Structure (Feet)	MAT – No. of Cores	JOINT - No. of 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: Testing requirement for Density Lots  $\geq$  500 Tons**

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

**TABLE 4.06-5B: Testing requirement for Density Lots  $<$  500 Tons**

Lot Type	No. of Mat Cores	No. of Joint Cores	Lot Size (Tons)
Lot Without Bridge <sup>(1)</sup>	3	3	1 per lift
Lot With Bridge(s) <sup>(1)(2)</sup>	3	3	1 per lift

Notes:

<sup>(1)</sup> The number of “Required Paver Passes for Full Width” shall be used to determine the sub-lot sizes within the lot. The number of paver passes for full width is determined by the contractor.

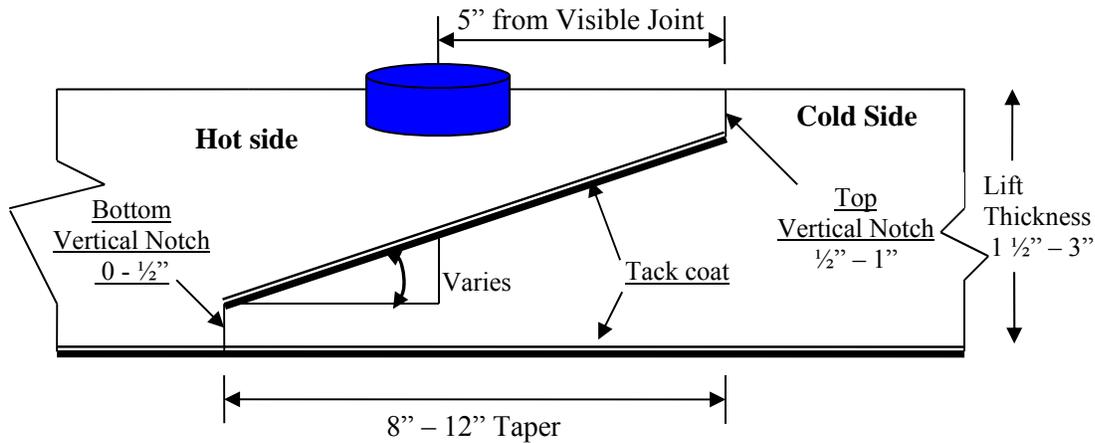
<sup>(2)</sup> If a non-bridge mat or joint core location randomly falls on a structure, the core is to be obtained on the structure in addition to the core(s) required on the structure.

A density lot will be complete when the full designed paving width of the established lot length has been completed and shall include all longitudinal joints that exist between the curb lines regardless of date(s) paved. Quantity of material placed on structures less than or equal to 500 feet long is inclusive of the standard lot. Prior to paving, the total length of the project to be paved shall be split up into lots that contain approximately 2000 tons each. Areas such as highway ramps may be combined to create one lot. In general, combined areas should be set up to target a 2000 ton lot size. One adjustment will apply for each lot. The tons shall be determined using the yield calculation in Article 4.06.04. The last lot shall be the difference between the total payable tons for the project and the sum of the previous lots.

After the compaction process has been completed, the material shall be allowed to cool sufficiently to allow the cutting and removal of the core without damage. The Contractor shall core to a depth that allows extraction so that the uppermost layer being tested for density will not be affected.

A mat core shall not be taken 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, locate the core so that the sample is one foot from the edge.

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. Refer to Figure 4.06-5.



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

When 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.

All cores must be cut within 5 calendar days of placement. 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.

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 fill shall be compacted to 1/8 inch above the finished pavement.

**11. Acceptance Inspection, Sampling and Testing:** Inspection, sampling, and testing to be used by the Engineer shall be performed at the minimum frequency specified in Section M.04 and stated herein.

Sampling for acceptance shall be established using ASTM D 3665, or a statistically based procedure of random sampling approved by the Engineer.

Plant Material Acceptance: The Contractor shall provide the required acceptance sampling, testing and inspection during all phases of the work in accordance with Section M.04. The Department will perform verification testing on the Contractor's acceptance test results. Should binder content, theoretical maximum density (Gmm), or air void results exceed the specified tolerances in the Department's current QA Program for Materials, Acceptance and Assurance Testing Policies and Procedures, the Department will investigate to determine an assignable cause. Contractor test results for a subject lot or sub lot may be replaced with the Department's

results for the purpose of assessing adjustments. The verification procedure is included in the Department's current QA Program for Materials.

Density Acceptance: The Engineer will perform all acceptance testing on the cores in accordance with AASHTO T 331.

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

**13. Corrective Work Procedures:** Any portion of the completed pavement that does not meet the requirements of the specification shall be corrected at the expense of the Contractor. Any corrective courses placed as the final wearing surface shall match the specified lift thickness after compaction.

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) Perform all corrective work in accordance with the Contract and the approved corrective procedure.

**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. Prior to the Engineer's authorization to open the pavement to traffic, the Contractor is responsible to protect the pavement from damage.

**15. Cut Bituminous Concrete Pavement:** Work under this item shall consist of making a straight-line cut in the bituminous concrete 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 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:  $A = \text{Area} = \{[L \times (\text{Designed width} + \text{tolerance (lift thickness)}) / 12] / 9\}$   
 $t_{\text{adj}} = \text{Adjusted thickness} = [(\text{Dt} + \text{tolerance}) - \text{Actual thickness}]$   
 $\text{Dt} = \text{Designed thickness (inches)}$

- 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 will be adjusted based on test results and values listed in Tables 4.06-6 and 4.06-7, . The Department's Division of Material Testing will calculate the daily adjustment value for T<sub>SD</sub>.

The adjustment values in Table 4.06-6 and 4.06-7 shall be calculated for each sub lot based on the Air Void and Liquid Binder Content 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:  $\text{AdjAV}_t$  = Total percent air void adjustment value for the lot  
 $\text{AdjAV}_i$  = 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.04.03-1

**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

Positive air void adjustment values will not be calculated for any test that fails to meet gradation or binder content tolerances of the JMF in Table M.04.03– 5.

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

Where:  $\text{AdjPB}_t$  = Total percent liquid binder adjustment value for the lot  
 $\text{AdjPB}_i$  = 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**

Adjustment Value (AdjAV <sub>i</sub> ) (%)	<u>S0.25, S0.375, S0.5, S1</u> Pb (refer to Table M.04.02-5)
0.0	Equal to or above the min. liquid content
- 10.0	Below the min. liquid content

- 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. 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.

$$\text{Tons Adjusted for Density (T}_D\text{)} = [ \{ (\text{PA}_M \times .50) + (\text{PA}_J \times .50) \} / 100 ] \times \text{Density Lot Tons}$$

Where:  $T_D$  = Total tons adjusted for density for each lot  
 $\text{PA}_M$  = Mat density percent adjustment from Table 4.06-9  
 $\text{PA}_J$  = 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**

Average Core Result Percent Joint Density	Percent Adjustment (Bridge and Non-Bridge) <sup>(1)(2)</sup>
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.

Method of Measurement:

- 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. Truck Method- The Engineer will establish a weight per gallon of the tack coat based on the density at 60°F for the material furnished. The number of gallons furnished will be determined by weighing the material on scales furnished by and at the expense of the Contractor, or from the automated metering system on the delivery vehicle.

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

**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 in any manner by the Contractor. If the Contractor should alter the amount shown, the altered figure will be disregarded and the original estimated cost will be used for the Contract.

**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 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 9.21 - CONCRETE SIDEWALKS AND RAMPS**

Section 9.21 is being deleted in its entirety and replaced with the following:

### **9.21.01 – Description**

### **9.21.02 – Materials**

### **9.21.03 – Construction Methods**

### **9.21.04 – Method of Measurement**

### **9.21.05 – Basis of Payment**

**9.21.01—Description:** This item shall consist of concrete sidewalks and ramps constructed on a gravel or reclaimed miscellaneous aggregate base course in the locations and to the dimensions and details shown on the plans or as ordered and in accordance with these specifications.

**9.21.02—Materials:** Materials for this work shall conform to the requirements of Article M.03.01 for Class “F” Concrete.

Gravel or reclaimed miscellaneous aggregate for base shall conform to Article M.02.01 for granular fill.

Detectable warning strips shall be a prefabricated detectable warning tile chosen from the Department’s Qualified Products List for retrofit and/or cast in place applications.

### **9.21.03—Construction Methods:**

**1. Excavation:** Excavation, including removal of any existing sidewalk (bituminous or concrete) and curbing, shall be made to the required depths below the finished grade, as shown on the plans or as directed. All soft and yielding material shall be removed and replaced with suitable material.

When connecting new concrete sidewalk to a section of existing concrete sidewalk, the connection point shall be at the nearest joint in the existing sidewalk.

The Contractor shall establish the limits required to achieve grades for each ramp prior to removal of existing sidewalk and ramps. The Contractor shall document and notify the Engineer of any control points that may conflict with the design grades or configuration of ramps shown on the plans. Control points can be but are not limited to ROW, utility poles, drainage structures, buildings, fences, walls or other features found near the proposed ramp. When control points are encountered within the limits of the ramp, the Engineer will determine if an alternative ramp type is required or the ramp is to be constructed as shown on the plans.

**2. Gravel or Reclaimed Miscellaneous Aggregate Base:** The gravel or reclaimed miscellaneous aggregate base shall be placed in layers not over 6 inches in depth and to such a depth that after compaction it shall be at the specified depth below the finished grade of the walk. The base shall be wetted and rolled or tamped after the spreading of each layer.

**3. Forms:** Forms shall be of metal or wood, straight, free from warp and of sufficient strength to resist springing from the pressure of the concrete. If made of wood, they shall be of 2-inch surfaced plank except that at sharp curves thinner material may be used. If made of metal, they shall be of an approved section and have a flat surface on the top. Forms shall be of a depth equal to the depth of the sidewalk. Forms shall be securely staked, braced and held firmly to the required line and grade and shall be sufficiently tight to prevent leakage of mortar. All forms

shall be cleaned and oiled or wetted before concrete is placed against them. Sheet metal templates 1/8 inch in thickness, of the full depth and width of the walk, shall be spaced at intervals of 12 feet or as directed. If the concrete is placed in alternate sections, these templates shall remain in place until concrete has been placed on both sides of the template. As soon as the concrete has obtained its initial set, the templates shall be removed.

**4. Concrete:** The concrete shall be proportioned, mixed, placed, etc., in accordance with the provisions of Section 6.01 for Class “F” Concrete. Concrete shall be cured in accordance with the provisions of Article 4.01.03 for Concrete Pavement.

**5. Finishing:** The surface of the concrete shall be finished with a wood float or by other approved means. The outside edges of the slab and all joints shall be edged with a 1/4-inch radius edging tool. Each slab shall be divided into two or more sections by forming dummy joints with a jointing tool as directed.

**6. Backfilling and Removal of Surplus Material:** The sides of the sidewalk shall be backfilled with suitable material thoroughly compacted and finished flush with the top of the sidewalk. All surplus material shall be removed and the site left in a neat and presentable condition to the satisfaction of the Engineer.

**7. Detectable Warning Strip:** The detectable warning strip for new construction shall be set directly in poured concrete and each tile shall be weighted down to prevent the tile from floating after placement in wet concrete in accordance with curing procedures. Install detectable warning strip, according to the plans and the Manufacturer’s specifications, or as directed by the Engineer.

The detectable warning strip for retrofit construction shall be installed according to the plans in the direction of pedestrian route and contained wholly within painted crosswalk when present. Its installation shall conform to all Manufactures requirements.

**9.21.04—Method of Measurement:** This work will be measured for payment as follows:

**1. Concrete Sidewalk or Sidewalk Ramp:** This work will be measured by the actual number of square feet of completed and accepted concrete sidewalk or ramp.

**2. Excavation:** Excavation below the finished grade of the sidewalk or ramp, backfilling, and disposal of surplus material will not be measured for payment, but the cost shall be included in the price bid for the sidewalk or ramp. Excavation above the finished grade of the sidewalk or ramp will be measured and paid for in accordance with Section 2.02

**3. Gravel or Reclaimed Miscellaneous Aggregate Base:** This work will not be measured for payment, but the cost shall be considered as included in the price bid for the sidewalk or ramp.

**4. Detectable Warning Strip:** For new construction (cast in place), the detectable warning strip will be measured for payment by the actual number of each ramp where a detectable warning strip has been installed and accepted regardless of the number of tiles installed.

**5. Retrofit Detectable Warning Strip:** For retrofit construction (surface applied), the detectable warning strip will be measured for payment by the actual number of each ramp where a detectable warning strip has been installed and accepted regardless of the number of tiles installed.

**6. Construction Staking:** The establishment of control points and limits of grading will be measured in accordance with the item Construction Staking.

**9.21.05—Basis of Payment:** Construction of a concrete sidewalk or ramp will be paid for at the contract unit price per square foot for "Concrete Sidewalk," or "Concrete Sidewalk Ramp" complete in place, which price shall include all excavation as specified above, backfill, disposal of surplus material, curb removal and any monolithic or separately cast sidewalk curb when required for the sidewalk ramp as shown on the plans, gravel or reclaimed miscellaneous aggregate base, equipment, tools, materials and labor incidental thereto.

A new detectable warning strip will be paid for at the contract unit price for each ramp where the detectable warning strip has been installed complete in place. This price shall include all tiles, materials, equipment, tools and labor incidental thereto.

Retrofitting the existing concrete sidewalk with a detectable warning strip will be paid for at the contract unit price for each ramp where the retrofit detectable warning strip has been installed complete in place. This price will include all tiles, saw cutting concrete, adhesive, drilling holes for fasteners, materials, equipment, tools and labor incidental there to.

The establishment of control points and limits of grading will be paid for in accordance with the item Construction Staking.

Pay Item	Pay Unit
Concrete Sidewalk	s.f.
Concrete Sidewalk Ramp	s.f.
Detectable Warning Strip	Each
Retrofit Detectable Warning Strip	Each

**SECTION 10.00 - GENERAL CLAUSES FOR HIGHWAY ILLUM. AND TRAFFIC SIGNAL PROJECTS**

Add the following: Article 10.00.14 – Maintenance of Illumination During Construction

The Contractor shall organize his work so that any portion of the roadway which has existing illumination and is open for use remains lighted. The Contractor shall also provide illumination on all temporary crossovers, ramps and roadways, constructed as part of the stage construction, which are open for use. The lighting may consist of: existing lighting, new lighting, temporary lighting, or any combination of the above. It is the Contractor's responsibility to stage the installation/relocation of service cabinets, poles, lights, and circuitry so that all roadways as described above remain lighted. If it is necessary to install temporary poles, lights, or circuitry, that work shall be submitted to the Engineer for approval prior to installation, and will be paid for at the contract bid unit price for these items.

If the contract documents include temporary illumination plans, these plans shall serve as a framework for providing roadway illumination during construction. Temporary illumination plans may not represent the extent of the temporary illumination work required, or the exact quantity of temporary lights to be installed.

Prior to the start of any work on the lighting system, the Contractor, along with ConnDOT District Electrical Maintenance, shall inspect the system for lighting outages, pole knockdowns, and circuit malfunctions. If found, these deficiencies shall be noted and repaired by ConnDOT prior to the start of work by the Contractor.

Once the Contractor begins work on the roadway lighting system, maintenance of that system becomes the Contractor's responsibility. ConnDOT District Construction personnel will note the start and end date of the Contractor's responsibility for maintenance of the lighting system. The Contractor shall maintain the illumination throughout the duration of the project, until accepted by the State. The Contractor shall supply to the Project Engineer and to the ConnDOT District Electrical Maintenance Supervisor, the names and phone numbers of a primary, and back-up representative, to be contacted should a problem with the lighting system occur.

Initial notification of lighting outages or pole knockdowns within the project limits should immediately be directed to ConnDOT Highway Operations, who would then notify ConnDOT Electrical Maintenance. ConnDOT Highway Operations can be reached at the following telephone numbers: for projects in District 3 call (203)-696-2690, for projects in Districts 1, 2, and 4 call (860) 594-3447. The following procedures will be followed for lighting outages:

- 1) Once notified of a lighting outage, ConnDOT Electrical Maintenance personnel will assess the situation, and in the case of a pole knockdown, may clear the pole from the roadway and make safe any exposed wires.

- 2) Upon assessment of the lighting outage, ConnDOT will notify the Project Inspector and the Contractor's designated representative of the outage, thereby transferring responsibility for any further repairs to the Contractor.
- 3) Upon notification, The Contractor shall be responsible to repair the lighting system before the normal nighttime turn-on of the lights. If this cannot be achieved, the Contractor will be required to have the lighting operational prior to the next normal nighttime turn-on of the lights, up to a maximum of 24 hours from the time the Contractor was notified of the problem. The Contractor shall contact the district construction field office and apprise the Project Inspector of the situation, and brief him on what steps will be taken to bring the lighting back on line along with an anticipated time frame for doing this.
- 4) For isolated individual luminaire outages (not a continuous circuit), the Contractor shall repair such luminaires within 48 hours of notification.

If the Contractor's response to the lighting outage is deemed unacceptable, repairs to the lighting system may be carried out for safety reasons, by State forces, at the State's discretion. Labor and material costs incurred by the State for this repair work, will be assessed to the Contractor.

The Contractor shall follow standard "lock-out", "tag-out", and "call before you dig" procedures when working on the lighting circuit. Both the Contractor and ConnDOT Electrical Maintenance shall have mutual accessibility to active lighting control cabinets.

The Contractor shall be responsible for repair of damage to the lighting system incurred as the result of his operations. All repairs or replacements due to the Contractor's operations shall be made by the Contractor at the Contractor's expense.

The Contractor shall maintain a log book of any lighting repair work performed, which will include a description of the repairs, and the date the work was performed. The log book shall be made accessible to the project Engineer.

Temporary illumination circuitry shall consist of pre-assembled aerial cable of the type and size as indicated in the special provisions. If aerial cable cannot be installed due to specific construction activities (driving of piles, placing of bridge girders..etc.), the Contractor shall notify the Engineer and suggest alternative methods of installation. Alternative options may include installing cable in duct underground, or installing surface mounted cable in duct or PVC conduit with cable along the backside of a bridge parapet or temporary concrete barrier curbing. Temporary cable in duct/conduit laying directly on the ground will not be allowed. The option of surface mounting duct or conduit to the backside of a parapet or barrier will only be allowed when construction activities make it necessary, and where the surface mounted conduit will not expose workers to a high voltage hazard. The Engineer's approval will be required prior to the installation of any temporary circuitry not installed overhead.

When temporary circuitry is installed in trench, standard warning tape procedures will be followed as set forth in Article 1.05.15. When temporary circuitry is surface mounted to the

backside of a parapet or barrier wall, the Contractor shall install warning placards which read: "Live Electricity". Warning placards shall be installed at the beginning, end, and at intermittent points 100' (30 meters) apart along the exposed length of the duct/conduit. All temporary lighting circuits shall include a continuous No. 8 bare copper grounding conductor connected to all light standards and effectively grounded as per the NEC.

## **SECTION M.04 - BITUMINOUS CONCRETE**

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 material, and facility or plant used to produce and test bituminous concrete must be qualified on an annual basis by the Engineer. Test Procedures and Specifications referenced herein are in accordance with the latest AASHTO and ASTM Standard Test Procedures and Specifications. Such references when noted with an (M) have been modified by the Engineer and are detailed in Table M.04.03-7.

The Contractor shall submit to the Engineer all sources of coarse aggregate, fine aggregate, mineral filler, PG binder, and if applicable any additives such as but not limited to anti-strip, warm mix, and polymer modifiers. The Contractor shall submit a Safety Data Sheet (SDS) for each grade of binder, and additive to be used on the Project. The Contractor shall not change any material sources without prior approval of the Engineer.

An adequate quantity of each size aggregate, mineral filler, bitumen, and additives, shall be maintained at the bituminous concrete plant site at all times while the plant is in operation to ensure that the plant can consistently produce bituminous concrete mixtures that meet the job mix formula (JMF) as specified in Article M.04.02. The quantity of such material shall be reviewed by the Engineer on an individual plant basis and is dependent upon the plant's daily production capacity. A total quantity of any material on site that amounts to less than one day's production capacity may be cause for the job mix formula to be rejected.

#### **1. Coarse Aggregate:**

- a. **Requirements:** The coarse aggregate shall consist of clean, hard, tough, durable fragments of crushed stone or crushed gravel of uniform quality. Aggregates from multiple sources of supply must not be mixed or stored in the same stockpile.
- b. **Basis of Approval:** The request for approval of the source of supply shall include a washed sieve analysis in accordance with AASHTO T 27. The G<sub>sa</sub>, G<sub>sb</sub>, and P<sub>w<sub>a</sub></sub> shall be determined in accordance with AASHTO T 85. The coarse aggregate must not contain more than 1% crusher dust, sand, soft disintegrated pieces, mud, dirt, organic and other injurious materials. When tested for abrasion using AASHTO T 96, the aggregate loss must not exceed 40%. When tested for soundness using AASHTO T 104 with a magnesium sulfate solution, the coarse aggregate must not have a loss exceeding 10% at the end of 5 cycles.

For all bituminous mixtures, materials shall also meet the coarse aggregate angularity criteria as specified in Tables M.04.02-2 thru M.04.02-4 for blended aggregates retained

on the #4 sieve when tested according to ASTM D 5821. The amount of aggregate particles of the coarse aggregate blend retained on the #4 sieve that are flat and elongated shall be determined in accordance with ASTM D 4791 and shall not exceed 10% by weight when tested to a 5:1 ratio, as shown in Tables M.04.02-2 thru M.04.02-4.

**2. Fine Aggregate:**

- a. **Requirements:** The fine aggregate from each source quarry/pit deposit shall consist of clean, hard, tough, rough-surfaced and angular grains of natural sand; manufactured sand prepared from washed stone screenings; stone screenings, slag or gravel; or combinations thereof, after mechanical screening or manufactured by a process approved by the Engineer. The Contractor is prohibited from mixing two or more sources of fine aggregate on the ground for the purpose of feeding into a plant.

All fine aggregate shall meet the listed criteria shown in items #1 thru #7 of Table M.04.01-1. Table M.04.01-1 indicates the quality tests and criteria required for all fine aggregate sources. Individually approved sources of supply shall not be mixed or stored in the same stockpile. The fine aggregates must be free from injurious amounts of clay, loam, and other deleterious materials.

For Superpave mixtures, in addition to the above requirements, the fine aggregate angularity shall be determined by testing the materials passing the #8 sieve in accordance with AASHTO T 304, Method A. Qualification shall be based on the criteria listed in Tables M.04.02-2 thru M.04.02-4. The fine aggregate shall also be tested for clay content as a percentage contained in materials finer than the #8 sieve in accordance with AASHTO T 176.

**TABLE M.04.01-1: Fine Aggregate Criteria by Pit/Quarry Source**

Item	Title	AASHTO Protocol(s)	Criteria
1	Grading	T 27 & T 11	100% Passing 3/8 inch 95% Passing the #4 min.
2	Absorption	T 84	3% maximum
3	Plasticity limits	T 90	0 or not detectable
4	L.A. Wear	T 96	50% maximum(fine agg. particle size # 8 and above)
5	Soundness by Magnesium Sulfate	T 104	20% maximum @ 5 cycles
6	Clay Lumps and Friable Particles	T 112	3% maximum
7	Deleterious Material	As determined by the Engineer	Organic or inorganic calcite, hematite, shale, clay or clay lumps, friable materials, coal-lignite, shells, loam, mica, clinkers, or organic matter (wood, etc). -Shall not contain more than 3% by mass of any individual listed constituent and not more than 5% by mass in total of all listed constituents.
8	Petrographic Analysis	ASTM C 295	Terms defined in Section M.04.01-2c.

b. Basis of Approval: A Quality Control Plan for Fine Aggregate (QCPFA) provided by the Contractor shall be submitted for review and approval for each new source documenting how conformance to Items 1 through 7 as shown in Table M.04.01-1 is monitored. The QCPFA must be resubmitted any time the process, location or manner of how the fine aggregate (FA) is manufactured changes, or as requested by the Engineer. The QCPFA must include the locations and manufacturing processing methods. The QCPFA for any source may be suspended by the Engineer due to the production of inconsistent material.

The Contractor shall submit all test results to the Engineer for review. The Contractor shall also include a washed sieve analysis in accordance with AASHTO T 27/T 11. Any fine aggregate component or final combined product shall have 100% passing the 3/8 inch sieve and a minimum of 95% passing the # 4. The G<sub>sa</sub>, G<sub>sb</sub>, and P<sub>w<sub>a</sub></sub> shall be determined in accordance with AASHTO T 84.

The Contractor will be notified by the Engineer if any qualified source of supply fails any portion of Table M.04.01-1. One retest will be allowed for the Contractor to make corrections and/or changes to the process. If, upon retest, the material does not meet the requirements of items 1-7, additional testing will be required in accordance with item 8.

The Contractor may provide a Petrographic analysis of the material performed by a third party acceptable to the Engineer at its' own expense. The Contractor shall submit the results of the analysis with recommended changes to the manufacturing process to the Engineer. The Contractor shall submit fine aggregate samples for testing by the Engineer after the recommended changes have been made.

The Contractor may request the use of such fine aggregate on select project(s) for certain applications of bituminous concrete pavement. Such material will be monitored for a period no less than 48 months, at no cost to the State. Terms of any evaluation and suitable application will be determined by the Engineer.

### **3. Mineral Filler:**

- a. Requirements: Mineral filler shall consist of finely divided mineral matter such as rock dust, including limestone dust, slag dust, hydrated lime, hydraulic cement, or other accepted mineral matter. At the time of use it shall be freely flowing and devoid of agglomerations. Mineral filler shall be introduced and controlled at all times during production in a manner acceptable to the Engineer.
- b. Basis of Approval: The request for approval of the source of supply shall include the location, manufacturing process, handling and storage methods for the material. Mineral filler shall conform to the requirements of AASHTO M 17.

#### 4. Performance Graded Asphalt Binder:

a. General:

- i. Liquid PG binders shall be uniformly mixed and blended and be free of contaminants such as fuel oils and other solvents. Binders shall be properly heated and stored to prevent damage or separation.
- ii. The blending at mixing plants of PG binder from different suppliers is strictly prohibited. Contractors who blend PG binders will be classified as a supplier and will be required to certify the binder in accordance with AASHTO R 26(M). 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 materials. 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 (tanker truck) 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 will be free of contamination from any residual material, along with two (2) copies of the bill of lading.
- iv. 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) will be allowed to supply PG binders to Department projects.

b. Neat Performance Grade (PG) Binder:

- i. PG binder shall be classified by the supplier as a "Neat" binder for each lot and be so labeled on each bill of lading. 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 asphalt binder shall be PG 64S-22.

c. Modified Performance Grade (PG) Binder:

Unless otherwise noted, the 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.

d. Warm Mix Additive or Technology:

- i. The warm mix additive or technology must be listed on the NEAUPG Qualified Warm Mix Asphalt (WMA) Technologies List at the time of bid, which may be accessed online at [http://www.neaupg.uconn.edu/wma\\_info.html](http://www.neaupg.uconn.edu/wma_info.html).
- 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. Emulsified asphalts shall be homogeneous and be free of contaminants such as fuel oils and other solvents. Emulsions shall be properly stored to prevent damage or separation.
- ii. The blending at mixing plants of emulsified asphalts from different suppliers is strictly prohibited. Contractors who blend emulsified asphalts will be classified as a supplier and will be required to certify the emulsion in accordance with AASHTO PP 71. The emulsified asphalt shall meet the requirements of AASHTO M 140(M) or AASHTO M 208 as applicable.

b. Supplier 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 will be allowed to supply emulsified asphalt to Department projects.
- ii. The supplier shall submit to the Division Chief a Certified Test Report representing each lot in accordance with AASHTO PP 71. The Certified Test Report shall include test results for each specified requirement for the grade delivered and shall also indicate the density at 60°F. Additionally, once a month one split sample for each emulsified asphalt grade shall be submitted.

c. Basis of Approval

- i. Each shipment of emulsified asphalt delivered to the project site shall be accompanied with the corresponding SDS and Certified Test Report listing Saybolt viscosity, residue by evaporation, penetration of residue, and weight per gallon at 60°F.
- ii. Anionic emulsified asphalts shall conform to the requirements of AASHTO M-140(M). 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.
- iii. 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. Requirements: RAP shall consist of asphalt pavement constructed with asphalt and aggregate reclaimed by cold milling or other removal techniques approved by the Engineer. For bituminous concrete mixtures containing RAP, the Contractor shall submit a JMF in accordance with Article M.04.02 to the Engineer for review.
- 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 test the material and provide the following information along with a 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 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.
    3. A statement that RAP material has been crushed to 100% passing the ½ inch sieve and remains free from contaminants such as joint compound, wood, plastic, and metals.

## 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

## 8. Joint Seal Material:

- a. Requirements: Joint seal material shall be a hot-poured rubber compound intended for use in sealing joints and cracks in bituminous concrete pavements. Joint seal material must meet the requirements of ASTM D 6690 – Type 2.

## 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.

## 10. Plant Requirements:

- a. Mixing Plant and Machinery: The mixing plant used in the preparation of the bituminous concrete shall comply with AASHTO M 156/ASTM D 995 for a Batch Plant or a Drum Dryer Mixer Plant, and be approved by the Engineer.

- b. Storage Silos: For all mixes, the Contractor may use silos for short-term storage of Superpave mixtures with prior notification and 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. Prior approval must be obtained for storage times greater than those indicated. When multiple silos are filled, the Contractor shall discharge one silo at a time. Simultaneous discharge of multiple silos 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	

- 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 delivery ticket, as specified herein. Material feed controls shall be automatically or manually adjustable to provide proportions within the tolerances listed below for any batch size.

An asterisk (\*) shall be automatically printed next to any individual batch weight(s) exceeding the tolerances in ASTM D 995 section 8.7.3. 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.

There must be provisions so that scales are not 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 truck and batch plant printout when the automatic batching sequence is interrupted or switched to auto-manual or full manual during proportioning. For each day's production, each project shall be provided a clear, legible copy of these recordings on each delivery ticket.

- d. Aggregates: The Contractor shall ensure that aggregate stockpiles are managed to provide uniform gradation and particle shape, prevent segregation and cross contamination in a manner acceptable to the Engineer. For drum plants only, the Contractor shall determine the percent moisture content at a minimum, prior to production and half way through production.
- e. Mixture: The dry and wet mix times shall be sufficient to provide proper coating (minimum 95% as determined by AASHTO T 195(M)) of all particles with bitumen and produce a uniform mixture.

The Contractor shall make necessary adjustments to ensure all types of bituminous concrete mixtures contain no more than 0.5% moisture throughout when tested in accordance with AASHTO T 329.

- f. RAP: The Contractor shall indicate the percent of RAP, the moisture content (as a minimum determined twice daily prior to production and halfway through production), and the net dry weight of RAP added to the mixture on each delivery ticket. For each day of production, the production shall conform to the job mix formula and RAP percentage and no change shall be made without the prior approval of the Engineer.
- g. Asphalt Binder: The last day of every month, a binder log shall be submitted when the monthly production for the Department exceeds 5000 tons. Blending of PG binders from different suppliers or grades at the bituminous concrete production facility is strictly prohibited.
- h. Warm mix additive: For mechanically foamed WMA, the maximum water injection rate shall not exceed 2.0% water by total weight of binder and the water injection rate shall be constantly monitored during production.
- i. Field Laboratory: The Contractor shall furnish the Engineer an acceptable field laboratory at the production facility to test bituminous concrete mixtures during production. The field 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 a high speed internet connection with a minimum upstream of 384 Kbps and a functioning web browser with unrestricted access to <https://ctmail.ct.gov>. This equipment shall be maintained in clean and good working order at all times and be made available for use by the Engineer.

The laboratory shall be equipped with a suitable 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. Windows shall be installed to provide sufficient light and ventilation. During summer months adequate cooling or ventilation must be provided so the indoor air temperature shall not exceed the ambient outdoor temperature. Light fixtures and outlets shall be installed at convenient locations, and a telephone shall be within audible range of the testing area. The laboratory shall be equipped with an adequate workbench that has a suitable length, width, and sampling tables, and be approved by the Engineer.

The field laboratory testing apparatus, supplies, and safety equipment shall be capable of performing all tests in their entirety that are referenced in AASHTO R 35, *Standard Practice for Superpave Volumetric Design for Hot-Mix Asphalt (HMA)* and AASHTO M 323, *Standard Specification for Superpave Volumetric Mix Design*. In addition, the quantity of all equipment and supplies necessary to perform the tests must be sufficient to

initiate and complete the number of tests identified in Table M.04.03-2 for the quantity of mixture produced at the facility on a daily basis. The Contractor shall ensure that the Laboratory is adequately supplied at all times during the course of the project with all necessary testing materials 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 field 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: When curb mix is specified, the Contractor shall develop a bituminous concrete mix design that includes a JMF consisting of target values for gradation, binder content and air voids as shown in Table M.04.02-1. The Contractor may use RAP in 5% increments up to a maximum of 30% provided a new JMF is accepted by the Engineer.
- b. Basis of Approval: The Contractor shall submit to the Engineer a request for approval of the JMF annually in accordance with one of the methods described herein. Prior to the start of any paving operations, the JMF must be accepted by the Engineer, and the Contractor must demonstrate the ability to meet the accepted JMF. Additionally, the fraction of material retained between any two consecutive sieves shall not be less than 4%.

The Contractor shall test the mixture for compliance with the submitted JMF and Table M.04.02-1. The maximum theoretical density (Gmm) will be determined by AASHTO T 209. If the mixture does not meet the requirements, the JMF shall be adjusted within the ranges shown in Table M.04.02-1 until an acceptable mixture is produced.

An accepted JMF from the previous operating season may be acceptable to the Engineer provided that there are no changes in the sources of supply for the coarse aggregate, fine aggregate, recycled material (if applicable) and the plant operation had been consistently producing acceptable mixture.

The Contractor shall not change sources of supply after a JMF has been accepted. Before a new source of supply for materials is used, a new JMF shall be submitted to the Engineer for approval.

**TABLE M.04.02 – 1:  
Master Ranges 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 determined by AASHTO T 164 or AASHTO T 308.		
Mix	Curb Mix	Production Tolerances from JMF target
Grade of PG Binder content %	PG 64S-22 6.5 - 9.0	0.4
Sieve Size		
# 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"		
Additionally, the fraction of material retained between any two consecutive sieves shall not be less than 4%		
Mixture Temperature		
Binder	325°F maximum	
Aggregate	280-350° F	
Mixtures	265-325° F	
Mixture Properties		
VOIDS %	0 – 4.0 (a)	

**2. Superpave Design Method – S0.25, S0.375, S0.5, and S1**

- a. Requirements: The Contractor or its representative shall design and submit Superpave mix designs annually for approval. The design laboratory developing the mixes shall be approved by the Engineer. The mix design shall be based on the specified Equivalent Single-Axle Loads (ESAL). Each bituminous concrete mix type must meet the requirements shown in Tables M.04.02-2 thru Table M.04.02-5 and in accordance with AASHTO M 323 and AASHTO R 35. The mix design shall include the nominal maximum aggregate size and a JMF consisting of target values for gradation and bitumen content for each bituminous concrete mix type designated for the project.

The contractor shall provide test results with supporting documentation from an AASHTO Materials Reference Laboratory (AMRL) with the use of NETTCP Certified Technicians for the following tests:

1. Aggregate consensus properties for each type & level, as specified in Table M.04.02-3 and the specific gravity data.
2. Extracted aggregates from RAP aggregate, when applicable, consensus properties for each type & level, as specified in Table M.04.02-3 and the specific gravity data.
3. New mixes shall be tested in accordance with AASHTO T 283(M) *Standard Method of Test for Resistance of Compacted Hot-Mix Asphalt (HMA) to Moisture-Induced Damage*, (TSR). The compacted specimens may be fabricated at a bituminous concrete facility and then tested at an AMRL accredited facility.

The AASHTO T 283(M) test results, specimens, and corresponding JMF sheet (Form MAT-429s) shall be submitted by the Contractor for review.

In addition, minimum binder content values apply to all types of bituminous concrete mixtures, as stated in Table M.04.02-5. For mixtures containing RAP, the virgin production and the anticipated proportion of binder contributed by the RAP cannot be less than the total permitted binder content value for that type nor the JMF minimum binder content.

- i. Superpave Mixture (virgin): For bituminous concrete mixtures that contain no recycled material, the limits prescribed in Tables M.04.02-2 thru Table M.04.02-5 apply. The Contractor shall submit a JMF, on a form provided by the Engineer, with the individual fractions of the aggregate expressed as percentages of the total weight of the mix and the source(s) of all materials to the Engineer for approval. The JMF shall indicate the corrected target binder content and applicable binder correction factor (ignition oven or extractor) for each mix type by total weight of mix. The mineral filler (dust) shall be defined as that portion of blended mix that passes the #200 sieve by weight when tested in accordance with AASHTO T 30. The dust-to-effective asphalt (D/Pbe) ratio shall be between 0.6 and 1.2 by weight. The dry/wet mix times and hot bin proportions (batch plants only) for each type shall be included in the JMF.

The percentage of aggregate passing each sieve shall be plotted on a 0.45 power gradation chart and shall be submitted for all bituminous concrete mixtures. This chart shall delineate the percentage of material passing each test sieve size as defined by the JMF. The percentage of aggregate passing each standard sieve shall fall within the specified control points as shown in Tables M.04.02-2 thru Table M.04.02-5. A change in the JMF requires that a new chart be submitted.

- ii. Superpave Mixtures with RAP: Use of approved RAP may be allowed 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 test results that show 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.

Unless approved by the Engineer, RAP material shall not be used with any other recycling option.

- iii. Superpave Mixtures with RAS: Use of RAS may be allowed 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 test results that show 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 Equation 2 shall be 0.85.
- iv. Superpave Mixtures with CRCG: In addition to the requirements in M.04.02 – 2 a through c, for bituminous concrete mixtures that contain CRCG, the Contractor shall submit a materials certificate to the Engineer stating that the CRCG complies with requirements stated in Article M.04.01, as applicable. Additionally, 1% 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: On an annual basis, the Contractor shall submit to the Engineer any bituminous concrete mix design, and JMF anticipated for use on Department projects. Prior to the start of any paving operations, the mix design and JMF must be approved by the Engineer. Bituminous concrete mixture supplied to the project without an approved mix design and JMF will be rejected. The following information must be included in the mix design submittal:
- i. Gradation, consensus properties and specific gravities of the aggregate, RAP, and RAS.
  - ii. Average asphalt content of the RAP and RAS by AASHTO T 164.
  - iii. Source of RAP and RAS and percentage to be used.
  - iv. Warm mix Technology and manufacturer's recommended additive rate and tolerances.
  - v. TSR test report, and, if applicable, anti-strip manufacturer and recommended dosage rate.
  - vi. Mixing and compaction temperature ranges for the mix with and without the warm-mix technology incorporated.
  - vii. JMF ignition oven correction factor by AASHTO T 308.

The JMF shall be accepted if the Plant mixture and materials meet all criteria as specified in Tables M.04.02-2 thru Table M.04.02-5. If the mixture does not meet the requirements, the contractor shall adjust the JMF within the ranges shown in Tables M.04.02-2 thru Table M.04.02-5 until an acceptable mixture is produced. All equipment, tests, and computations shall conform to the latest AASHTO R 35 and AASHTO M 323.

Any JMF, once approved, shall only be acceptable for use when it is produced by the designated plant, it utilizes the same component aggregates and binder source, and it continues to meet all criteria as specified herein, and component aggregates are maintained within the tolerances shown in Table M.04.02-2.

The Contractor shall not change any component source of supply including consensus properties after a JMF has been accepted. Before a new source of materials is used, a revised JMF shall be submitted to the Engineer for approval. Any approved JMF applies only to the plant for which it was submitted. 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 bituminous concrete mixture evaluated based on the previous year of production, for the next construction paving season, as determined by the Engineer. Based on the rating a type of mixture receives it will determine whether the mixture can be produced without the completion of a PPT. Ratings 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.04.03-3: *Superpave Master Range for Bituminous Concrete Mixture Production*, and are as follows:

Criteria A: Based on Air Voids. Percentage of acceptance results with passing air voids.

Criteria B: Based on Air Voids and VMA. The percentage of acceptance results with passing VMA, and the percentage of acceptance results with passing air voids, will be averaged.

The final rating assigned will be the lower of the rating obtained with Criteria A or Criteria B.

Ratings are defined as:

“A” – Approved:

A rating of “A” is assigned to each mixture type from a production facility with a current rating of 70% passing or greater.

“PPT” – Pre-Production Trial:

Rating assigned to each mixture type from a production facility when:

1. there are no passing acceptance production results submitted to the Department from the previous year;
2. there is a source change in one or more aggregate components from the JMF on record by more than 10% by weight;
3. there is a change in RAP percentage;
4. the mixture has a rating of less than 70% from the previous season;
5. a new JMF not previously submitted.

Bituminous concrete mixtures rated with a “PPT” cannot be shipped or used on Department projects. A passing “PPT” test shall be performed with NETTCP certified personnel on that type of mixture by the bituminous concrete producer and meet all specifications (Table M.04.02-2 Table M.04.02-5) before production shipment may be resumed.

Contractors that have mix types rated as “PPT” may use one of the following methods to change the rating to an “A.”

Option A: Schedule a day when a Department inspector can be at the facility to witness a passing “PPT” test or,

Option B: When the Contractor or their representative performs a “PPT” test 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 for binder and gradation determination, and 5,000 grams of cooled loose bituminous concrete for Gmm determination for verification testing and approval. Passing verifications will designate the bituminous concrete type to

be on an “A” status. Failing verifications will require the contractor to submit additional trials.

Option C: When the Contractor or their representative performs a “PPT” test without being witnessed by a Department inspector, the Engineer may verify the mix in the Contractor’s laboratory. Passing verifications will designate the bituminous concrete type to be an “A” status. Failing verifications will require the Contractor to submit additional trials.

When Option (A) is used and the “PPT” test meets all specifications, the “PPT” test is considered a passing test and the rating for that mix is changed to “A”. When the “PPT” test is not witnessed, the “PPT” Option (B) or (C) procedure must be followed. If the “PPT” Option (B) procedure is followed, the mixtures along with the test results must be delivered to the Materials Testing Lab. The test results must meet the “C” tolerances established by the Engineer. The tolerance Table is included in the Department’s current QA Program for Materials, Acceptance and Assurance Testing Policies and Procedures.

“U” – No Acceptable Mix Design on File:

Rating assigned to a type of mixture that does not have a JMF submitted, or the JMF submitted has not been approved, or is incomplete. A mix design or JMF must be submitted annually seven (7) days prior in order to obtain an “A,” or “PPT” status for that mix. A “U” will be used only to designate the mix status until the mix design has been approved, and is accompanied with all supporting data as specified. Bituminous concrete mixtures rated with a “U” cannot be used on Department projects.

**TABLE M.04.02– 2: Superpave Master Range for Bituminous Concrete Mixture Design Criteria**

Sieve inches	S0.25		S0.375		S0.5		S1	
	CONTROL POINTS <sup>(3)</sup>		CONTROL POINTS <sup>(3)</sup>		CONTROL POINTS <sup>(3)</sup>		CONTROL POINTS <sup>(3)</sup>	
	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	-	90	-	90	-	-	-	-
#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
Pb <sup>(1)</sup>	-	-	-	-	-	-	-	-
VMA <sup>(2)</sup> (%)	16.0 ± 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/Pbe <sup>(4)</sup>	0.6 – 1.2		0.6 – 1.2		0.6 – 1.2		0.6 – 1.2	
Agg. Temp <sup>(5)</sup>	280 – 350°F		280 – 350°F		280 – 350°F		280 – 350°F	
Mix Temp <sup>(6)</sup>	265 – 325°F		265 – 325°F		265 – 325°F		265 – 325°F	
Design TSR	> 80%		> 80%		> 80%		> 80%	
T-283 Stripping	Minimal, as determined by the Engineer							

**TABLE M.04.02–3: Superpave Master Range for Consensus Properties of Combined Aggregate Structures**

Notes: (1) If less than 25 % of a given layer is within 4 inches of the anticipated top surface, the layer may be considered to be below 4 inches for mixture design purposes.					
Traffic Level	Design ESALs (80 kN)	Coarse Aggregate Angularity <sup>(1)</sup> ASTM D 5821	Fine Aggregate Angularity <sup>(7)</sup> AASHTO T 304	Flat and Elongated Particles ASTM D 4791	Sand Equivalent AASHTO T 176
-----	(million)			> # 4	-----
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
	Design ESALs are the anticipated project traffic level expected on the design lane, projected over a 20 year period, regardless of the actual expected design life of the roadway.	Criteria presented as minimum values. 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.	Criteria presented as minimum percent air voids in loosely compacted fine aggregate passing the #8 sieve.	Criteria presented as maximum Percent by mass of flat and elongated particles of materials retained on the #4 sieve, determined at 5:1 ratio.	Criteria presented as minimum values for fine aggregate passing the #8 sieve.

**\* NOTE: Level 1 for use by Towns and Municipalities ONLY.**

**TABLE M.04.02– 4: Superpave Master Range for Traffic Levels and Design Volumetric Properties**

Traffic Level	Design ESALs	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			
		(million)	Nini	Ndes	Nmax	Nini	Ndes	Nmax	0.25	0.375	0.5
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	73 - 76	73 - 76	65 - 75	65 - 75

**\* NOTE: Level 1 for use by Towns and Municipalities ONLY.**

**TABLE M.04.02– 5:  
Superpave Minimum Binder Content by Mix Type and Level**

Mix Type	Level	Binder Content Minimum <sup>(1)</sup>
S0.25	1*	5.6
S0.25	2	5.5
S0.25	3	5.4
S0.375	1*	5.6
S0.375	2	5.5
S0.375	3	5.4
S0.5	1*	5.0
S0.5	2	4.9
S0.5	3	4.8
S1	1*	4.6
S1	2	4.5
S1	3	4.4

**\* NOTE: Level 1 for use by Towns and Municipalities ONLY.**

**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 Sampling & Testing Methods:**

### **i. General:**

Acceptance samples of mixtures shall be obtained from the hauling vehicles and tested by the Contractor at the facility during each day's production.

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. Verification testing will be performed by the Engineer in accordance with the Department's QA Program for Materials. Labeled Acceptance test specimens shall be retained at the production facilities 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.

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 at the plant. In addition, the Contractor must provide supporting documentation or test results to validate the subject acceptance test result(s). The Engineer may invalidate any positive adjustments for material corresponding to the 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.

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 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 inoperable, production can continue for a maximum of 1 hour. The Contractor shall obtain box sample(s) in accordance with Table M.04.03-1 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.

**ii. Curb Mix Acceptance Sampling and Testing Procedures:**

Curb Mixes shall be tested by the Contractor at a frequency of one test per every 250 tons of cumulative production, regardless of the day of production.

When these mix designs are specified, the following acceptance procedures and AASHTO test methods shall be used:

**TABLE M.04.03 – 2: 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)</b>	Theoretical Maximum Specific Gravity and Density of Bituminous Paving Mixtures
<b>5</b>	<b>AASHTO T 312</b>	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

a. Determination of Off-Test Status:

- i. The test results of AASHTO T 308 and T 30(M) will be used to determine if the mixture is within the tolerances shown in Table M.04.02-1. Curb Mixtures are 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 for that mixture. 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 plants and 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 master range indicated in Table M.04.02-1 regardless of production date.

b. JMF Changes

- i. If a test indicates that the bitumen content or gradation are outside the tolerances, the Contractor may make a single JMF change as allowed by the Engineer prior to any additional testing. A JMF change shall include the date and name of the Engineer that allowed it. 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 Sampling and Testing Procedures:**

The hauling vehicle from which samples are obtained shall be selected using stratified – random sampling based on the total estimated tons of production in accordance with ASTM D 3665, except that the first test shall be randomly taken from the first 151 tons or as directed by the Engineer. The Engineer may request a second acceptance test within the first sub lot. One acceptance test shall always be performed in the last sub-lot based on actual tons of material produced.

The number of sub lots/acceptance tests is based on the total production per day as indicated in Table M.04.03-1. Quantities of the same type/level mix per plant may be combined daily for multiple state projects to determine the number of sub lots. The Engineer may direct that additional acceptance samples be obtained to represent materials actually being delivered to the project.

The payment adjustment for air voids and liquid binder will be calculated per sub lot as described in Section 4.06.

An acceptance test shall not be performed within 150 tons of production from a previous acceptance test unless approved by the Engineer. Quality Control tests are not subject to this restriction. Unless otherwise tested, a minimum of one (1) acceptance test shall be performed for every four days of production at a facility for each type/level mix (days of production may or may not be consecutive days).

**TABLE M.04.03 – 1:  
Superpave Acceptance Testing Frequency per Type/Level/Plant**

Daily quantity produced in tons (lot)	Number of Sub Lots/Tests
0 to 150	0, Unless requested by the Engineer
151 to 600	1
601 to 1,200	2
1,201 to 1,800	3
1,801 or greater	1 per 600 tons or portions thereof

When the Superpave mix design is specified, the following acceptance and AASHTO test procedures shall be used:

**TABLE M.04.03– 3: Superpave Acceptance Testing Procedures**

Protocol	Reference	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	Gradation of extracted aggregate for bituminous concrete mixture
5	AASHTO T 312	<sup>(1)</sup> Superpave Gyrotory molds compacted to N <sub>des</sub>
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 Production bituminous concrete

**Notes:** <sup>(1)</sup> One set equals two six-inch molds. Molds to be compacted to N<sub>max</sub> for PPTs and to N<sub>des</sub> for production testing. The first subplot of the year will be compacted to N<sub>max</sub>

<sup>(2)</sup> Average value of one set of six-inch molds.

If the average corrected Pb content differs by 0.3% or more from the average bituminous concrete facility production delivery ticket 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, the Engineer may require a new aggregate correction factor.

The test specimen must be ready to be placed in an approved ignition furnace 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 moisture susceptibility (TSR) testing annually for all design levels of HMA-, WMA-, and PMA- S0.5 plant-produced mixtures, in accordance with the latest version of AASHTO T 283(M).

If any material source changes from the previous year, or during the production season, a mix design TSR as well as a production TSR is required for the new mixture. The AASHTO T 283(M) test shall be performed at an AASHTO Materials Reference Laboratory (AMRL) by NETTCP Certified Technicians. The test results and specimens shall be submitted to the Engineer for review. This shall be completed within 30 days from the start of production. 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. In addition, compaction of samples shall be accomplished utilizing an accepted Superpave Gyratory Compactor (SGC), supplied by the Contractor. The SGC shall be located at the facility supplying mixture to the project.

a. Determination of Off-Test Status:

i. Superpave mixes shall be considered “*off test*” when any Control Point Sieve, VA, VMA, and Gmm values are outside of the limits specified in Table M.04.03-4 and the computed binder content (Pb) established by AASHTO T308 or as documented on the vehicle delivery ticket is below the minimum binder content stated in sub article 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 (and project staff) when the plant is “*off test*” for a type of mixture. When multiple plants and 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.

b. Cessation of Supply for Superpave Mixtures with no Payment Adjustment: Production of bituminous concrete shall cease for the Project from any plant that consistently fails to produce mixture that meets the JMF and volumetric properties. The quantity of Superpave mixtures shipped to the project that is “*off-test*” will not be adjusted for deficient mixtures.

A Contractor shall cease to supply mixture from a plant when:

1. Bituminous concrete mixture is “off test” on three (3) consecutive tests for any combination of VMA or Gmm, regardless of date of production.
2. Bituminous concrete mixture is “off test” on two (2) consecutive tests for the Control Point sieves in one day’s production.

Following cessation, the Contractor shall immediately make necessary material or process corrections and run a Pre-Production Trial (PPT) for that type of mixture. Use of that type of mixture from that plant will be prohibited on the Project until the Contractor has demonstrated the ability to produce acceptable mixture from that facility. When the Contractor has a passing test and has received approval from the Engineer, the use of that mixture to the Project may resume.

- c. Cessation of Supply for Superpave Mixtures with Payment Adjustment: Production of bituminous concrete shall cease for the Project from any plant that consistently fails to produce mixture that meets the Superpave minimum binder content by mix type and level listed in Table M.04.02-5. The quantity of Superpave mixtures shipped to the project that is “off-test” will be adjusted for deficient mixtures in accordance with Section 4.06.

A Contractor shall cease to supply mixture from a plant when:

1. The binder content (Pb) is below the requirements of Table M.04.02-5 on the ignition oven test result after two (2) consecutive tests, regardless of the date of production.
2. The air voids (VA) is outside the requirements of Table M.04.03-4 after three (3) consecutive tests, regardless of the date of production.

Following cessation, the Contractor shall immediately make necessary material or process corrections and run a Pre-Production Trial (PPT) for that type of mixture. Use of that type of mixture from that plant will be prohibited on the Project until the Contractor has demonstrated the ability to produce acceptable mixture from that facility. When the Contractor has a passing test and has received approval from the Engineer, the use of that mixture to the Project may resume.

- d. JMF Changes for Superpave Mixture Production: It is understood that a JMF change is effective from the time it was submitted forward and is not retroactive to the previous test or tests. JMF changes are permitted to allow for trends in aggregate and mix properties but every effort shall be employed by the Contractor to minimize this to ensure a uniform

and dense pavement. A revised JMF submittal shall include the date and name of the Engineer that allowed it.

JMF changes are only permitted prior to or after a production shift for all bituminous-concrete types of mixtures and only when they:

- i. Are requested in writing and pre-approved by the Engineer.
- ii. Are based on a minimum of a two test trend.
- iii. Are documented with a promptly submitted revised JMF on the form provided by the Engineer.
- iv. A revised JMF submittal shall include the date and name of the Engineer that allowed it.

No change will be made on any aggregate or RAP consensus property or specific gravity unless the test is performed at an AASHTO Materials Reference Laboratory (AMRL) by NETTCP Certified Technicians.

A JMF change shall be submitted every time 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 Master Range for Bituminous Concrete Mixture Production**

<i>Notes:</i> (1) 300°F minimum after October 15. (2) Minimum Pb as specified in Table M.04.02-5 (3) Control point range is also defined as the master range for that mix. (4) JMF tolerances shall be defined as the limits for production compliance. VA & Pb payment is subject to adjustments, as defined in sub-article 4.06.04 - 2. (5) For WMA, lower minimum aggregate temperature will require Engineer's approval. (6) For WMA and/or polymer modified asphalt, the mix temperature shall meet manufacturer's recommendations. In addition, for WMA, the maximum mix temperature shall not exceed 325°F once the WMA technology is incorporated.									
	S0.25		S0.375		S0.5		S1		Tolerances
Sieve	CONTROL POINTS <sup>(4)</sup>		CONTROL POINTS <sup>(4)</sup>		CONTROL POINTS <sup>(4)</sup>		CONTROL POINTS <sup>(4)</sup>		From JMF Targets <sup>(4)</sup>
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	-	90	-	90	-	-	-	-	
#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 <sup>(2)</sup>	-	-	-	-	-	-	-	-	note (2)
VMA (%)	16.0		16.0		15.0		13.0		1.0
VA (%)	4.0		4.0		4.0		4.0		1.0
Gmm	JMF value		JMF value		JMF value		JMF value		0.030
Agg. Temp <sup>(5)</sup>	280 – 350F		280 – 350F		280 – 350F		280 – 350F		
Mix Temp <sup>(6)</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:  
JMF Tolerances for Application  
of Positive Adjustments**

<i>Notes:</i> (1) Only for S1 mixes. (2) Only for S0.5 and S1 mixes.	
Sieve	Tolerances
	From JMF Targets
inches	±Tol
3/4	9 (1)
1/2	9 (1)
3/8	9 (2)
#4	8
#8	7
#16	6
#200	3
Pb	0.4

**TABLE M.04.03– 6:  
Superpave Master Range for 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

\* NOTE: Level 1 for use by Towns and Municipalities ONLY.

**TABLE M.04.03-7:  
Modifications to Standard AASHTO and ASTM Test Specifications and Procedures**

<b>AASHTO Standard Specification</b>	
<b>Reference</b>	<b>Modification</b>
<b>M 140</b>	Emulsified Asphalt grade RS-1H shall meet all the requirements of the emulsified asphalt grade RS-1 except for the penetration requirement of the residue that will change from 100 to 200 penetration units (0.1 mm) to 40 to 90 penetration units (0.1 mm).
<b>AASHTO Standard Method of Test</b>	
<b>Reference</b>	<b>Modification</b>
<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>T 331</b>	6.1 Cores are dried to a constant mass prior to testing using a core-dry machine.

<b>AASHTO Standard Recommended Practices</b>	
<b>Reference</b>	<b>Modification</b>
<b>R 26</b>	<p>Quality Control Plans must be formatted in accordance with AASHTO R 26, certifying suppliers of performance-graded asphalt binders, Section 9.0, Suppliers Quality Control Plan, and “NEAUPG Model PGAB QC Plan.”</p> <ol style="list-style-type: none"> <li>1. The Department requires that 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.</li> <li>2. Sampling of asphalt binders should be done under the supervision of qualified technician. NECTP “Manual of Practice,” Chapter 2 Page 2-4 (Key Issues 1-8).</li> <li>3. A copy of the Manual of Practice for testing asphalt binders in accordance with the Superpave PG Grading system shall be in the testing laboratory.</li> <li>4. All laboratories testing binders for the Department are required to be accredited by the AASHTO Materials Reference Laboratory (AMRL).</li> <li>5. 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.</li> <li>6. 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.</li> <li>7. All AASHTO M 320 references shall be replaced with AASHTO M 332.</li> <li>8. Each year, in April and September, the supplier shall submit test results for two BBR testing at two different temperatures in accordance with AASHTO R 29.</li> </ol> <p>Suppliers shall provide AASHTO M 332 testing results and split samples at a minimum of once per lot.</p>

## **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).

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 12 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.
- Packers, 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)

## **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 Area. Work under this Item consists of the development and implementation of a HASP that addresses the relative risk of exposure to potential hazards present within the Project limits, including those related to soil excavation and cleaning/removal of petroleum-containing underground storage tanks (USTs). This also includes possible entry into confined spaces or excavations with the potential for vapors to accumulate. In addition to the former stated risks, the HASP must also address the associated risks with the excavation and handling of contaminated soil. 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 investigation to develop the HASP. The documents containing this data are referenced in "Notice to Contractor – Environmental Investigations." Note that as indicated in the Notice to Contractor for this project, the chemical data obtained at this site indicates impacts to soil or groundwater within the Project limits and may also represent soil impacts surrounding the USTs subject for removal.

#### 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 Project, 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 on the Project 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 Project 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 on the Project, 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 within four (4) weeks of submittal and provide written comments as to deficiencies in and/or exceptions to the plan, 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 on the Project, 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

### 1. 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.

### 2. Elements

#### a. 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.

#### b. 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.

c. 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 onsite 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:

- i. Directing and implementing the HASP.
  - ii. 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.
  - iii. Authorizing Stop Work Orders, which shall be executed upon the determination of an imminent health and safety concern.
  - iv. 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.
  - v. Authorizing work to resume, upon approval from the Contractor's HSM.
  - vi. Directing activities, as defined in the Contractor's written HASP, during emergency situations; and
  - vii. Providing personal monitoring where applicable, and as identified in the HASP.
- d. 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.

- e. 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.

f. 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.

g. 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.

h. 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).

i. Communications

Written procedures for routine and emergency communications procedures shall be included in the Contractor's HASP.

j. 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.

k. 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 onsite at all times during site operations.

l. 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.

m. 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.

n. Confined Space Entry Procedures

Confined space entry procedures, both permit required and non permit required, shall be discussed in detail.

o. 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.

p. 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 onsite 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

Lump Sum

## **ITEM #0101117A - CONTROLLED MATERIALS HANDLING**

### **Description:**

Work under this Item is intended to provide specific procedural requirements to be followed by the Contractor during the excavation of controlled materials from within any AOEC and LLAOEC, as shown on the Project Plans. This supplements Specifications Section 2.02, 2.03, 2.05, and 2.06 and Contract Special Provisions for excavation wherever contaminated materials are encountered. Work under this item shall include transporting and stockpiling materials at the WSA; and covering, securing, and maintaining the stockpiled materials throughout the duration of the Project. All materials, excluding the existing pavement structure (asphalt and subbase), rock, ledge, and concrete excavated within AOECs are to be considered controlled materials. All surplus excavated material within LLAOECs that cannot be reused within the project limits shall be considered controlled materials. If the vertical limits of the existing subbase cannot be determined visually, subbase will be presumed to exist 12” below the bottom of existing pavement.

Controlled materials consisting of non-hazardous levels of regulated substances have been documented to exist within the Project limits. Such contamination is documented in the reports listed in the “Notice to Contractor – Environmental Investigations”. Where contaminated soils are excavated, such soil will require special handling, disposal and documentation procedures.

### **Materials:**

The required materials are detailed on the Project Plans. All materials shall conform to the requirements of the Contract.

Plastic Sheet: Polyethylene plastic sheeting for underlayment shall be at least 30 mil thick. Polyethylene plastic sheeting for covering excavated material shall be a thickness of 10 mil. Both shall be at least 10 feet wide.

Covers for roll-off/storage containers shall be made of polyethylene plastic, or similar water-tight material, that is of sufficient size to completely cover top opening and can be securely fastened to the container.

Sand Bags: Sandbags used to secure polyethylene covers shall be at least 30 pounds.

Sorbent Boom: Shall be 8 inches in diameter and 10 feet long and possess petrophilic and hydrophilic properties. Sorbent booms shall also have devices (i.e. clips, clasps, etc.) for connection to additional lengths of boom.

### **Construction Methods:**

#### **A. General**

When controlled materials are encountered during the course of the work, health and safety provisions shall conform to the appropriate sections of the Contract. Provisions may include implementation of engineering controls, air and personal monitoring, the use of chemical protective clothing (CPC), personal protective equipment (PPE), implementation of engineering controls, air and personal monitoring, and decontamination procedures.

Excavated material from the AOECs, if suitable, may be reused within the AOEC from which it was excavated, in accordance with the following conditions: (1) such soil is deemed to be structurally suitable as fill by the Engineer; (2) such soil is not placed below the water table; (3) the CT DEEP groundwater classification of the area where the soil is to be reused as fill does not preclude said use; and (4) such soil is not placed in an area subject to erosion. Materials removed from any excavation within an AOEC which cannot be immediately reused within the same AOEC shall be transported directly from their point of origin on the Project to the WSA. The stockpiles of excavated controlled materials shall be maintained as shown on the Project Plans. The Contractor shall plan excavation activities within AOEC(s) in consideration of the capacity of WSA, and the material testing and disposal requirements of the applicable Contract item. **No claims for delay shall be considered based on the Contractor's failure to coordinate excavation activities as specified herein.**

The Engineer will sample the stockpiled controlled materials at a frequency and for the constituents to meet the acceptance criteria of the treatment/recycling/disposal facilities submitted by the Contractor. The Contractor is hereby notified that laboratory turnaround time is expected to be fifteen (15) working days. Turnaround time is the period of time beginning when the Contractor notifies the Engineer which facility it intends to use and that the stockpile is ready for sampling and ending with the Contractor's receipt of the laboratory analytical results. Any change of intended treatment/recycling/disposal facility may prompt the need to resample and will therefore restart the time required for laboratory turnaround. The laboratory will furnish such results to the Engineer. Upon receipt, the Engineer will make available to the Contractor the results of the final waste characterization determinations. **No delay claim will be considered based upon the Contractor's failure to accommodate the laboratory turnaround time as identified above.**

#### B. Transportation and Stockpiling

In addition to following all pertinent Federal, State and local laws or regulatory agency policies, the Contractor shall adhere to the following precautions during transport of non-hazardous materials:

- Transported controlled materials are to be covered prior to leaving the point of generation and are to remain covered until the arrival at the WSA;
- All vehicles departing the site are properly logged to show the vehicle identification, driver's name, time of departure, destination, and approximate volume and content of materials carried;

- All vehicles shall have secure, watertight containers free of defects for material transportation;
- No material shall leave the site until there is adequate lay down area prepared in the WSA; and,
- Documentation must be maintained indicating that all applicable laws have been satisfied and that the materials have been successfully transported and received at the WSA.

Construction of the WSA shall be completed prior to the initiation of construction activities generating Controlled Materials. Plastic polyethylene sheeting shall underlay all excavated controlled materials. Measures shall be implemented to divert rainfall away from the WSA.

No controlled materials shall be excavated or transported to the WSA until registration under the General Permit for Contaminated Soil and/or Sediment Management (Staging and Transfer) has been obtained by ConnDOT.

Placement of sorbent boom along the perimeter of the WSA shall be conducted when soil is saturated with petroleum product.

Excavated materials shall be staged as shown on the Project Plans or as directed by the Engineer.

#### C. WSA Maintenance

The Contractor shall provide all necessary materials, equipment, tools and labor for anticipated activities within the WSA. Such activities include, but are not limited to, handling and management of stockpiles and drummed CPC/PPE; uncovering and recovering stockpiles; maintenance of WSA; replacement of damaged components (i.e. sand bags, plastic polyethylene sheeting, etc.); and waste inventory record management. The Contractor shall manage all materials in the WSA in such a way as to minimize tracking of potential contaminated materials across the site and off-site, and minimize dust generation.

Each stockpile shall be securely covered when not in active use with a cover of sufficient size to prevent generation of dust and infiltration of precipitation. The cover shall be to prevent wind erosion.

The staged stockpiles shall be inspected at least daily by the Contractor to ensure that the cover and containment have not been damaged and that there is no apparent leakage from the pile. If the cover has been damaged, or there is evidence of leakage from the piles, the Contractor shall immediately replace the cover or containment as needed to prevent the release of materials to the environment from the piles.

An inventory of stockpiled materials and drummed CPC/PPE shall be conducted on a daily basis. Inventory records shall indicate the approximate volume of material/drums stockpiled per day; the approximate volume of material/drums stockpiled to date; material/drums loaded and transported off-site for disposal; any materials loaded and transported for on-site reuse; and identification of stockpiles relative to their points of generation.

Following the removal of all stockpiled controlled materials, residuals shall be removed from surfaces of the WSA as directed by the Engineer. This operation shall be accomplished using dry methods such as shovels, brooms, mechanical sweepers or a combination thereof. Residuals shall be disposed of as Controlled Materials.

#### D. Dewatering

Dewatering activities shall conform to Items in pertinent articles of the Contract.

#### E. Decontamination

All equipment shall be provided to the work site free of contamination. The Engineer may prohibit from the site any equipment that in his opinion has not been thoroughly decontaminated prior to arrival. Any decontamination of the Contractor's equipment prior to arrival at the site shall be at the expense of the Contractor. The Contractor is prohibited from decontaminating equipment on the Project that has not been thoroughly decontaminated prior to arrival.

The Contractor shall furnish labor, materials, tools and equipment for decontamination of all equipment and supplies that are used to handle Controlled Materials. Decontamination shall be conducted at an area designated by the Engineer and may be required prior to equipment and supplies leaving the Project, between stages of the work, or between work in different AOEC's.

Dry decontamination procedures are recommended. Residuals from dry decontamination activities shall be collected and managed as Controlled Materials. If dry methods are unsatisfactory as determined by the Engineer, the Contractor shall modify decontamination procedures as required subject to the Engineer's approval.

#### F. Dust Control

The Contractor shall implement a fugitive dust suppression program in accordance with the Contract to prevent the off-site migration of particulate matter and/or dust resulting from excavation, loading and operations associated with Controlled Materials. It shall be the Contractor's responsibility to supervise fugitive dust control measures and to monitor airborne particulate matter. The Contractor shall:

1. Employ reasonable fugitive dust suppression techniques.
2. Visually observe the amounts of particulate and/or fugitive dust generated during the handling of controlled materials. If the apparent amount of fugitive dust and/or particulate matter is not acceptable to the Engineer, the Engineer may

direct the Contractor to implement corrective measures at his discretion, including, but not limited to, the following:

- (a) apply water to pavement surfaces
- (b) apply water to equipment and excavation faces; and
- (c) apply water during excavation, loading and dumping.

#### G. Permit Compliance

The Contractor shall comply with the terms and conditions of the DEEP “General Permit for Contaminated Soil and/or Sediment Management (Staging and Transfer)”, including the General Operating Conditions and the Specific Operating Conditions, except that the Engineer will conduct all soil/sediment characterization and perform all record keeping. In particular, the Contractor shall:

1. Operate, maintain and repair the WSA in conformance with the requirements of the General Permit.
2. Maintain a communications system capable of summoning fire, police, and/or other emergency service personnel.
3. Prevent unauthorized entry onto the stockpiles by the use of fences, gates, or other natural or artificial barriers.
4. Separate incidental excavation waste to the satisfaction of the receiving facility or to an extent that renders the contaminated soil and/or sediment suitable for its intended reuse.
5. Isolate and temporarily store incidental waste in a safe manner prior to off-site transport to a facility lawfully authorized to accept such waste.
6. Not store more than 100 cubic yards of incidental waste at any one time.
7. Sort, separate and isolate all hazardous waste from contaminated soil and/or sediment.
8. Prevent or minimize the transfer or infiltration of contaminants from the stockpiles to the ground as detailed in “B. Transportation and Stockpiling” above.
9. Securely cover each stockpile of soil as detailed in “C. WSA Maintenance” above.
10. Minimize wind erosion and dust transport as detailed in “F. Dust Control” above.
11. Use anti-tracking measures at the WSA to ensure the vehicles do not track soil from the WSA onto a public roadway at any time.
12. Instruct the transporters of contaminated soil and/or sediment of best management practices for the transportation of such soil (properly covered loads, removing loose material from dump body, etc.).
13. Control all traffic related to the operation of the facility in such a way as to mitigate the queuing of vehicles off-site and excessive or unsafe traffic impact in the area where the facility is located.
14. Ensure that except as allowed in section 22a-174-18(b)(3)(C) of the Regulations of Connecticut State Agencies, trucks are not left idling for more than three (3) consecutive minutes.

**Method of Measurement:**

The work of Controlled Material Handling will be measured for payment by the number of cubic yards of controlled material excavated within the AOEC(s) and taken to the WSA and stockpiled within the storage bins for sampling by the Engineer or temporarily stockpiled for later reuse. Material kept in proximity to the site of the excavation and reused as it is generated will not be measured for payment under this item. This measurement shall be in accordance with and in addition to the quantity measured for payment of the applicable excavation item in Specification Sections 2.02, 2.03, 2.05, 2.06, or the Contract Special Provisions, as applicable. Excess excavations made by the Contractor beyond the payment limits specified in the Contract will not be measured for payment and the Contractor assumes all costs associated with the appropriate handling, management and disposal of this material.

Equipment decontamination, the collection of residuals, and the collection and disposal of liquids generated during equipment decontamination activities will not be measured separately for payment.

**Basis of Payment:**

This work shall be paid for at the Contract unit price, which shall include all transportation from the excavation site to the final WSA, including any intermediate handling steps; stockpiling controlled materials at the WSA; covering, securing, and maintaining the individual stockpiles within the WSA throughout the duration of the Project; and all tools, equipment, material and labor incidental to this work.

This price shall also include equipment decontamination; the collection of residuals generated during decontamination and placement of such material in the WSA; and the collection and disposal of liquids generated during equipment decontamination activities.

All materials, labor and equipment associated with compliance with the General Permit for Contaminated Soil and/or Sediment Management (Staging and Transfer) will not be measured separately, but will be considered incidental to the item "Controlled Materials Handling".

Securing and construction of the WSA shall be paid for under Item 101128A. Handling and disposal of contaminated groundwater will be paid for under Item 0204213A. Payment for dust control activities shall be made under the appropriate Contract items.

Pay Item	Pay Unit
Controlled Materials Handling	C.Y.

**ITEM #0101128A - SECURING, CONSTRUCTION AND DISMANTLING OF A WASTE STOCKPILE AND TREATMENT AREA**

**Description:**

Work under this Item shall consist of the securing and construction of the Waste Stockpile Area (WSA) at the location designated on the Project Plans and in accordance with the Contract.

**Note: The WSA will not be dismantled following project completion but remain the property of the State.** All controlled and hazardous materials excavated during construction activities shall be stockpiled in the WSA. The WSA shown on the Plans is to be used exclusively for temporary stockpiling of excavated materials from within the project AOECs/surplus materials excavated from LLAOECs for determination of disposal classification.

**Materials:**

The required materials are detailed on the Project Plans. All materials shall conform to the requirements of the Contract.

Construction blocks shall be solid precast rectangular concrete six feet in length, three in height, and two feet in depth.

Polyethylene plastic sheeting for underlayment shall be a thickness of 30 mil and minimum width of ten feet.

Sand bags used to secure polyethylene sheeting soil covers shall have a minimum weight of thirty pounds.

Bedding sand shall conform to Section 6.51.02 of the Specifications.

Processed Aggregate Base shall conform to Section 3.04 of the Specifications.

Hay bales shall conform to the requirements of Section 2.18 of the Specifications.

Bituminous Concrete shall conform to Section 4.06 of the Specifications.

Roll-off/Storage Containers shall be of watertight, steel-body construction, of the size specified and able to handle the storage and subsequent transportation of material to the disposal facility.

Precast Concrete Barrier Curb shall conform to Section 8.22 of the Specifications.

**Construction Methods:**

The WSA shall be constructed in accordance with the Contract at the location shown on the Project Plans.

Construction of the WSA shall be completed prior to the initiation of construction activities generating Controlled Materials. The Contractor is responsible for the maintenance and protection of all utilities potentially affected during WSA construction. The Contractor shall locate and mark all existing utilities potentially affected prior to initiating WSA construction.

The proposed location of the WSA shall be cleared of any debris and vegetation as directed by the Engineer. Any objectionable materials, which may result in damage to the polyethylene sheeting underlayment, shall be removed prior to stockpiling excavated controlled materials.

The Contractor shall comply with the terms and conditions of the DEEP "General Permit for Contaminated Soil and/or Sediment Management (Staging and Transfer)", including the General Operating Conditions and the Specific Operating Conditions, except that the Engineer will conduct all soil/sediment characterization and perform all record keeping. In particular, the Contractor shall:

1. Construct and repair the WSA in conformance with the requirements of the General Permit.
2. Prevent unauthorized entry onto the stockpiles by the use of fences, gates, or other natural or artificial barriers.
3. Install anti-tracking measures at the WSA to ensure the vehicles do not track soil from the WSA onto a public roadway at any time.
4. Post and maintain a sign that is visible from a distance of at least 25' at the WSA identifying the name of the permittee (State of CT, Department of Transportation), the DOT field office phone number, the hours of operation for the WSA, and the phrase, "Temporary Soil Staging Area". Lettering shall be at least one inch (1") high with a minimum overall sign dimension of four (4) feet wide by two (2) feet high. Such sign is only required if the capacity of the WSA is equal to or greater than 1,000 cubic yards. If initially the WSA capacity is less than 1,000 c.y. and the WSA capacity is subsequently increased, the Contractor shall post and maintain the required sign at no additional cost to the State, prior to stockpiling the additional material.

Following the removal of all stockpiled material, the Contractor shall use dry decontamination procedures for all surfaces of the WSA as directed by the Engineer. Residual materials shall be disposed of as Controlled Materials. If the results from dry methods are unsatisfactory to the Engineer, the Contractor shall modify decontamination procedures as required.

The Contractor shall be responsible for the collection and treatment/recycling/disposal of any liquid wastes that may be generated by its decontamination activities in accordance with applicable regulations.

Upon completion of the Project, the Contractor will complete the removal of all residual Controlled Materials and all materials such as polyethylene sheeting and sand bags. Materials

shall be disposed of by the Contractor as solid waste in accordance with the Contract and all Federal, State and local regulations. The WSA will remain intact for future DOT use.

Operation and maintenance of the WSA during the project shall be included under Item 101117A "Controlled Material Handling".

**Method of Measurement:**

This work will be measured for payment at the Lump Sum cost for securing, construction, and dismantling of a WSA.

**Basis of Payment:**

This work will be paid for at the Contract Lump Sum, which shall include all materials, tools, labor, equipment, permits, and work needed to secure, construct, and decontaminate the WSA, including all clearing, grubbing, grading, and clean up. The work shall also include site restoration and seeding of areas disturbed beyond the WSA footprint.

All materials, labor and equipment associated with compliance with the General Permit for Contaminated Soil and/or Sediment Management (Staging and Transfer) will not be measured separately, but will be considered incidental to the item "Securing, Construction and Dismantling of a Waste Stockpile and Treatment Area".

Pay Item	Pay Unit
Securing, Construction and Dismantling Of a Waste Stockpile and Treatment Area	L.S.

**ITEM #0201001A - CLEARING AND GRUBBING**

Work under this item shall conform to the requirements of Section 2.01 and as supplemented and amended as follows:

**2.01.01 – Description:** Add the following: The work shall also include the abandonment of the septic system and the connection to the existing building sewer of 1218 Main Street

**2.01.03 – Construction Methods:** Add the following: Work for the abandonment of the septic system and the connection to the existing building sewer of 1218 Main Street will conform to the local and state health code. This shall include septic pumping and disposal of the septage. Coordination with the property owner shall conform to the requirements set forth elsewhere.

**2.01.05 - Basis of Payment:** Add the following: Item No. 0201001A will be paid for at the contract lump sum price for Clearing and Grubbing in accordance with the value earned including all materials, tools, and equipment incidental for the abandon of the septic system and to the Work:

<u>Pay Item</u>	<u>Pay Unit</u>
Clearing and Grubbing	Lump Sum

## **ITEM #0201902A - INTERPRETIVE SIGN DISPLAY**

**Description:** This item of work shall conform to the relevant provisions of the Standard Specifications for Roads, Bridges and Incidental Construction and the following; it shall consist of supplying and installing materials for Interpretive Sign Display. Interpretive Sign Display locations shall be as shown on the plans, in accordance with these specifications, and/or as required by the Engineer.

**Materials:** Contractor shall submit manufacturers' product data which shall include details as required to show all materials and reinforcing, layout, dimensions, jointing, method of connection and assembly, fabrication and tolerances for types of materials, types and details of connections and openings, cuts, holes, bolts, plates, concrete footings, reinforcing and finishing, anchors and fasteners, attachment details, and painting and finishing.

Units shall be free of cracks, chips, scratches and any other defect at the time of delivery. All units shall be placed in a storage area, protected from damage prior to and during transit to the site.

Cutting, painting (other than touch-up), and welding in the field will not be permitted.

Contractor shall provide a guarantee of minimum of one year after acceptance of Workmanship and against defect as determined by the Department, and shall completely replace or repair Interpretive Sign Display and associated site improvements at their own expense within two months after item is identified in the field.

Interpretive Sign Display shall be a low profile, embedded graphic composite panel sign mounted on cantilever style NPS National Parks Service standard square aluminum tube frame 48" high 45 degree angle. The sign panel shall be 24"x 36" UV resistant, exterior grade panel with the image layer infused with layers of melamine resin and a phenolic resin core melted in a hydraulic process. Panel shall be 1/4" min. thickness. Panel edges shall be sealed, smoothed, polished and beveled. Panel shall not be susceptible to chipping or cracking. UV protection shall be an acrylic resin with a fluoride additive and metal oxides.

Panels shall contain an anti-graffiti layer which allows graffiti to be removed with lacquer thinner.

Acceptable Interpretive Sign Displays shall be one of the following or approved equal.

Wayside Exhibit Base and Frame  
Pannier Graphics  
345 Oak Rd.  
Gibsonia, PA 15044  
800-544-8428.

DuraReader dHPL Interpretive Signs  
EnviroSign Ltd. 2700 Fulton Drive  
NW, Canton, OH 44718 (888) 492 5377

CHPL 0.500 panel  
iZone Imaging  
2526 Charter Oak Dr, Suite 100  
Temple, TX 76502  
888-464-9663

or approved equal

Anchoring for Interpretive Sign Display shall be surface mount on concrete pad with stainless steel anchor bolts to dimensions and requirements of the manufacturer. Zinc plated bolts will not be accepted.

All bolts shall receive an ornamental cover to hide bolt form view.

Provide all materials from new stock, free from defects impairing strength, durability and appearance, and of best commercial quality for the purpose specified.

Supply all equipment hardware and required accessories required for complete, operating and installed site improvement item specified herein.

Provide all exposed fasteners of the same material, color and painted finish as the fastened material unless otherwise indicated in the Drawings and specified herein. Exposed fasteners shall be vandal-proof (spanner-head type), unless otherwise noted in the Drawings or specified herein. Some items will require removal for regular maintenance or for other uses. Provide fasteners and sleeves that allow for removal without damaging the fasteners or the item.

Finish shall be an electro-statically applied polyester powdercoat, Thickness of finish coat shall be 8-10 mils. Color shall be dark brown.

Graphics and text for the signs shall be provided by the Town of Coventry. Contact is Eric Trott, the Town Planner at 860-742-4062 [etrott@coventryct.org](mailto:etrott@coventryct.org).

**Construction Methods:** Deliver units to the site in manufacturer's original, unopened containers and packaging. Upon delivery examine packages immediately to ensure all products are complete and undamaged. Remove and replace damaged items.

Protect all stored and installed Interpretive Sign Display from damage, use, theft or vandalism until acceptance. Contractor shall adjust, repair, or replace damaged, missing, or unacceptable items at their own expense. Site items shall be clean, and finishes as specified as condition of

acceptance. Clean with non-abrasive means. Protect product's finish from damage during handling and installation. Any scratches shall be touched up with manufacturer supplied paint.

Install Interpretive Sign Display in accordance with manufacturer's instructions. Refer to the specific site elements and the Drawings for horizontal and vertical alignment. Anchor Interpretive Sign Display securely and according to manufacturer's instructions and the Drawings, to concrete paving or min. 3'x 4' wide, 4" thick concrete pad on 6" deep compacted gravel base. Attach with stainless steel anchor bolts and fasteners with lock-tight washers.

Any items damaged by excavation, which are to remain or are newly installed shall be replaced or repaired to existing conditions by the Contractor at no cost to the Department.

Contractor shall finish all concrete surfaces which will remain at finished grade by toweling all surfaces smoothly to drain away from installed item, tooling all edges neatly with rolled edges and corners and protecting surfaces from the sun, wind and vandalism until cured. Wrap and protect all imbedded anchor bolts.

The contractor shall provide adequate surveillance for all poured-in-place concrete pavements until concrete has set firmly, to prevent unwarranted markings of the concrete surface. Unauthorized marking or graffiti in the finished surfaces shall be cause for rejection, and replacement by the contractor at no additional cost.

Gravel borrow base shall be furnished and placed under requirements of Section 0304001 Processed Aggregate Base of the Standard Specifications, and the sections and elevations shown on the Drawings.

Interpretive Sign Display shall be securely installed to a 1/4 inch tolerance overall and shall be installed per manufacturer's directions, plumb and level, unless otherwise shown in the Drawings. Items that fall outside of this tolerance shall be required to be reset to meet tolerance, as a condition of acceptance. Bolts and fasteners shall be trimmed to safe length, as applicable and with review by the Engineer.

**Method of Measurement:** Item (0201902A) Interpretive Display Sign will be measured for payment per each as called out on the plans complete in place or as directed by the Engineer.

**Basis Of Payment:** Item (0201902A) Interpretive Display Sign will be paid at the Contract Unit Price per each, of the type and size specified which price shall include all labor, material, equipment, tools and labor incidental thereto, and incidental costs required to complete the work. No additional payment will be made for material or equipment necessary for the satisfactory completion of the work.

Pay Item  
Interpretive Sign Display

Pay Unit  
Each

**ITEM #0202216A - EXCAVATION AND REUSE OF EXISTING CHANNEL BOTTOM MATERIAL**

**Description:** Work under this item consists of removing material from the existing channel bottom of Mill Brook as shown on the plans and as directed by the Engineer, storing and protecting the material and placement of the material in accordance with the plans and as directed by the Engineer. This item also includes the removal and proper disposal off-site of all unused material.

**Materials:** If a sufficient quantity of material is not available from the site, the Contractor shall furnish additional material meeting the requirements of this specification from other sources within the project limits, or from another approved source. Material the Contractor proposes to bring to the site from another source must be inspected and approved by the Engineer at the source prior to the excavation or hauling of the material.

**Streambed Material:** The material shall conform to the following gradation requirements:

<b>Stone Size</b>	<b>% of the Mass</b>
Over 10 in	0
6 in to 10 in	20-50
4 in to 6 in	30-60
2 in to 4 in	30-40
1 in to 2 in	10-20
Less than 1 in	0-10

Additional material including uncrushed bank run gravel may be mixed with the available on-site material to produce the required gradation. Bank run gravel shall be uncrushed, conforming to the requirements of M.02.01—2.

**Construction Methods:** The Contractor shall prepare an area suitable for storing the excavated channel bottom material so that it cannot be contaminated, mixed with other excavated material or eroded. Before storing material, the area shall be approved by the Engineer. The location should be such as to minimize impacts to the channel and wetland areas caused by moving the material to and from the storage location.

Material excavated from the existing channel bottom shall be stored separately from other excavated materials.

After the box culvert and paved channel has been constructed, channel bottom material may be placed in the bottom of the culvert and paved channel to the limits as shown on the plans and as directed by the Engineer. At least seven days before replacement of the channel bottom material, the Contractor shall call Mr. Don Mysling of the Department of Environmental Protection, Fisheries Division (D.E.P. Fisheries) at telephone number (860) 567-8998 to notify the agency when he plans to place the material.

Stored material in excess of what is required to be placed in the culvert and channel shall be removed from the site and disposed of properly.

Once the stored material has been removed completely from the storage site, the area shall be restored to a condition acceptable to the Engineer.

**Method of Measurement:** Work under this item will be measured for payment by the cubic yard of channel bottom material actually placed in the culvert and paved channel.

**Basis of Payment:** Payment for this work will be made at the contract unit price per cubic yard for "Excavation and Reuse of Existing Channel Bottom Material," which price includes all material, equipment, tools and labor incidental to the excavation, storage and protection of excavated material, placement of material to the required depth and removal and proper disposal of excess material. The price shall also include furnishing all additional materials required to produce the necessary quantity and gradation, including bank run gravel; all required mixing of on-site and additional materials; excavation and hauling of additional materials to the site.

There will be no additional payment for excess material. Excess material shall be placed and compacted in the embankments, if so ordered by the Engineer, without additional compensation.

The control of water for the work described in this special provision will be paid for under the item "Handling Water".

Pay Item	Pay Unit
Excavation and Reuse of Existing Channel Bottom Material	Cubic Yard

**ITEM #0202315A - DISPOSAL OF CONTROLLED MATERIALS**

**Description:**

Work under this Item shall consist of the transportation and final off-site disposal/recycling/treatment of Controlled Materials (excluding dewatering fluids) that have been generated from various excavations within the Areas of Environmental Concern (AOECs) and Low-Level Areas of Environmental Concern (LLAOEC) that have been determined to be contaminated with regulated substances at non-hazardous levels. This contamination is documented in the report listed in the “Notice to Contractor – Environmental Investigations”. The Controlled Materials will be properly characterized by the Engineer and shall be excavated, loaded, transported directly to, and treated/ recycled/disposed of at, a Department-approved permitted treatment/recycle/disposal facility (TDRF) listed herein.

**Contractor Take Note: No delay claim will be considered based upon the Contractor’s failure to select facility(s) with enough capacity to handle the anticipated volume of Controlled Materials being generated by its activities.**

Controlled Materials include:

- (1) Soil materials (excluding pavement, concrete, sub-base, structures, utilities, and ledge/boulders) that contain regulated substances at concentrations exceeding numeric criteria in the Connecticut Department of Energy and Environmental Protection (CTDEEP) Remediation Standard Regulations (RSRs); and
- (2) Soil materials that contain detectable concentrations of regulated substances that are below numeric criteria in the CTDEEP RSRs, but above typical background concentrations, and which cannot be reused within the Project Limits.

The Contractor must use the following Department-approved Transportation, Disposal, Recycle Facility (TDRFs) for the disposal of non-hazardous materials:

Clean Earth of Carteret 24 Middlesex Avenue Carteret, NJ 07008 (732) 541-8909; Cheryl Coffee	Clean Earth of Philadelphia, Inc. 3201 S. 61 Street Philadelphia, PA 19153 (215) 724-5520; Mike Kelly
Clean Earth of Southeast Pennsylvania, Inc. 7 Steel Road Morrisville, PA 19067 (215) 428-1700; Joe Siravo	Cranston Sanitary Landfill 1690 Pontiac Avenue Cranston, RI 02920 (413) 552-3688; Paul Mahoney

ESMI of New York, LLC 304 Towpath Road Fort Edward, NY 12828 (518) 747-5500; Peter Hansen	ESMI of New Hampshire, LLC 67 International Drive Louden, NH 03307 (518) 747-5500; Peter Hansen
Hazelton Creek Properties, LLC 280 South Church Street Hazelton, PA 18201 (570) 207-2000; Allen Swantek	Northampton Landfill (Solid Waste Solutions, LLC) 170 Glendale Road Florence, MA 01062
Ontario County Landfill 3555 Post Farm Road Stanley, New York 14561 (603) 235-3597; Scott Sampson	Upton Landfill (former) / Upton Site Remediation, LLC Maple Avenue Upton, MA (413) 522-3688 ; Paul Mahoney
Soil Safe, Inc. 378 Route 130 Logan Township Bridgeport, NJ 08085 (410) 872-3990 XT. 1123; Mike Kozak	Waste Management (Chicopee Sanitary Landfill) 161 New Lombard Road Chicopee, MA 01020 (413) 534-8741; Tom Heaton
Ted Ondrick Company, LLC 58 Industrial Road Chicopee, MA 01020 (413) 592-2565; Alan Desrosiers	Waste Management Granby Sanitary Landfill 11 New Ludlow Road Granby, MA 01033 (413) 534-8741; Tom Heaton
Waste Management of NH; TLR III Refuse Disposal Facility 90 Rochester Neck Road P.O. Box 7065 Rochester, NY 03839 (603) 330-2170; Ellen Bellio	

The above list contains TDRFs which can accept the waste stream generated by this Project in quantities limited by their permits and their operational needs. In addition, some of these TDRFs may become unavailable during the duration of the Project. It is the responsibility of the Contractor to verify that a TDRF will be available and capable of handling the volume as well as the chemical and physical characteristics of soil generated by this Project. As such, the Contractor must factor in such possibilities.

### **Construction Methods:**

#### **A. Submittals**

The apparent low bidder shall submit in writing, within 14 days after bid opening the following:

ITEM #0202315A

1. A copy of the attached “Disposal Facility Material Acceptance Certification” form from each facility from the list above, which shall be signed by an authorized representative of each TDRF; and
2. A copy of the facility acceptance criteria and facility sampling frequency requirements from the TDRF.

**Failure to comply with all of the above requirements may result in the rejection of the bid.** If the material cannot be accepted by any of the TDRFs listed above, the Department will supply the Contractor with the name(s) of other acceptable facilities.

**Disposal Facility Materials Acceptance Certification**

Project Number: 0032-0130

Project Location: Reconstruction of Route 31 from Route 275 (Stonehouse Road) & Lake Street to North of Mason Street, Coventry, CT

Facility Name: \_\_\_\_\_ Telephone: \_\_\_\_\_

Facility Address: \_\_\_\_\_ Fax: \_\_\_\_\_

\_\_\_\_\_  
\_\_\_\_\_

The Contractor has supplied the analytical data contained in the report concerning the site investigation performed by the Designer. I have personally reviewed this data and intend to accept the following Controlled Material as described in Item 0202315A - Disposal of Controlled Materials.

This intent to accept the material will be subject to and dependent upon the facility's subsequent evaluation of waste characterization determination documentation to be provided to the Contractor by the Engineer.

Authorized Facility

Representative \_\_\_\_\_ / \_\_\_\_\_  
Printed/Typed Name Title

\_\_\_\_\_ / \_\_\_\_\_  
Signature Date

Note: The facility shall attach the acceptance criteria and facility sampling frequency requirements to this document.

**DO NOT ALTER FORM IN ANY WAY. FORM MUST BE COMPLETED IN ENTIERETY.**

B. General

When Controlled Materials are encountered during the course of the work, health and safety provisions shall conform to the appropriate sections of the Contract. Provisions may include implementation of engineering controls, air and personal monitoring, the use of chemical protective clothing (CPC), personal protective equipment (PPE), implementation of engineering controls, and decontamination procedures.

Controlled Materials requiring disposal off-site shall be loaded directly into vehicles for immediate transport to the Contractor selected treatment/recycling/disposal facility(s). Controlled Materials awaiting disposal shall not be stockpiled within the Project limits, unless otherwise directed by the Engineer.

C. Material Disposal

The Engineer shall sample the in-place Controlled Materials prior to the start of any work for waste characterization purposes. The Engineer will provide the Contractor with the waste characterization sampling results.

The Contractor shall obtain and complete all paperwork necessary to arrange for material disposal (such as disposal facility waste profile sheets). It is solely the Contractor's responsibility to coordinate the disposal of Controlled Materials with the selected TDRF(s). Upon receipt of the final approval from the facility, the Contractor shall arrange for the excavation, loading, transport, and treatment/recycling/disposal of the materials in accordance with all Federal and State regulations.

**The Contractor shall not begin excavation within the Project AOECs until the selected disposal facility has indicated final approval of the Controlled Material for disposal. No claim will be considered based on the failure of the Contractor's selected TDRF(s) to meet the Contractor's production rate or for the Contractor's failure to select sufficient TDRF(s) to meet its production rate.**

Any material processing (removal of woody debris, scrap metal, treated and untreated wood timber, large stone, concrete, polyethylene sheeting or similar material) required by the Contractor's selected facility, will be completed by the Contractor prior to the material leaving the site. It is solely the Contractor's responsibility to meet any such requirements of its facility. Any materials removed shall be disposed of or recycled in a manner acceptable to the Engineer at no additional cost. If creosote treated railroad ties or timbers are removed, they will be disposed of under the Item No. 0101133A – Disposal of Contaminated Railroad Ties, or in accordance with Article 1.04.05 in the absence of such item.

All manifests or bills of lading utilized to accompany the transportation of the material shall be prepared by the Contractor a minimum of 24 hours in advance and signed by an authorized

Department representative, as Generator, for each truckload of material that leaves the site. The Contractor shall forward the appropriate original copies of all manifests or bills of lading to the Engineer the same day the material leaves the Project.

A load-specific certificate of treatment/recycling/disposal, signed by the authorized agent representing the TDRF, shall be obtained by the Contractor and promptly delivered to the Engineer for each load.

#### D. Dust Control

The Contractor shall implement a fugitive dust suppression program in accordance with the Contract to prevent the off-site migration of particulate matter and/or dust resulting from excavation, loading, and operations associated with Controlled Materials. It shall be the Contractor's responsibility to supervise fugitive dust control measures and to monitor airborne particulate matter. The Contractor shall:

1. Employ reasonable fugitive dust suppression techniques.
2. Visually observe the amounts of particulate and/or fugitive dust generated during the handling of Controlled Materials. If the apparent amount of fugitive dust and/or particulate matter is not acceptable to the Engineer, the Engineer may direct the Contractor to implement corrective measures at his discretion, including, but not limited to, the following:
  - (a) apply water to pavement surfaces
  - (b) apply water to equipment and excavation faces; and
  - (c) apply water during excavation, loading, and dumping.

#### E. Material Transportation

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 Controlled Materials off-site:

1. Transported Controlled Materials are to be covered sufficiently to preclude the loss of material during transport prior to leaving the site and are to remain covered until the arrival at the selected TDRF;
2. Discharge openings on trucks used for the transportation of Controlled Materials must be securely closed during transportation and load tarpaulins must be deployed. Trucks deemed unacceptable for use by the Engineer shall not be used for the transportation of Controlled Materials;

3. All vehicles departing the Project are to be properly logged to show the vehicle identification, driver's name, time of departure, destination, approximate volume, and contents of materials carried;
4. No materials shall leave the site unless a TDRF willing to accept all of the material being transported has agreed to accept the type and quantity of waste; and
5. Documentation must be maintained indicating that all applicable laws have been satisfied and that materials have been successfully transported to and received at the TDRF.

F. Dewatering

Dewatering activities shall conform to items in pertinent articles of the Contract.

G. Equipment Decontamination

All equipment shall be provided to the work site free of gross contamination. The Engineer may prohibit from the site any equipment that in his opinion has not been thoroughly decontaminated prior to arrival. Any decontamination of the Contractor's equipment prior to arrival at the site shall be at the expense of the Contractor. The Contractor is prohibited from decontaminating equipment on the Project that has not been thoroughly decontaminated prior to arrival.

The Contractor shall furnish labor, materials, tools, and equipment for decontamination of all equipment and supplies that are used to handle Controlled Materials. Decontamination shall be conducted at an area acceptable to the Engineer and shall be required prior to equipment and supplies leaving the Project and between stages of the work.

The Contractor shall use dry decontamination procedures. Residuals from dry decontamination activities shall be collected and managed as Controlled Materials. If the results from dry methods are unsatisfactory to the Engineer, the Contractor shall modify decontamination procedures as required.

The Contractor shall be responsible for the collection and treatment/recycling/disposal of any liquid and solid wastes that may be generated by its decontamination activities in accordance with applicable regulations.

**Method of Measurement:**

The work of "DISPOSAL OF CONTROLLED MATERIALS" will be measured for payment as the actual net weight in tons of material delivered to the TDRF. Such determinations shall be made by measuring each hauling vehicle on the certified permanent scales at the TDRF before

and after unloading and subtracting the weight of the empty vehicle from the weight of the loaded vehicle. Total weight will be the summation of weight bills issued by the facility specific to this Project.

Excess excavations made by the Contractor beyond the payment limits specified in Specification Sections 2.02, 2.03, 2.05, 2.06, or the Contract Special Provisions (as appropriate) will not be measured for payment and the Contractor assumes responsibility for all costs associated with the appropriate handling, management, and disposal of this material.

The disposal of excavated materials, originally anticipated to be Controlled Materials, but determined by characterization sampling not to contain concentrations of regulated chemicals (non-polluted or “clean” materials) will not be measured for payment under this Item but will be considered as surplus excavated materials and shall be handled in accordance with Article 1.04.05.

Any Controlled Materials which are reused within the Project limits will not be measured for payment under this Item.

Equipment decontamination, the collection of residuals, and the collection and disposal of liquids generated during equipment decontamination activities will not be measured separately for payment.

Any material processing required by the Contractor-selected disposal facility, including the proper disposal of all removed materials other than creosote treated wood, will not be measured for payment.

**Basis of payment:**

This work shall be paid for at the Contract unit price, which shall include transportation of Controlled Materials from the Project WSA to the TDRF(s); the preparation of manifests, bills of lading, and fees paid; and all equipment, materials, tools, and labor incidental to this work. **This unit price will be applicable to all of the listed TDRFs and will not change for the duration of the Project.**

This price shall also include equipment decontamination, the collection and handling of residuals generated during decontamination, and the collection and disposal of solids and liquids generated during equipment decontamination activities.

Payment for dust control activities shall be made under the appropriate Contract items.

Pay Item	Pay Unit
Disposal of Controlled Materials	ton

## **ITEM #0204151A - HANDLING WATER**

**Description:** This work shall consist of the construction of such cofferdams, flow diversion dams, barriers or other such protective facilities and methods as are necessary for the conduction of water beyond the limits of construction; the dewatering of the site on which work is to be constructed; and the removal of all such temporary structures and facilities upon the completion of the permanent work or as required. The handling of water shall be in accordance with the requirements of Section 1.10 and the Connecticut D.E.E.P.'s Inland Wetlands and Watercourses Permit. For the purposes of this specification, such work shall be understood to mean any temporary type of protective facility which the Contractor elects to build or use to satisfy, and which does satisfy, the condition that the work be built in the dry. The handling of flood flows, the protection of any or all of the finished construction during high water, and maintaining the operation of the existing structure until it is abandoned are included in the scope of the work under this item.

**Construction Methods:** The Contractor shall investigate and verify existing stream conditions, and evaluate the need for, and the type of protection and facilities required. The suggested method of controlling water during construction consist of a temporary by-pass pipe and temporary flow diversion dams as shown on the plans. The Contractor shall submit his plans and methods for handling water for review and approval in accordance with the requirements of Section 1.10 of the Standard Specifications. The temporary by-pass pipe shall be designed by the Contractor to carry all anticipated traffic loads. The furnishing of such plans and methods shall not serve to relieve the Contractor of any part of his responsibilities for the safety or the successful completion of this work.

The minimum height of any cofferdams, flow diversion dams and barriers shall be in accordance with the information shown on the plans and sizes of pumps shall be as designed by the Contractor to provide reasonable protection from flooding. All such temporary structures or facilities shall be safely designed, extended to sufficient depth and be of such dimensions and water-tightness to assure construction of the permanent work in the dry. They shall not interfere with proper performance of the work. Their construction shall be such as to permit excavation for the permanent work to the limits shown on the plans. Interior dimensions shall give sufficient clearance for construction. Movements or failures of the temporary protection facilities, or any portions thereof, which prevent proper completion of the permanent work, shall be corrected at the sole expense of the Contractor.

Any pumped water must be discharged in accordance with the requirements of Section 1.10 of the Standard Specifications.

Unless otherwise provided, or directed, all such temporary protective work shall be removed and disposed of in an approved manner when no longer required.

The Contractor will be responsible for the scheduling of work so as not to interfere with any sequence of operations developed for this project. Delays as a result of work required under this item will not constitute a claim for an extension of contract time.

In addition to the requirements set forth in these specifications, this work shall conform to the applicable requirements described in the Connecticut Department of Energy and Environmental Protection's Inland Wetlands and Watercourses Permit. A copy of the approved permit is included elsewhere in this contract.

**Method of Measurement:** This item, being paid for on a lump sum basis, will not be measured for payment.

**Basis of Payment:** This work will be paid for at the contract lump sum price for "Handling Water" completed and accepted, which price shall include all materials, tools, equipment, labor and work incidental to the construction; reconstruction if required; dewatering, including pumping; handling the stream flow during construction; the removal and disposal of all protective works or facilities; disposal of water removed from the construction area; damages incurred by the Contractor; and any damages to existing facilities and to the work in progress, materials or equipment from flows or high stages of the stream.

Pay Item  
Handling Water

Pay Unit  
L.S.

## **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 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.

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.

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 Waste Stockpile Area (WSA) for testing and characterization by the Engineer.

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 overfilling or equipment/piping failure to the DEEP Spill Response Unit in accordance with RCSA 22a-450 and provide the Engineer with all information, including the 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 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 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 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 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 DEEP prior to the Engineer's review of and comment on the treatment system.

The Contractor shall submit a copy of the 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 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 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 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 DEEP General Permit. The Contractor shall be responsible for registering under the General Permit and all associated fees.

The 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 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 DEEP prior to review of and comment on the treatment system by the Engineer.

The Contractor shall submit a copy of the 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 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 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

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 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 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 DEP-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 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, 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, transporting of solids to the WSA, 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; treatment; 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 WSAs; 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 #0210100A - ANTI-TRACKING PAD**

**Description:** The work shall also include the construction and maintenance of an Anti-Tracking Pad at the locations and to the details as shown on the plans or as directed by the Engineer.

**Materials:** Crushed stone shall comply to M.01.01 and shall be 2 inch

Geotextile shall comply with M.08.01-26

**Construction Methods:**

1. Excavation: Excavation shall be made to the required depth below the finished grade of the access road to place the geotextile and crushed stone.
2. Geotextile: The geotextile shall be placed in accordance with Section 7.55.03.
3. 2 inch Crushed Stone: The area on which the crushed stone is to be placed shall be shaped to a reasonably true surface and the geotextile placed before placing the stone. The stone shall be spread by any means which will not crush the stone and shall be shaped to a smooth uniform finished grade.
4. Replenish and/or maintain the Anti-Tracking Pad as necessary or as directed by the Engineer to keep it in good working condition.

**Method of Measurement:** Anti-Tracking Pad shall be measured by the actual square yards of anti-tracking pad installed and accepted. The square yard cost shall include the excavation, geotextile and crushed stone complete and accepted in accordance with the details shown on the plans.

**Basis of Payment:** Anti-Tracking Pad shall be paid at the contact unit price per square yard of Anti-Tracking Pad installed, accepted and maintained which price shall include excavation, geotextile, crushed stone materials, equipment, tools, replacement materials for replenishment and/or maintenance, and labor incidental thereto.

Pay Item  
Item No. 0210100A – Anti-Tracking Pad

Pay Unit  
Square Yard

## **ITEM #0216000A - PERVIOUS STRUCTURE BACKFILL**

**Description:** Pervious structure backfill shall include the furnishing, placing, and compaction of pervious material adjacent to structures. This item shall also consist of furnishing and placing crushed stone or gravel in burlap bags at the inlet ends of weep holes in structures to the dimensions indicated on the plans or as ordered by the Engineer.

**Material:** Pervious structure backfill shall conform to the requirements of Article M.02.05.

The materials for bagged stone shall conform to the following requirements:

- (a) The crushed stone or gravel shall conform to the grading requirements of Article M.01.01 for No. 4 or No. 4 coarse aggregate or a mixture of both.
- (b) The bag shall be of burlap and shall be large enough to contain one cubic foot of loosely packed granular material.

**Construction Methods:** Pervious structure backfill shall be placed adjacent to abutments, retaining walls, box culverts, and elsewhere as called for. It shall be placed above a plane extending on a 1.5 to 1 slope from the upper edge of the footing to the top of the embankment, or as shown on the plans. Where the face of undisturbed material is above or beneath this slope plane, the amount of pervious structure backfill shall be decreased or increased accordingly, if ordered by the Engineer.

In filling behind abutment, retaining walls, box culverts or other structures, the fill is placed against undisturbed material, or against compacted embankments having a length in a direction at right angles to the abutment wall or culvert not less than twice the height of the structure against which the fill is placed. The slope of the embankment on which the pervious structure backfill is to be placed shall be plowed deeply or cut into steps before and during the placing of pervious structure backfill so both types of material will be thoroughly bonded and compacted.

Each layer of pervious structure backfill shall be spread to a thickness not exceeding 6 inches in depth after compaction and shall be thoroughly compacted as directed by the Engineer by the use of power rollers or other motorized vehicular equipment, by tamping with mechanical rammers or vibrators, or by pneumatic tampers. Any equipment not principally manufactured for compaction purposes and equipment, which is not in proper working order in all respects, shall not be used within the area described above.

Special attention shall be given to compaction in places close to walls where motorized vehicular equipment cannot reach. Within 3 feet of the back face of walls and within a greater distance at angle points of walls, each layer of pervious structure backfill shall be compacted by mechanical rammers, vibrators, or pneumatic tampers.

The dry density of each layer of pervious structure backfill formed from broken or crushed stone, broken or crushed gravel or reclaimed miscellaneous aggregate free of bituminous concrete shall

have a dry density after compaction that is no less than 100 percent of the dry density for that material when tested in accordance with AASHTO T180, Method D. If a layer formed from reclaimed miscellaneous aggregate containing bituminous concrete is placed as pervious structure backfill, the wet density of this layer after compaction shall not be less than 100 percent of the wet density of that material when tested in accordance with AASHTO T180, Method D.

In this test, material retained on the ¾ inch sieve shall be replaced with material retained on the number 4 sieve, as noted as an option in the specifications for this test.

Each layer of the pervious structure backfill shall be compacted at optimum moisture content. No subsequent layer shall be placed until the specified compaction is obtained for the pervious layer.

Where weep holes are installed, bagged stone shall be placed around the inlet end of each weep hole, to prevent movement of the pervious material into the weep hole. Approximately one cubic foot of crushed stone or gravel shall be enclosed in each of the burlap bags. All bags shall then be securely tied at the neck with cord or wire so that the enclosed material is contained loosely. The filled bags shall be stacked at the weep holes to the dimensions shown on the plans or as directed by the Engineer. The bags shall be unbroken at the time pervious material is placed around them, and bags which are broken or burst prior to or during the placing of the pervious material shall be replaced at the expense of the Contractor.

**Method of Measurement:** Payment lines for pervious structure backfill shall coincide with the limits of the compacted pervious structure backfill as actually placed and ordered by the Engineer. There shall be no direct payment for bagged stone, but the cost thereof shall be considered as included in the cost of the work for “Pervious Structure Backfill”.

**Basis of Payment:** Pervious structure backfill will be paid for at the contract unit price per cubic yard for “Pervious Structure Backfill”, complete in place.

Pay Item	Pay Unit
Pervious Structure Backfill	Cubic Yard

## **ITEM #0404100A - BITUMINOUS CONCRETE PATCHING - FULL DEPTH**

**1. Description:** This work shall consist of repairing areas of structurally failed flexible pavement by:

- a) removal of the entire thickness of the bound layers of the pavement structure to a distance at least one foot beyond the deteriorated area,
- b) reconditioning the base, which shall include removal of a specified minimum thickness of the base and replacement with suitable material, and which shall include compacting and bringing back to line and grade the granular material,
- c) Application of tack coat to the bound-layer vertical edges of the patch, and
- d) Placement of Hot-Mix Asphalt (HMA) to match surrounding pavement thickness as closely as possible except that the minimum HMA thickness shall be two (2) inches. Since the pay item is by area, the estimated composition of the patch is to be included as a detail in the plans or contract documents.

1.1 Definitions: The following definitions of terms shall apply to this Special Provision.

Structurally failed pavement: Structurally failed pavement exhibits deterioration that extends through the entire depth at least the bound layers of the pavement structure. Typical distress forms visible at the surface include potholes, temporary or deteriorated patches, severe depressions or heaves, or areas of alligator cracking. Raveling, delamination, or surface potholes are not indicators of structural failure and are not subject to the repair procedure described in this Provision.

Bound layers: Total thickness of pavement structure composed of material bound together by a bituminous binder.

Granular layers: Total thickness of the pavement structure composed of unbound but selected and/or engineered materials, typically crushed or bank-run aggregate and fines, or crushed stone or crushed or bank-run gravel.

Subgrade: The native fill or unimproved soil underlying the pavement structure.

Flexible pavement: For the purposes of this provision, flexible pavement shall be a pavement structure composed of bound layers and granular layers only, with no Portland-cement concrete (PCC) layers or cementitiously treated layers present in the pavement structure.

**2. Materials:** Materials for this work shall consist of the following:

- a) Processed Aggregate Base conforming to the requirements of Sections 3.04 and M.05.01 of the Standard Specifications.
- b) Hot-mix Asphalt conforming to the requirements of Sections 4.06 and M.04 of the Standard Specifications.
- c) Tacking agent conforming to the material requirements for tack coat in Sections 4.06 and M.04 of the Standard Specifications.
- d) If geotextile is included in the patch, it shall be a High Survivability Separation geotextile from the latest version of the Department of Transportation's Qualified

Products List, available at

[http://www.ct.gov/dot/LIB/dot/documents/dresearch/conndot\\_qpl.pdf](http://www.ct.gov/dot/LIB/dot/documents/dresearch/conndot_qpl.pdf).

**3. Equipment:** Equipment for this work shall include all pavement cutting, removal, material handling, and compaction equipment to perform all patching operations. Compaction equipment shall include, but not be limited to, a steel-wheeled roller and vibratory plate compactor both capable of compacting both granular and HMA materials to specification requirements.

#### **4. Construction Methods:**

a) Demarcation of Areas to be Patched:

Mark the areas to receive this treatment. All areas to be full-depth patched shall completely encompass the entire deteriorated area and extend one (1) foot beyond into the surrounding pavement, and shall be approved by the Engineer prior to execution of the work.

b) Patch Preparation:

- i. Saw cut the edges of the areas demarcated for full-depth patching.
- ii. Excavate and remove all layers (bound, granular, and subgrade) in demarcated areas as approved by the Engineer to accommodate the pavement structure for full-depth patching indicated in the Plans. No surrounding pavement, either its bound layers or its granular layers, shall be damaged during removal; if surrounding pavement is damaged, the area of removal shall be extended to encompass the newly damaged pavement. The volume of pavement damaged and repaired beyond the demarcated areas shall be repaired at the Contractor's expense and not be measured for payment.
- iii. Place the granular layer in the patch pavement structure to the depth shown on the Plans, compact to the requirements of the Standard Specifications, and bring to line and grade prior to placement of hot-mix asphalt.
- iv. In cases where the subgrade is not sufficiently stable to support compaction of the granular layers, a geotextile material may be used on top of the subgrade; if use of a geotextile is selected, the minimum thickness of the granular layer shall be 18 inches.

c) Patch construction:

- i. Apply tack coat to the bound-layer edges of the patch prior to placement of HMA.
- ii. Place HMA in lifts as indicated in the plans or contract documents to match the existing thickness of the surrounding pavement as closely as possible but with a minimum HMA thickness of two (2) inches. The surface elevation of the finished HMA patch shall be even with the surrounding existing pavement within ¼ inch as measured with a 10-foot straightedge.

d) Disposal of waste: Remove all waste materials the same day they are excavated.

**5. Method of measurement:** This work shall be measured by the total area, in square yards, of "Bituminous Concrete Patching – Full Depth." If geotextile is used, it shall be measured by the total area, in square yards, of "Geotextile (Separation – High Survivability)" placed.

**6. Basis of Payment:** This work will be paid for at the contract unit price per square yard of “Bituminous Concrete Patching-Full Depth.” The price shall include all tools, materials, labor, and equipment used for this activity, including, but not limited to: sawcutting, pavement and granular base excavation and removal, HMA and Processed Aggregate Base used in the construction of the patch, compaction and/or formation of granular base, and tacking agent. Geotextile shall be paid for separately at the contract unit per square yard of “Geotextile (Separation – High Survivability)” placed and shall include all tools, materials, labor, and equipment used for placement of this item. No payment will be issued to the contractor prior to document submissions required.

<u>Pay Item</u>	<u>Pay Unit</u>
0404100A Bituminous Concrete Patching – Full Depth	S.Y.
0755014A Geotextile (Separation – High Survivability)	S.Y.

## **ITEM #0406000A - TEMPORARY ASPHALT PAVEMENT**

**Description:** Work under this item shall consist of placing temporary pavement at the locations and to the general requirements shown on the contract drawings or as directed by the Engineer.

**Materials:** The materials to be used in the construction of temporary pavement shall be those indicated on the plans and in the details or ordered by the Engineer. Processed Aggregate Base shall conform to the requirements of CTDOT Form 816 Article M.05.01. Bituminous Concrete shall conform to the requirements of CTDOT Form 816 Article M.04.01. of the type and thickness specified.

### **Construction Methods:**

- A. The Contractor, upon completing the backfilling of the trenches in pavement used by traffic will be required to construct a temporary pavement.
- B. The methods employed in placing the bituminous pavement and all equipment, tools, machinery and other plant equipment used in handling materials and executing any part of the work shall conform to all requirements of CTDOT Form 816 Article 4.06.03. The completed and compacted temporary pavement shall match the adjacent grade of the existing pavement and meet or surpass the uniformity of the adjacent surface and its roughness or riding quality. Replacement of the temporary pavement will be required at no additional cost where the pavement surface is not smooth or the compacted thickness of the bituminous concrete is deficient by more than 1/2".
- C. It shall be the responsibility of the Contractor to maintain and repair temporary bituminous pavement surfaces until such time as the temporary pavements have been replaced with the construction of permanent pavements. The Contractor shall at all times maintain the temporary pavements in a safe and satisfactory condition and all maintenance and repairs of permanent and temporary pavements shall be provided by the Contractor at no additional expense.
- D. The Contractor shall perform and complete the construction work in a continuous manner and so that pavement replacement work may proceed without delay. The Contractor shall install the temporary pavement as soon as practical. Unless otherwise directed by the Engineer the contractor shall install the temporary pavement daily.
- E. All curbing, street fixtures and such other appurtenant work damaged or displaced as a result of the Contractor's operations shall be repaired or replaced and restored by the Contractor in a manner satisfactory to the Engineer at no cost.
- F. Payment for temporary pavement shall be made only to the limits shown on the detail for trench excavation. The City shall not be responsible for the cost of additional temporary pavement required for trenches wider than the limits detailed.

**Method of Measurement:** This work will be measured for payment by the ton of temporary pavement applied to the limits shown on the plans or ordered by the Engineer and after verification of the proper depth of bituminous concrete pavement thickness by the Engineer. For

sewer pipe the maximum width allowed for payment of a temporary pavement patch will be four feet wide. For a sewer manhole the maximum size of patch will be 9 square yards.

**Basis of Payment:** The temporary pavement will be paid for at the contract unit price per ton for "Temporary Pavement" complete in place and approved which price shall include all materials, tools, equipment and labor incidental thereto. No separate payments will be made for excavation and disposal of materials, furnishing, placing, and compaction of processed aggregate base, or the cleaning, saw cutting, and tack coating of the existing pavement. The costs for these items shall be included in the contract unit price.

Pay Item	Pay Unit
Temporary Asphalt Pavement	Ton

## **ITEM #0406272A - MILLING OF BITUMINOUS CONCRETE – (0 - 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 rotary drum of the machine shall use carbide or diamond tipped tools spaced not more than  $\frac{5}{8}$  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.

For projects that are 5000 feet in length or greater, the Contractor may submit a request in writing to perform a test strip(s) to demonstrate that the same surface tolerance can be attained at an increased forward speed. The submission shall include:

- Increased forward speed(s) to be tested
- Location of the test strip(s)
- Length of test strip(s)
- Make and model of the milling machine
- Type of drum (Standard or Fine)

The increased forward speed shall be made in 5 ft/min. increments from the maximum 45 ft/min. per test strip. The test strip(s) shall have a minimum length of 250 feet, a maximum length of 500 feet and shall have the same criteria for surface tolerance as noted in this Specification. The surface tolerance shall be verified by a Contractor supplied 10 foot straightedge with measurements taken every 50 feet and at any location the Inspector deems appropriate within the test strip. In no case shall the forward speed be allowed to increase beyond 60 feet/minute. The final decision for implementing or continuing approved increased forward speed will be at the discretion of the Engineer.

If an increase in forward speed is approved, the same equipment used for the test strip shall be used throughout the milling operation. If at any time during approved increased speed there is evidence of gouging, cupping, delamination or any surface texture outside of the tolerances within this specification is evident, the forward speed shall be reduced to a maximum of 45 feet/minute for the remainder of the project.

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  $\frac{3}{8}$  inch. The variation of the top of any ridge to the bottom of the groove adjacent to that ridge shall not exceed  $\frac{3}{8}$  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.

The depth of removal will be calculated by taking measurements at a minimum every 250 feet per each pass of the milling machine, or as directed by the Engineer. The average depth of each section will determine which payment item is applicable.

**Basis of Payment:** This work will be paid for at the Contract unit price per square yard for “Milling of Bituminous Concrete (0 to 4 inches),” “Milling of Bituminous Concrete (Over 4 to 8 inches)” and “Milling of Bituminous Concrete (Greater Than 8 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	Pay Unit
Milling of Bituminous Concrete – (0 - 4 inches)	S.Y.
Milling of Bituminous Concrete – (Over 4 to 8 inches)	S.Y.
Milling of Bituminous Concrete – (Greater than 8 inches)	S.Y.

## **ITEM #0406999A - ASPHALT ADJUSTMENT COST**

**The Asphalt Price is available on the Department of Transportation web site at:**

<http://www.ct.gov/dot/asphaltadjustment>

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 in the contract.

An asphalt adjustment cost will be applied only if all of the following conditions are met:

- I. For HMA and PMA mixtures:
  - a. The HMA or PMA mixture in which the adjustment is being applied is listed as a contract item with a pay unit of tons or metric tons.
  - b. The total quantity for all HMA and PMA mixtures in a contract or individual purchase order (Department of Administrative Service contract awards) exceeds 1000 tons or more.
  - c. The difference between the posted *Asphalt Base Price* and *Asphalt Period Price* varies by more than \$5.00.
- II. For Ultra-Thin Bonded HMA mixtures:
  - a. The Ultra-Thin Bonded HMA mixture in which the adjustment is being applied is listed as a contract item.
  - b. The total quantity for Ultra-Thin Bonded HMA mixture in a contract exceeds:
    - i. 800 tons (727 metric tons) if Ultra-Thin Bonded HMA is listed as a contract item with a pay unit of tons or metric tons.
    - ii. 30,000 square yards (25,080 square meters) if Ultra-Thin Bonded HMA is listed as a contract item with a pay unit of square yards or square meters.

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 Special Provision.
  - c. The difference between the posted *Asphalt Base Price* and *Asphalt Period Price* varies by more than \$5.00.
  - d. No Asphalt Adjustment Cost shall 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 and/or PMA mixtures, the Asphalt Adjustment Cost will be based on PG 64-22.

The Connecticut Department of Transportation (ConnDOT) shall 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 a standard ton (US\$/ST). The metric ton price is determined by applying a factor of 1.1023 (US\$/ST x 1.1023 = US\$/mton). Example: \$150.00/ton x 1.1023 = \$165.34/mton

Formula:  $HMA \times \frac{PG\%}{100} \times [(Period\ Price - Base\ Price)] = \$ \underline{\hspace{2cm}}$ , where

- **HMA:**
  1. For HMA, PMA, and Ultra-Thin Bonded HMA mixtures with pay units of mass:  
The quantity (tons or metric 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 area:  
The quantity of Ultra-Thin Bonded HMA mixture delivered, placed, and accepted for payment, calculated in tons or metric tons as documented according to the Material Documentation provision (section E) of the Ultra-Thin Bonded HMA Special Provision.
- **Asphalt Base Price:** The asphalt price that is posted on the ConnDOT website 28 days before the actual bid opening posted.
- **Asphalt Period Price:** The asphalt price that is posted on the ConnDOT website for the period in which the HMA, PMA mixture is placed.
- Performance-Graded Binder percentage (**PG%**)
  1. For HMA or PMA mixes:
    - PG% = 4.5
      - For Superpave 37.5mm (1.5 inch), Superpave 25.0mm (1.0 inch), PMA S1, HMA S1, and Class 4
    - PG % = 5.0
      - For Superpave 12.5mm (0.50 inch), HMA S0.5 and Class 1.
    - PG % = 6.0
      - For Superpave 0.375 inch (9.5mm), HMA S0.375, Superpave 6.25mm (0.25 inch), HMA S0.25, Superpave 4.75mm (#4) and Class 2.

2. For Ultra-Thin Bonded HMA mixes:  
PG% = Design % PGB (Performance Graded Binder) in the approved job mix formula, expressed as a percentage to one decimal point (e.g. 5.1%)

The adjustment shall not be considered as a changed condition in the contract because of this provision and because the Contractors are being 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 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 the Contract.

**ITEM #0503866A - REMOVAL OF EXISTING CULVERT (SITE NO. 1)**

The work under this item shall conform to the requirements of Section 5.03 amended as follows:

**Article 5.03.01 - Description:** The work under this item shall include the removal and satisfactory disposal of the existing twin 27” culverts, pedestrian bridge, light pole, fire pond walls, headwalls, and 36” x 54” culvert and other work stages 1 through 5 and/or as directed by the Engineer.

**Article 5.03.02 - Materials:** The materials required for this work shall be as shown on the plans or as ordered. All materials shall conform to the requirements of these specifications or the special provisions for the material in question; or if not so specified, they shall be of a quality satisfactory to the Engineer.

**Article 5.03.03 - Construction Methods:** This work shall be removed in accordance with the sequence shown and described for Stages 1 through 5 on drawing no. STR-04 and STR-05.

**Article 5.03.04 - Method of Measurement:** This work under this item shall be paid for at the Contract lump sum price for the completion of all work specified.

**Article 5.03.05 - Basis of Payment:** The removal of the Existing Culvert at Site No. 1 shall be paid for as a contract lump sum price which price shall be full compensation for work necessary to perform the stated work, including, but not limited to, excavation, backfilling, compaction, restoring facilities destroyed or damaged during the removal and salvaging and/or disposing of existing materials.

Pay Item	Pay Unit
Removal of Existing Culvert (Site No. 1)	l.s.

**ITEM #0506003A - REBUILD STONE RETAINING WALL**

**Description:** Work under this item shall conform to the relevant provisions of Section 5.06 Retaining Walls, Endwalls and Steps of the Standard Specifications and the following:

This item of work shall consist of removing, relocating, and rebuilding un-cemented stone walls to the lines and grades shown on the plans in such a way as to match the look, color and feel of the undisturbed section of the walls.

**Materials:** Existing stones from the existing walls.

**Construction Methods:** The Contractor shall employ a mason with experience in reconstructing historic walls to perform this item of work. The stones used for the wall shall be the same stones removed from the same wall. Exposed faces of the existing wall stones shall be exposed faces on the rebuilt or relocated wall stones.

**Method of Measurement:** Measurement for Item 0506003A Rebuild Stone Retaining Wall, will be measured, cubic yard complete in place and accepted.

**Basis of Payment:** Payment for Item 0506003A Rebuild Stone Retaining Wall, will be paid for at the Contract Unit Price per cubic yard of the type and size specified which price shall include all labor, material, equipment, tools and labor incidental thereto, and incidental costs required to complete the work. No additional payment will be made for material or equipment necessary for the satisfactory completion of the work.

Pay Item  
Rebuild Stone Retaining Wall

Pay Unit  
cubic yard

## **ITEM #0601082A - 5' X 4' PRECAST CONCRETE BOX CULVERT**

## **ITEM #0601463A - 5' X 3' PRECAST CONCRETE BOX CULVERT**

**Description:** Work under this item shall consist of designing, furnishing and installing a precast concrete box culvert, constructed of four sided, reinforced, monolithically precast concrete sections with open ends, in accordance with the details shown on the plans, in accordance with these specifications and as ordered by the Engineer.

**Materials:** The concrete shall conform to the requirements of Subarticle M.14.01-1, as applicable, except when zero-slump concrete is used the entrained air content requirement is eliminated. The concrete shall have a minimum 28 day compressive strength,  $f'_c$ , of 6,000 psi.

The reinforcement shall be either welded wire fabric or deformed steel bars. The welded wire fabric shall be uncoated and conform to the requirements of ASTM A185 or ASTM A497. The deformed steel bars shall be uncoated and conform to the requirements of ASTM A615, Grade 60.

Mechanical reinforcing bar connectors shall be dowel bar mechanical connectors conforming to M.06.01.

All threaded concrete inserts, lifting fixtures and miscellaneous hardware cast into precast concrete components shall be galvanized in accordance with ASTM A153 or ASTM B695, Grade 50, or be stainless steel.

Gaskets shall be flexible, expanded rubber conforming to ASTM D1056.

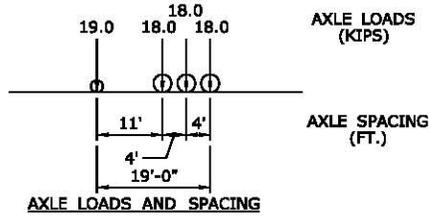
Non-shrink grout shall conform to Subarticle M.03.01-12.

Geotextile shall conform to Subarticle M.08.01-26 and type "Separation (High Survivability)"

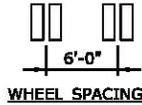
### **Construction Methods:**

**1. Design and Load Rating:** The design of the precast concrete box culvert shall conform to the requirements of the latest edition of the AASHTO LRFD Bridge Design Specifications, including the latest interim specifications, as supplemented by ASTM C1577 and amended as follows:

- In addition to the HL-93 design live load, the precast concrete box culvert shall be designed to carry the legal and permit live loads shown in Figure 1. The load and resistance factors, multiple presence factors, dynamic load allowance and distribution factors for the legal and permit live loads shall be consistent with Table 1.



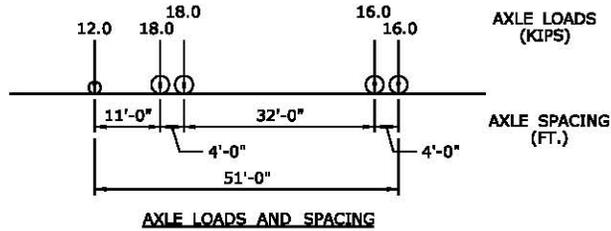
**AXLE LOADS AND SPACING**



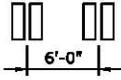
**WHEEL SPACING**

NOTE: CT-L73.0 REPRESENTS THE CONSTRUCTION VEHICLE DESCRIBED IN SECTION 14-269(d) OF THE CT GENERAL STATUTES

**CT-L73.0 LEGAL LIVE LOAD VEHICLE**  
73 KIPS ON 4 AXLES



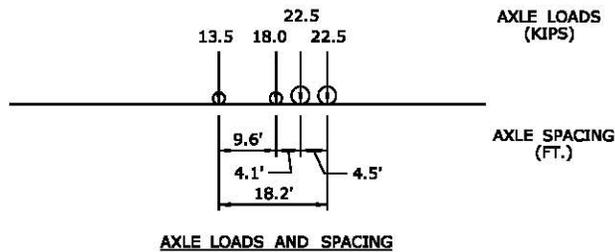
**AXLE LOADS AND SPACING**



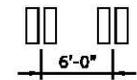
**WHEEL SPACING**

NOTE: CT-L3S2 REPRESENTS THE VEHICLE DESCRIBED IN SECTION 14-267A(b)(8) OF THE CT GENERAL STATUTES

**CT-L3S2 LEGAL LIVE LOAD VEHICLE**  
80 KIPS ON 5 AXLES



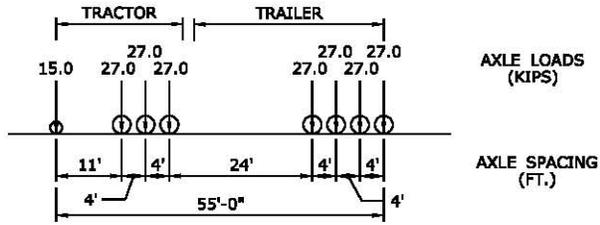
**AXLE LOADS AND SPACING**



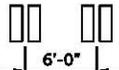
**WHEEL SPACING**

**CT-P76.5 PERMIT LIVE LOAD VEHICLE**  
76.5 KIPS ON 4 AXLES

**FIGURE 1**



**AXLE LOADS AND SPACING**

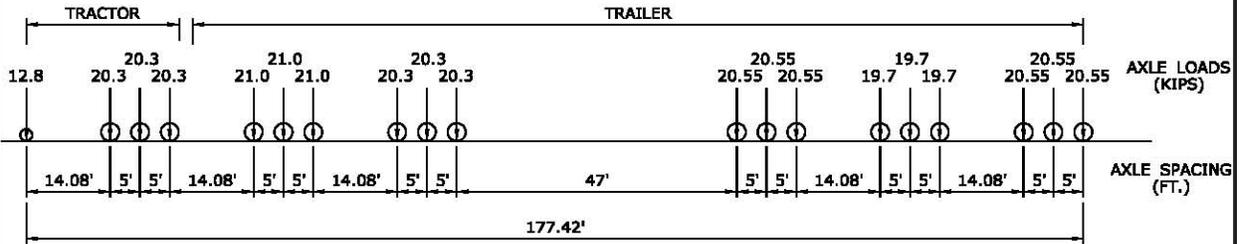


**WHEEL SPACING**

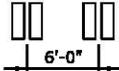
NOTE: CT-P204 IS A NOTIONAL VEHICLE

**CT-P204 PERMIT LIVE LOAD VEHICLE**

204 KIPS ON 8 AXLES



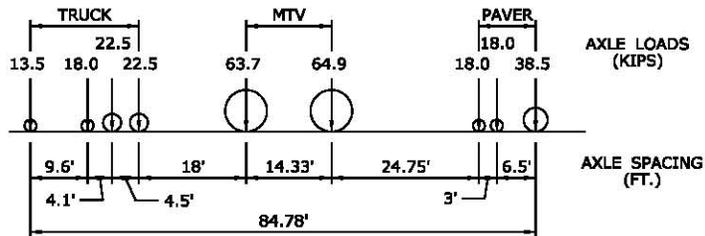
**AXLE LOADS AND SPACING**



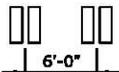
**WHEEL SPACING**

**CT-P380 PERMIT LIVE LOAD VEHICLE**

380 KIPS ON 19 AXLES



**AXLE LOADS AND SPACING**



**WHEEL SPACING**

NOTE: TLC = TRI-LOAD COMBINATION OF VEHICLES IN PAVING TRAIN

**CT-TLC PERMIT LIVE LOAD VEHICLE**

279.6 KIPS ON 9 AXLES

**FIGURE 1**

- The precast concrete box culvert shall be designed for all construction load effects that may be applied during all stages/phases of construction.
- The precast concrete box culvert shall be designed for the load effects resulting from all current and future finished grading conditions shown on the plans
- The precast concrete box culvert shall be designed to have an adequate stiffness to limit the deflection, due to the design live load, to no greater than 1/800 of the span (clear distance between the inside face of walls).
- The side wall length of skewed box culvert section shall be no less than 4'-0"
- The reinforcement in box culvert sections skewed greater than 15° shall be deformed steel bars. The use of welded wire fabric in these skewed sections is not permitted. Bar reinforcement in the roof and floor of skewed end of these box culvert sections shall be placed parallel to the skewed end and splayed/fanned along the section until it is oriented normal to the centerline of the section.
- Live load ratings shall be prepared for each box culvert. The live load ratings shall conform to the Load and Resistance Factor Rating (LRFR) method in accordance with the AASHTO Manual for Bridge Evaluation. All software used to compute the live load ratings shall be pre-approved by the Department's Bridge Design Section.
- Live load ratings shall include the condition factor (Article 6A.4.2.3) in the AASHTO Manual for Bridge Evaluation. The condition factor,  $\phi_c$  shall be no greater than 0.95.
- Live load ratings shall be prepared for the live loads, and the load factor criteria and analysis parameters shown in Table 1 and Table 2. The minimum acceptable rating factors shall be no less the values shown in Column A of Table 1 and Table 2.

Rating Procedure	Live Load Vehicle	Load factor criteria and analysis parameters	Minimum Acceptable Rating Factor (RF)		
			Column A	Column B	Column C
Design Load Rating	HL-93	Evaluation Level – inventory	1.00	1.00, unless permitted in writing by the department	Report value
Design Load Rating	HL-93	Evaluation Level – operating	Report value	1.00	1.00, unless permitted in writing by the department

Legal Rating	Load	CT-L73.0	Load factor : use AASHTO MBE Table 6A.4.5.4.2a-1 Permit Type: Routine or Annual Frequency: Unlimited Crossings Loading Condition: Mix with traffic Distribution Factor: Two or more lanes	1.00	1.00	1.00, unless permitted in writing by the department
Legal Rating	Load	CT-L3S2	Load factor : use AASHTO MBE Table 6A.4.5.4.2a-1 Permit Type: Routine or Annual Frequency: Unlimited Crossings Loading Condition: Mix with traffic Distribution Factor: Two or more lanes	1.00	1.00	1.00, unless permitted in writing by the department
Permit Rating	Load	CT-P76.5	Load factor : use AASHTO MBE Table 6A.4.5.4.2a-1 Permit Type: Routine or Annual Frequency: Unlimited Crossings Loading Condition: Mix with traffic Distribution Factor: Two or more lanes	1.00	1.00, unless permitted in writing by the department	Report value, may be less than 1.00
Permit Rating	Load	CT-P204	Load factor : use AASHTO MBE Table 6A.4.5.4.2a-1 Permit Type: Routine or Annual Frequency: Unlimited Crossings Loading Condition: Mix with traffic Distribution Factor: Two or more lanes	1.00	1.00, unless permitted in writing by the department	Report value, may be less than 1.00
Permit Rating	Load	CT-P380	Load factor : use AASHTO MBE Table 6A.4.5.4.2a-1 Permit Type: Special or Limited Crossing Frequency: Single Trip Loading Condition: Escorted with no other vehicles on the bridge Distribution Factor: One lane ADTT: N/A	1.00	1.00, unless permitted in writing by the department	Report value, may be less than 1.00
Permit Rating	Load	CT-TLC	Load factor : use AASHTO MBE Table 6A.4.5.4.2a-1 Permit Type: Special or Limited Crossing Frequency: Single trip Loading Condition: Mix with traffic Distribution Factor: One lane Dynamic Load Allowance: 0.00	1.00	1.00, unless permitted in writing by the department	Report value, may be less than 1.00

<b>TABLE 2 – Service Limit States</b>						
<b>Rating Procedure</b>	<b>Live Load Vehicle</b>	<b>Load factor criteria and analysis parameters</b>	<b>Minimum Acceptable Rating Factor (RF)</b>			
			<b>Column A</b>	<b>Column B</b>	<b>Column C</b>	
Design Load Rating	HL-93	Evaluation Level – inventory	1.00	1.00, unless permitted in writing by the department	Report value	
Design Load Rating	HL-93	Evaluation Level – operating	Report value	1.00	1.00, unless permitted in writing by the department	
Legal Load Rating	CT-L73.0	Load factor : use AASHTO MBE Table 6A.4.5.4.2a-1	1.00	1.00	1.00, unless permitted in writing by the department	
Legal Load Rating	CT-L3S2	Load factor : use AASHTO MBE Table 6A.4.5.4.2a-1	1.00	1.00	1.00, unless permitted in writing by the department	
Permit Load Rating	CT-P76.5	Load factor : use AASHTO MBE Table 6A.4.5.4.2a-1	1.00	1.00, unless permitted in writing by the department	Report value, may be less than 1.00	
Permit Load Rating	CT-P204	Load factor : use AASHTO MBE Table 6A.4.5.4.2a-1	1.00	1.00, unless permitted in writing by the department	Report value, may be less than 1.00	
Permit Load Rating	CT-P380	Load factor : use AASHTO MBE Table 6A.4.5.4.2a-1 Distribution Factor: One lane	1.00	1.00, unless permitted in writing by the department	Report value, may be less than 1.00	
Permit Load Rating	CT-TLC	Load factor : use AASHTO MBE Table 6A.4.5.4.2a-1 Distribution Factor: One lane Dynamic Load Allowance: 0.00	1.00	1.00, unless permitted in writing by the department	Report value, may be less than 1.00	

**2. Working Drawing, Design Computations and Load Rating Submittals:** Prior to fabrication, the Contractor shall submit working drawings and design computations for each box culvert to the Engineer for review in accordance with Article 1.05.02. An individual, independently packaged set of working drawings and computations, with all details and documents necessary for fabrication and erection, including a copy of the certificate of insurance, shall be prepared and submitted for **each** box culvert. The working drawings and computations shall be prepared in Customary U.S. units.

The packaged set of working drawings and computations for each box culvert shall be submitted either in paper (hard copy) form or in an electronic portable document format (.pdf) with appropriate bookmarks. The packaged set submitted in paper form shall be bound with a staple. The packaged set submitted in an electronic portable document format (.pdf) shall be in an individual file. The packaged set shall include the following:

- title sheet
- table of contents
- contact information for designer and fabricator – contact information should include name and address of each firm and the name of contact person with phone number and email address
- copy of the certificate of insurance
- box culvert working drawings
- box culvert design computations and supporting data

The working drawings and design computations shall be **signed, dated and sealed** by a Professional Engineer licensed in the State of Connecticut, who shall also be available for consultation in interpreting their computations and drawings, and in the resolution of any problems which may occur during the performance of the work. Each working drawing shall be signed, dated and sealed. The cover/first sheet for the computations shall be signed, dated and sealed.

Working drawings submitted in paper form shall be printed on ANSI B (11" x 17"; Ledger/Tabloid) sheets. Each drawing shall have a border and title block. Located in the lower right hand corner of the drawing adjacent to the title block, each drawing shall have a rectangular box, 2 ¼" wide x 1 ¾" high, for the reviewers stamp. On the ANSI B sheets, the minimum text height and width shall be 1/16". All letter characters shall be uppercase. Design computations, procedures and other supporting data shall be submitted on 8 ½" x 11" (Letter) sheets.

Working drawings submitted in an electronic portable document format (.pdf) shall be created on ANSI D (22" x 34") full scale (1" electronic file = 1" paper) sheets. (The purpose of creating the drawings on ANSI D sheets is so that the sheets may be printed/plotted at that size or smaller without loss of legibility.) Each drawing shall have a border and title block. Located in the lower right hand corner of the drawing adjacent to the title block, each drawing shall have a rectangular box, 2 ¼" wide x 1 ¾" high, for the reviewers stamp. On the ANSI D full scale sheets, the minimum text height and width shall be 1/8". All letter characters shall be uppercase.

The electronic files for the design computations, procedures and other supporting data shall be created on ANSI A (8 ½" x 11") letter sheets.

The working drawings shall include complete details of the precast concrete box culvert. The drawings shall include, but not be limited to the following:

- Project number, town and crossing
- Layout plan of the precast box culvert. The plan shall include the dimensions of each box culvert section. The length of each box culvert section shall be determined by the Contractor and shall satisfy the stages of construction, sequence of construction, and construction methodology shown on the plans. When installed, the combined length of the box culvert sections shall equal the total length of the box culvert shown on the plans.
- Plans and cross-sections of the box culvert sections detailing the length, width, height and thickness of walls and slabs
- Type, size, location and spacing of steel reinforcing, mechanical connectors and concrete inserts for anchoring threaded deformed steel bars. Provide bending diagrams, material lists and catalog cuts for mechanical connectors and inserts as applicable.
- Type, size and location of lifting holes and seating fixtures. All fixtures (inserts, etc.) cast permanently into the sections shall be recessed a minimum of ¾". No more than four lifting holes or fixtures shall be located in each box section.
- Location and size of all holes cast for grouting deformed steel bars or other reasons as noted on the plans
- Complete details of the lap joints at the end of the box sections, which shall include the type, size and location of gaskets and additional steel reinforcement. Except where shown otherwise, the ends of the box sections shall have lap joints with not less than 1½" of concrete overlap. Each joint shall be provided with a preplaced gasket.
- Material specifications/designations for all components

The design computations and load ratings shall include, but not be limited to the following:

- Project number, town and crossing
- References to design specifications, including interim specifications

- Diagrams identifying all members and load conditions and combinations
- Descriptions for each notation used, and references to applicable specification sections and articles
- Bending moment and shear diagrams
- Section specific computations for box culvert sections skewed greater than 15°
- Computations for reinforcing development lengths and diagrams indentifying splice locations
- Complete tabulated results from **all** load conditions and load combinations.
- Electronic copies of all computer generated input files
- Electronic copies of MathCad and Excel files
- Results of live load ratings tabulated on a summary sheet for each box culvert, with governing Inventory or Operating Ratings as applicable for each live load vehicle shown in Table 1

The Contractor shall submit the packaged set of working drawings and calculations to the “Engineer of Record”. The “Engineer of Record” is identified in the signature block on the structural contract plans. A copy of the transmittal shall be sent to the District Construction office administering the project.

The reviewed and stamped working drawings and calculations shall be sent by the reviewer, along with a recommendation regarding acceptance, to the District Construction office for review, comment and distribution. After the District Construction office has reviewed the working drawings and calculations, ensured all comments have been addressed and have found the submittal to be acceptable, in addition to distributing copies of the working drawings and calculations to the Contractor and District offices, a copy of each packaged set of working drawings and calculations shall be sent to the following:

CTDOT Bridge Design – Rabih Barakat  
 CTDOT Research and Materials – James P. Connery  
 Engineer of Record

**3. Fabrication and Manufacture:** The fabrication and manufacture of the precast concrete box culvert shall conform to the latest edition of the AASHTO LRFD Bridge Design Specifications, including the latest interim specifications, as supplemented by ASTM C1577 and the following:

**3-1. Forms and Forming Material:** Forms shall be mortar-tight and sufficiently strong to prevent misalignment of adjacent precast sections. Forms shall be constructed to allow

their removal without damage to the concrete. A positive means of supporting reinforcing cages in place during forming shall be required.

The forms shall not be removed until the concrete is sufficiently strong to avoid possible damage to the concrete. Forms shall not be removed without approval being granted by the Engineer.

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

**3-2. Concrete Mix:** The Contractor shall design and submit to the Engineer for review a concrete mix that shall attain a minimum 28 day compressive strength,  $f'_c$ , of 5,000 psi.

**3-3. Placing Concrete:** Concrete shall not be deposited in the forms until the Engineer has verified the presence and proper location of the reinforcing steel and other cast-in-place components, and has given his approval thereof.

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

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

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

Void forms shall be held in place against uplift or lateral displacement during the pouring and vibrating of the concrete by substantial wire ties or other satisfactory means as approved by the Engineer.

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

**3-4. Test Cylinders:** During the casting of the sections, the Contractor shall make test cylinders under the supervision of a representative of the Department. A minimum of 4

cylinders shall be taken during each production run or as ordered by the Engineer. The dimensions and type of cylinder mold shall be as specified by the Engineer. Cylinders shall be cured under the requirements of ASTM C31 and shall be used to determine the 28 day compressive strength requirements ( $f'_c$ ). Failure of any of the 28 day tests cylinders to meet 90% of the minimum compressive strength requirement may be cause for rejection. The Engineer also reserves the right to request and test core specimens from the sections to determine their adequacy.

**3-5. Finishing:** All fins, runs, or mortar shall be removed from the concrete surfaces which will remain exposed. Form marks on exposed surfaces shall be smoothed by grinding. All exposed, outside concrete surfaces shall be given a grout clean-down finish in accordance with Subarticle 6.01.03-21.

**3-6. Handling and Storage:** Care shall be taken during storage, transporting, hoisting and handling of all box sections to prevent damage. Sections damaged by improper storing, transporting or handling shall be repaired or replaced by the Contractor, as directed by the Engineer and at no cost to the Department. All storage and handling operations shall be as directed by the Engineer.

Forms shall not be removed from the box sections until the concrete has attained a minimum compressive strength of 75% of the 28 day strength. The box sections shall not be shipped to the job site until the 28 day strength ( $f'_c$ ) has been attained.

**3-7. Repairs:** The Engineer shall evaluate the acceptability and the cause of the defects and the service condition of the box section. No repairs shall be done by the Contractor unless permission has been granted by the Engineer. The Contractor shall submit to the Engineer, for review, the proposed methods and materials to be used in the repair operation. All repairs shall be sound and properly finished and cured before the box section is delivered to the job site. The Contractor shall bear the costs of all repair work.

**4. Installation:** The installation of the precast concrete box culvert shall conform to the following requirements:

The installation of the precast concrete box culvert sections shall proceed as required by the sequence of construction, stage construction plans, and the special provisions entitled "Prosecution and Progress" and "Maintenance and Protection of Traffic."

The box sections shall be placed in a manner to best accommodate and facilitate the construction of the cast-in-place concrete headwalls, cut-off walls, wingwalls, etc. No box sections shall be set on cast-in-place concrete without the approval of the Engineer.

The box sections shall be set to the line and grade indicated on the plans or as directed by the Engineer. Placement of the sections shall not start until the Engineer has approved the depth of excavation and the suitability of the foundation material.

The lap joints shall be securely seated together to achieve a silt-tight joint all around. A silt-tight joint is defined as a joint in which the gasket is compressed to a minimum of one half of its uncompressed width. The gasket shall be uniformly compressed along all vertical and horizontal surfaces. A positive means, through the use of seating devices, shall be used for pulling one section against another to assure an adequate silt-tight joint.

Details for the seating method shall be submitted to the Engineer for review. The lap joints shall be seated such that they make a continuous line of sections with a smooth interior free from irregularities in the invert line.

The top portions of the horizontal lap joints for the roof and floor slabs and the outside face of the vertical lap joints (full height on each side) shall be neatly filled with non-shrink grout after seating the sections. The exposed portions of the lap joints within the haunches or fillets shall also be neatly filled with non-shrink grout. The finished surface shall be smooth and level with the adjacent concrete.

The box sections for multiple barrel culverts shall be placed as detailed on the plans. Slight mismatches along the 1" longitudinal joint may be tolerated by the Engineer provided that the vertical difference between the top surfaces of adjacent sections is 1" or less. The top 2" of the longitudinal joint shall be filled flush with non-shrink grout. The top surface of the non-shrink grout shall be sloped to form a smooth transition to correct any allowable mismatches.

Geotextile shall be placed over all vertical joints. Geotextile shall also be placed over the roof joints of culverts not receiving woven glass fabric. The geotextile shall extend 6" to each side of the joint and be attached to the culvert using silicone caulk.

After its installation, any box section or joint that is, as determined by the Engineer, not acceptable in vertical or horizontal alignment for any reason, including but not limited to settlement, displacement, excess camber or misfit, shall be removed by the Contractor and correctly installed, as directed by the Engineer and at no additional cost to the State.

All fixtures or holes cast into the sections for lifting or seating shall be neatly filled with non-shrink grout. The finished surface shall be smooth and level with the adjacent concrete. The surface preparation, mixing, placing, curing, and finishing of the non-shrink grout shall conform to the written instructions provided by the manufacturer of the grout. The Contractor shall furnish the Engineer with copies of the instructions. The grout shall be cured at least 3 days unless determined otherwise by the Engineer.

**Method of Measurement:** This work will be measured for payment by the number of linear feet of precast concrete box culvert, of the size indicated, completed and accepted, measured in place along the floor at the centerline of culvert from the inlet to the outlet of the culvert.

**Basis of Payment:** Payment for this work will be made at the contract unit price per linear foot for " ' x ' ' Precast Concrete Box Culvert", of the size indicated, complete and accepted,

which price shall include threaded inserts, non-shrink grout, geotextile, gaskets, and all other materials, equipment, tools and labor incidental thereto.

The contract unit price per foot for “ ‘ x ‘ "Precast Concrete Box Culvert” shall also include the costs of preparing and furnishing design computations, working drawings, final drawings, and erection drawings.

**Pay Item**

5' x 4' Precast Concrete Box Culvert

5' x 3' Precast Concrete Box Culvert

**Pay Unit**

Linear Foot

Linear Foot

## **ITEM #0601091A - SIMULATED STONE MASONRY**

**Description:** This item shall consist of furnishing and installing textured and colored formed concrete surfaces using simulated stone molds (form liners) and a color staining system designed to duplicate closely the appearance of natural stone as described herein of the type and size called for on the plans, including accessories and hardware and in accordance with monolithically formed with the concrete substructure.

### **Materials:**

1. Quality of Work: The process of form lining, texturing and color staining of the hardened concrete shall be performed in strict accordance with the manufacturer's written recommendations and as approved by the Engineer.
2. The design and pattern of form lined concrete surfaces shall follow the layout shown on the contract plans and the manufacturer's standard drawing. The completed concrete surface shall match the color and texture of the Referee Panel. The Referee Panel is available for inspection at the office of the Engineer. Final coloration of cast stone demonstrates the colors that may be apparent from aging, such as staining from oxidation, rusting and/or organic staining from soil and/or vegetation.
3. Quality Assurance:
  - a. Manufacturer of Simulated Stone Molds and Custom Coloring Systems shall have five years experience-making custom simulated stone molds and color stains to create formed concrete surfaces to match natural stone shapes, surface textures and colors.
  - b. Contractor/Subcontractor (installer) shall have five years experience pouring vertically formed architectural concrete. The installer shall be trained in the manufacturer's special techniques in order to achieve realistic surfaces.
  - c. Color Stain System Application shall be performed by the manufacturer or manufacturer's authorized representative. The stain shall be applied by an applicator who has experience with similar projects.
  - d. A Pre-installation Meeting shall be scheduled with the manufacturer's representative, installer, designer, and Department inspection personnel to assure understanding of simulated stone masonry use, color staining application, requirements for construction of mockup, and to coordinate the work.
4. Protection: The Contractor is solely responsible for construction methods, means techniques and for construction site safety precautions. The contractor shall conduct all construction operations in conformance with all applicable local, state and federal safety

laws, rules, regulations and codes. All Material Safety Data Sheets (MSDS) shall be available for inspection.

5. Manufacturer: Subject to compliance with the design, referee panel and specification requirements, the contractor shall provide simulated stone masonry and color staining system as manufactured by Custom Rock International, Inc., St. Paul, Minnesota, or approved equivalent.
6. Materials:
  - a. Simulated Stone Molds (form liners) shall be made of reusable elastomeric form liners, made of high-strength urethane and cutable form liners, made of lower grade urethane, easily attachable to forms. Formliners shall leave crisp, sharp definition of the architectural surface. Recurring textural configurations exhibited by repeating, recognizable shadow patterns shall be prevented by proper casting of formliner patterns. Form liners shall not compress more than ¼ inch when concrete is poured at a rate of 10 vertical feet per hour. Form liners shall be removable without causing deterioration of surface or underlying concrete. No substitutions will be permitted.
  - b. The form liner shall conform to the pattern shown on the plans and including texture and color staining system shall be as manufactured by Custom Rock International, St. Paul, Minnesota, as distributed by Connecticut Bomanite Systems, Inc., Newtown, Connecticut or approved equivalent.
  - c. The form liner shall be designed to permit 180-degree rotation and interconnection with itself or another pattern liner of differing horizontal dimension. Maximum relief of pattern and the average relief shall be as shown on the contract plans. The simulated stone pattern shall vary in a random manner in the coursing parameters to prevent noticeable multiple duplicate pattern repetition and avoid stacked joints.
  - d. In addition to orthogonal surfaces, the form liner shall be capable of forming curved and/or battered surfaces, if shown on the plans, while maintaining the dimensioned coursing and plumb vertical joints without distortion.
7. Release Agent: The release agent shall be compatible with simulated stone masonry and with color staining system to be applied to surface, as recommended by the manufacturer.
8. Form Ties: Form ties shall be designed to separate at least one inch back from finished surface, leaving only a neat hole that can be plugged with compatible patching material.
9. Color Stain: The color stain shall be a penetrating stain mix as provided by the manufacturer, shall achieve color variations present in the natural stone being simulated for the project, as approved by the Engineer and in accordance Items 1 and 2 above. The stain shall create a surface finish that is breathable (allowing water vapor transmission) and that resists deterioration from water, acid, alkali, fungi, sunlight or weathering. The stain mix shall be a

water borne, low V.O.C. material, less than 180 grams/liter and shall meet requirements for weathering resistance of 2000 hours accelerated exposure measured by weather-o-meter in accordance with ASTM G23 with 3-bulb. Scrub test 1000 revolutions. Abrasive resistance (Tabor-CF-10) 500 cycles. Adhesion ASTM D3359 1.00 MM cross cuts on glass pass 3 or higher on a scale of 1 to 5. The contractor shall supply information pertaining to chemical resistance in accordance with ASTM D1308.

### **Construction Methods:**

1. **Show Drawings and Submittals:** Before fabricating any materials, the Contractor shall submit shop drawings, product data sheets, samples and mock-ups to the Engineer for approval in accordance with Article 1.05.02 for the materials listed in Item 3 below. These drawings and submittals shall include, but not limited to, the following information: manufacturers name, listing of product compliance with referenced specification standards, complete details of the assemblies, material designations, nominal hardness of appropriate materials, design loads, quantities and locations. The Engineer's drawings shall not be reproduced, traced or used for show drawings or erection purposes.
2. **Field Measurements:** Prior to ordering or fabricating any materials, the Contractor shall take complete and accurate field measurements.
3. **Submittals:**
  - a. Catalog cuts, manufacturer's literature and technical data for the materials specified herein, including but not limited to simulated stone mold pattern, form liner, release agent, concrete patching materials and color charts for staining of hardened concrete.
  - b. Photographs: Color photographs of three (3) similar past projects of the manufacturer. Include project names, locations and a telephone number of the previous projects Owner's representatives.
  - c. Samples: Form ties, sample and description, showing method of separation when forms are removed.
  - d. Plan, elevation and details to show overall pattern, joint locations, form tie locations and end, edge and other special conditions.
  - e. Form Lined and Color Stained Concrete Mock-up: The mock-up shall be build on site at least four weeks before cast-in-place concrete work to be textured and colored starts, using same materials, methods and work force that will be used for the Project. Location on site for construction of mock-up shall be as approved by Engineer. Concrete shall be placed in the mock-up, texture constructed and construction procedure adjusted until a final texture and color is produced that complies with the color and texture of the Referee Panel.

1. Size: 50 s.f. or larger if needed to adequately illustrate the pattern and texture selected.
  2. Include an area to demonstrate simulated stone masonry butt joint, corner and if appropriate, continuation of pattern through expansion joint.
  3. If design includes stone texture across top of wall, include in mock-up.
  4. After concrete has cured sufficiently, the Contractor shall prepare the surface for color staining. After the Engineer has approved the prepared surface of the cast simulated stone masonry for color staining, the work of form lined cast-in-place concrete may proceed, except that color staining is not yet authorized.
  5. After concrete work on mock-up is completed and cured and after surface is determined by the Engineer to be acceptable for forming and pouring, the Contractor shall proceed with mock-up as quality standard.
  6. After a 30 day cure of the mock-up and the date of last pour of architectural concrete the ample is to be stained. After coloring is determined to be acceptable by the Engineer, construction of the remaining work under this specification section may proceed, using mock-up as quality standard.
  7. The Contractor shall remove mock-up as directed by the Engineer.
4. Scheduling: Schedule color stain application after adjacent earthwork is completed, to avoid contaminating or damaging the surface. Place topsoil and establish turf after staining application is completed. Coordinate the work to prevent interference with other trades.
5. Installation:
- a. Contractor's responsibilities:
    1. Install liners.
    2. Apply manufacturer release agent.
    3. Install concrete as specified elsewhere in the Specifications.
    4. Remove form liner.
    5. Patching, grinding and bush hammering of form liner seams as required.
    6. Provide scaffolding and heat as required and clean water for power washing of the hardened concrete prior to the staining process.
    7. Power washing and patching of form liners.
    8. Return of form liners to manufacturer.
  - b. Manufacture's responsibilities:

1. Ship and supply form liners and release agent.
  2. Technical information.
  3. Power wash wall.
  4. Apply the color staining process.
6. Liner to Form Attachment System: Securely attach form liners to forms with wood or sheet metal screws, threaded inserts added to the back of the form liner for bolts to fasten the form liner through the forms, or bolted through the face of the form liner with flat head bolts inserted in a pattern joint and through the form liner and forming system. Construction adhesives may be used, but not on reusable forms. Place adjacent form liners with less than ¼ inch separation between form liners.
7. Release of Form Liners From Hardened Concrete: Only manufacturer recommended form release agents (Lark V or Orna Con) shall be utilized and shall be applied to the form liners before the concrete is poured. Release agents shall be applied in strict accordance with release agent manufacturer recommendations. Hand-charged sprayers will only be allowed if a thin uniform coating of release agent is obtained on the form liner.
8. Remove the form liner from the wall within 24 hours of pouring the concrete. The form liners may be detached from the forms and then removed from the concrete or they may remain attached to the forms and the entire forming system removed from the concrete. Remove the form liners from the top down. Curing of concrete may be accomplished with form liners and forms and forms placed back against the wall after the initial detachment. Other means of curing can also be used including curing blankets and/or plastic. Curing compounds shall not be used.
9. Care and Cleaning of Form Liner: Form liners shall be cleaned the same day they are removed from the wall with a power wash and mild detergent. Synthetic brushes with stiff bristles may be used on areas. Mild acid washes may also be used. Solvents shall not be used. If necessary, patching of holes shall be performed with 100% clear silicone caulk. Form liners shall be stored inside or under a protective, non-transparent cover, in a vertical, upside-down position.
10. Wall Patching and Preparation: After form liners are removed from the hardened concrete, the textured uncolored surface shall be prepared for color staining. All concrete, the textured uncolored surface shall be prepared for color staining. All holes larger than ¾" in greatest principal dimension shall be filled with concrete patching material such as Tammas Speed-crete or equal mixed with latex or acrylic bonders, as approved by the manufacturer and Engineer. All honeycombed areas shall be filled and textured to match surrounding areas. Seam lines and other unnatural protrusions shall be ground down to match adjacent areas with a hand-held power grinder using discs made for concrete. Grinding of seams shall be performed immediately after removal of the form liners. Perform final bush hammering to blend defects and ground areas into the final rock texture. In particular, the process of wall patching and preparation shall be subject to approval of the manufacturer and Engineer.

11. Color Staining (by Manufacturer): The hardened concrete shall be a minimum of 30 days old before color staining is applied. Power washes the wall to free it from laitance, dirt, oil and other objectionable materials. After the wall has dried, the color staining process is applied in such a way that the stones shall have individual colorations from one to the other. Water-based stains shall be used in air temperatures between 50 degrees F and 100 degrees F. Solvent-based stains shall be used in air temperatures of 50 degrees F and below but in no case when the temperature of the hardened concrete is 40 degrees and falling. During color staining operations the Contractor shall protect property, pedestrians, vehicular and other traffic upon, underneath or in the vicinity of the bridge or disfigurement from errant stain materials. Comply with all environmental regulations regarding surface cleaning, stain application, ground and watercourse protection and disposal protection of waste materials. Refer to Section 1.10 of the Specifications.

11. Simulated Stone Molds Preparation: Clean and make free of buildup prior to each pour. Inspect for blemishes and tears. Repair if needed following manufacturer's recommendations.

**Method of Measurement:** This work shall be measured for payment by the actual number of square yards of the face area of accepted architectural form liner, poured in place simulated stone masonry, completed within the neat lines shown on the plans, or as ordered by the Engineer.

**Basis of Payment:** This Work will be paid for at the contract unit price per square yard for "Architectural Form Liner", complete in place, which price shall include all equipment, formwork molds, tools and labor incidental thereto.

This work shall also include the cost of furnishing and application of the color stain system to the simulated stone masonry surface.

Pay Item	Pay Unit
Simulated Stone Masonry	Sq. Yards

**ITEM #0601445A - EMBANKMENT WALL (SITE NO. 1)**

**Description:** This item will consist of designing, furnishing and constructing an embankment retaining wall in the location, grades, and to the dimensions and details shown on the contract drawings, and in accordance with these specifications.

**Retaining Wall Selection:** The Contractor shall select the proprietary embankment retaining wall from the Department's current approved list shown below. The Engineer will reject any proposed retaining wall that is not listed below.

The following is a list of the proprietary embankment retaining walls for this project:

1. VERSA-LOK Retaining Wall  
VERSA-LOK of New England  
P.O. Box 6002  
Nashua, NH 03063  
(603) 883-3042

3. KeySystem I Retaining Wall  
Keystone Retaining Wall Systems  
13453 County Road 1  
Fairhope, AL 36532  
(251) 990-5761

2. MESA Retaining Wall System  
TENSAR Earth Technology, Inc.  
227 Ritter Road  
Sewickley, PA 15143  
(412) 749-9190

4. Pyramid Modular Blockwall  
The Reinforced Earth Company  
133 Park Street  
North Reading, MA 01864  
(978) 664-2830

5. Redi-Rock Retaining Wall-  
Cobblestone Face Mold  
Redi-Rock Walls-CT Division  
68A South Canal Street  
Plainville, CT 06062  
(860) 793-6805

No other proprietary retaining walls will be allowed for this project.

This listing does not warrant that the individual walls can be designed to meet either the dimensional, structural, or geotechnical constraints at each site.

**Design:**

1 - Design Computations: It is the Contractor's responsibility for the design, detailing and additional construction specifications required to construct the wall. The actual designer of the retaining wall shall be a qualified Professional Engineer licensed in the State of Connecticut.

2 - Designer's Liability Insurance: The Designer 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 Five Hundred Thousand Dollars (\$500,000). The designer may, at his election, obtain a policy containing a maximum One Hundred Twenty Five Thousand Dollars (\$125,000) deductible clause, but if he should obtain a policy containing such a clause, the designer shall be liable to the extent of the deductible amount. The Designer shall obtain the appropriate and proper endorsement to its Professional Liability Policy to cover the indemnification clause in this contract as the same relates to negligent acts, errors or omissions in the work performed by the Designer. The Designer shall continue this liability insurance coverage for a period of three years from the date of the acceptance of the work by the agency head as evidenced by a certificate of acceptance issued to the contractor or for three years after the termination of the contract, whichever is earlier, subject to the continued commercial availability of such insurance.

The designer shall supply the certificate of this insurance to the Engineer prior to the start of construction of the wall. The designer's insurance company shall be licensed in the State of Connecticut.

3 - Preliminary Submissions: Prior to the start of fabrication or construction, the Contractor shall submit to the Engineer a design package, which shall include, but not be limited to the following:

a. Detailed Plans:

- Plan sheets shall be approximately 24" x 36"
- Stamped by a licensed Professional Engineer (Connecticut).
- Full plan view of the wall drawn to scale. The plan view must reflect the horizontal alignment and offset from the horizontal control line to the face of the wall. Beginning and ending stations, all utilities, signs, lights, etc. that affect the construction along with all property lines and easement lines adjacent to the wall shall be shown.
- Full elevation view of the wall drawn to scale. Elevation views should indicate the elevation at the top and bottom of walls, horizontal and vertical break points, and the location of finished grade.
- Typical cross sections drawn to scale including all appurtenances. Detailed cross section should be provided at significant reinforcement transitions such as wall ends.

- Details of all wall components and their connections such as the length, size and type of soil reinforcement and where any changes occur; facing details; connections; etc.
  - Certified test reports indicating the connection strength versus normal load relationship for the block-soil reinforcement connection to be used.
  - Drainage details for embankment backfill including attachment to outlets shown on contract drawings.
  - Details of any roadway drainage pipe projecting through the wall, or any attachments to the wall. Details of the treatment of drainage swales or ditches shown on the contract drawings.
  - Design parameters used along with AASHTO references.
  - Material designations for all materials to be used.
  - Detailed construction methods including a quality control plan. Construction quality control plans should include monitoring and testing frequencies (e.g, for setting batter and maintaining horizontal and vertical control). Construction restraints should also be listed in the details. Specific requirements for construction around obstructions should be included.
  - Details of installation of protective fencing where required.
  - Details of Architectural Treatment where required.
  - Details of Temporary Earth Retaining System(s) where required.
  - Details of wall treatment where the wall abuts other structures.
  - Treatment at underground utilities where required.
- b. Design Computations:
- Stamped by a licensed Professional Engineer (Connecticut).
  - Computations shall clearly refer to the applicable AASHTO provisions as stated in the Notes on the Contract Drawings.
  - Documentation of computer programs including all design parameters.

c. Construction Specifications:

- Construction methods specific to the proprietary retaining wall chosen. These specifications should include construction limitations including vertical clearance, right-of-way limits, etc. Submittal requirements for materials such as certification, quality, and acceptance/rejection criteria should be included. Details on connection of modular units and connection of reinforcements such that assurance of uniform stress transfer should be included.
- Any requirements not stated herein.

The submissions for proprietary retaining walls shall be treated as working drawings according to Section 1.05 amended as follows:

a. Six sets of each submission shall be supplied to the State

b. The Contractor shall allow 21 days for the review of each submission. If subsequent submissions are required as a result of the review process, 21 days shall be allowed for review of these submissions. No extensions in contract time will be allowed for the review of these submissions.

4 - Final Submissions: Once a proprietary retaining wall design has been reviewed and accepted by the Department, the Contractor shall submit the final plans. The final submission shall include one set of full size (approximately 24" x 36") mylar sheets and five sets of full size blue line copies.

The final submission shall be made within 14 days of acceptance by the State. No work shall be performed on the retaining wall until the final submission has been received by the Department.

Acceptance of the final design shall not relieve the Contractor of his responsibility under the contract for the successful completion of the work.

The actual designer of the proprietary retaining wall is responsible for the review of any shop drawings prepared for the fabrication of the wall. One set of full size blue line copies of all approved shop drawings shall be submitted to the Department's permanent records.

5 - General Design Requirements:

a. All designs for proprietary walls and temporary earth retaining systems shall conform to the latest edition of the American Association of State Highway and Transportation Officials (AASHTO) Standard Specifications for Highway Bridges and later interims published except as noted otherwise herein:

b. The wall design shall follow the general dimensions of the wall envelope shown in the contract plans.

c. The top of the concrete leveling pad shall be located at or below the theoretical leveling pad elevation. The minimum wall embedment shall be two feet as measured to the top of the leveling pad or as shown on the plans.

d. If footing steps are required, they shall be kept below the minimum embedment depth. Footing steps in addition to those shown on the plans will be permitted at no additional cost to the State.

e. The wall shall be designed to be within all property lines and easement lines shown on the contract drawings. If additional work areas are necessary for the construction of the proprietary retaining wall, the Contractor shall be responsible for obtaining the rights from the affected property owners. Copies of these rights shall be forwarded to the Department.

f. The top of the wall shall be at or above the top of the wall elevations shown on the plans. The top of the wall may be level or sloped to meet the top of the wall line noted.

g. Cast-in-place concrete will not be an acceptable replacement for areas noted by the wall envelope, except for minor grouting of pipe penetrations.

h. The mechanical wall height for the purposes of design calculations shall be from the top of the leveling pad to the top of the potential failure surface where the failure surface intercepts the ground surface.

i. The minimum length of internal soil reinforcement shall be as specified in AASHTO 5.8.1, except for the minimum eight (8.0') foot length requirement.

i. If there are specific surcharges acting on the wall, they shall also be accounted for. The minimum equivalent fluid pressure used to design the wall shall be 33 lbs./ft<sup>2</sup> per linear foot of wall.

j. The maximum allowable bearing capacity of the soil shall be assumed to be 4 ksf unless otherwise shown on the plans. If additional soils information is required by the designer, it must be obtained by the Contractor and will not be reimbursed by the State.

k. For limit state allowable stress computations of extensible reinforcements, the combined factor of safety for construction damage and environmental/aging effects shall not be less than 1.75.

**Materials:** Materials shall conform to the following requirements and those not listed below shall be as prescribed within the Standard Specifications for Roads, Bridges and Incidental Construction, including supplemental specifications and applicable special provisions.

1 – Facing Block: The facing block can be precast or drycast concrete and shall be the color specified on the plans. The block shall meet the following requirements:

a. Drycast Concrete:

- i. The minimum compressive strength of the block shall be 4000 psi measured at 28 days.
- ii. The maximum water absorption shall be less than five percent.

The Contractor shall submit to the Engineer a certified test report confirming the compressive strength and water absorption conform to the requirements of ASTM C-140.

b. Precast Concrete: Shall conform to the requirements of Section M.03 and as follows:

- i. The minimum compressive strength of the block shall be 4000 psi measured at 28 days.
- ii. All precast concrete components shall be air-entrained composed of portland cement, fine and coarse aggregates, admixtures and water. The air-entraining feature may be obtained by the use of either air-entraining portland cement or an approved air-entraining admixture. The entrained-air content shall be not less than four percent or more than seven percent.

2 - Geosynthetic Soil Reinforcement: The minimum strength of the geosynthetic soil reinforcement shall be based on experimental data. The Contractor shall submit to the Engineer a certified test report confirming the strength of the material when tested according to the methods specified in ASTM D5262 and extrapolated according to ASTM D2837 as outlined in AASHTO Article 5.8.7.2.

3 – Metallic Soil Reinforcement: All soil reinforcement and structural connectors shall be hot dipped galvanized according to the requirements of ASTM A123 (AASHTO M-111). The minimum thickness of the galvanizing shall be based on the service life requirements in the AASHTO Specifications.

Steel strip reinforcement shall be hot rolled to the required shape and dimensions. The steel shall conform to AASHTO M223 (ASTM A572) Grade 65 unless otherwise specified.

Welded wire fabric reinforcement shall be shop fabricated from cold-drawn wire of the sizes and spacings shown on the plans. The wire shall conform to the requirements of ASTM A82, fabricated fabric shall conform to the requirements of ASTM A185.

4 - Metal Connectors: All metal hardware shall be hot dipped galvanized according to the requirements of ASTM A123 (AASHTO M-111). The minimum thickness of the galvanizing shall be based on the service life requirements in the AASHTO Specifications.

5 - Backfill Material: The material for backfill shall be Pervious Structure Backfill conforming to the requirements of Articles M.02.05 and M.02.06.

6 - Facing Sealer: The face of all exposed drycast block shall be coated with clear Penetrating Sealer Protective Compound conforming to the requirements of Article M.03.01-11.

**Construction Methods:** All construction methods for items not listed below shall be in accordance with the detailed requirements prescribed for the construction of the several contract items entering into the completed structure as specified in the Standard Specifications for Roads, Bridges, and Incidental Construction.

1 - Installation: The foundation for the structure shall be graded level for a width equal to or exceeding the length of the soil reinforcements, or as shown on the plans. If rock is encountered in the excavation, it shall be removed to provide a level area equal to or exceeding the length of the soil reinforcements, but not greater than the pay limits shown on the plans.

Prior to wall construction, the foundation, if not in rock, shall be compacted as directed by the Engineer. Any foundation soils found to be unsuitable shall be removed and replaced.

At each foundation level, an unreinforced concrete leveling pad shall be provided as shown on the plans. The leveling pad shall have nominal dimensions of 6 inch thickness and 24 inch width, and shall be cast using minimum 2,000 psi 28-day compressive strength concrete. The leveling pad shall be cast to the design elevations as shown on the plans. Allowable elevation tolerances are +0.01 foot (1/8 inch), and -0.02 foot (1/4 inch), from the design elevation.

The materials for the wall shall be handled carefully and installed in accordance with manufacturer's recommendations and specifications. Special care shall be taken in setting the bottom course of blocks to true line and grade.

All blocks above the first course shall interlock with the lower courses by means of connecting pins. Vertical joints shall be staggered with each successive course as shown on the working drawings. Vertical tolerances and horizontal alignment tolerances measured from the face line shown on the plans shall not exceed 1/2 inch when measured along a 8-foot straightedge. The overall tolerance of the wall from top to bottom shall not exceed 1/2 inch per eight feet of wall height or one inch total, whichever is the lesser, measured from the face line shown on the plans. A bond breaker shall be placed between the blocks and any adjacent cast-in-place concrete.

2 - Backfilling: Backfill placement shall closely follow erection of each course of panels. Backfill shall be placed in such a manner as to avoid any damage or disturbance to the wall

materials or misalignment of the facing panels. Any wall materials which become damaged or disturbed during backfill placement shall be either removed and replaced at the Contractor's expense or corrected, as directed by the Engineer. Any backfill material placed within the reinforced soil mass which does not meet the requirements of this specification shall be corrected or removed and replaced at the Contractor's expense.

Backfill shall be compacted to 95 percent of the maximum density as determined by AASHTO T-99, Method C or D (with oversize correction, as outlined in Note 7).

The moisture content of the backfill material prior to and during compaction shall be uniform throughout each layer. Backfill material shall have a placement moisture content less than or equal to the optimum moisture content. Backfill material with a placement moisture content in excess of the optimum moisture content shall be removed and reworked until the moisture content is uniform and acceptable throughout the entire lift. The optimum moisture content shall be determined in accordance with AASHTO T-99, Method C or D (with oversize correction, as outlined in Note 7).

If 30 percent or more of the backfill material is greater than 19 mm in size, AASHTO T-99 is not applicable. For such a material, the acceptance criterion for control of compaction shall be either a minimum of 70 percent of the relative density of the material as determined by a method specification provided by the wall supplier, based on a test compaction section, which defines the type of equipment, lift thickness, number of passes of the specified equipment, and placement moisture content.

The maximum lift thickness after compaction shall not exceed 10 inches, regardless of the vertical spacing between layers of soil reinforcements. The Contractor shall decrease this lift thickness, if necessary, to obtain the specified density. Prior to placement of the soil reinforcements, the backfill elevation at the face shall be level with the connection after compaction. From a point approximately three feet behind the back face of the panels to the free end of the soil reinforcements the backfill shall be two inches above the attachment device elevation unless otherwise shown on the plans.

Compaction within three feet of the back face of the panels shall be achieved by at least three passes of a lightweight mechanical tamper, roller or vibratory system. The specified lift thickness shall be adjusted as warranted by the type of compaction equipment actually used. Care shall be exercised in the compaction process to avoid misalignment of the panels or damage to the attachment devices. Heavy compaction equipment shall not be used to compact backfill within three feet of the wall face.

At the end of each day's operation, the Contractor shall slope the last level of backfill away from the wall facing to direct runoff of rainwater away from the wall face. The Contractor shall control and divert runoff at the ends of the wall such that erosion or washout of the wall section does not occur. In addition, the Contractor shall not allow surface runoff from adjacent areas to enter the wall construction site.

3 - Face Sealer: After the wall has been erected, the entire exposed face of the wall shall be coated with Penetrating Sealer Protective Compound. The application of the sealer shall conform to the requirements Article 8.18.03.

Several samples of the dry cast block shall be sealed prior to sealing the actual wall to ensure that the sealer will not discolor the block. If the sealer does discolor the block, the Contractor shall change to another approved supplier of sealer.

**Method of Measurement:** This work will be paid for on a lump sum basis and will not be measured for payment.

**Basis of Payment:** This work will be paid for at the contract lump sum for "EMBANKMENT WALL (SITE NO. 1)", complete in place, which price shall include all work shown within the pay limits shown on the plans for the retaining wall including but not limited to the following:

1. Design, detailing, and specifications for the wall.
2. Excavation for the wall
3. Design and Construction of temporary earth retaining systems for the support of the slope during construction.
4. Construction of the Embankment Wall, including the unreinforced concrete leveling pad.
5. The furnishing, placing and compacting of pervious structure backfill within the maximum payment lines.
6. The furnishing and placing of backfill drainage systems for the wall.
7. Any other work and materials shown on the plans for the construction of the wall.

The price shall also include all materials, equipment, tools and labor incidental thereto.

If bedrock or large boulders (greater than one cubic yard) are encountered in the excavation, the payment for it's removal will be made under the item "Structure Excavation - Rock".

Pay Item	Pay Unit
Embankment Wall (Site No. 1)	L.S.

## **ITEM #0602910A - DRILLING HOLES AND GROUTING DOWELS**

**Description:** Work under this item shall consist of drilling holes in concrete and grouting dowels or anchor rods 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 anchor steel 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 Approved Product List.

A Materials Certificate 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 method 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 20 lbs.

The reinforcing dowels shall be able to develop a pull-out resistance of 90 percent of their nominal yield strength when bonded at the embedment depths provided.

The Contractor shall provide the minimum cover for the dowels as shown on the plans.

If the existing reinforcing steel is encountered during drilling, the holes may be relocated only if approved by the Engineer.

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.

The Contractor shall take necessary precautions to prevent any materials from falling onto the roadway below.

For the adhesive bonding material, a Certificate of Compliance and a Materials Certificate will be required in accordance with Article 1.06.07, confirming the conformance of the adhesive bonding material to the requirements set forth in these specifications.

**Method of Measurement:** This work will be measured for payment by the actual number of dowels or anchor rods grouted into drilled holes each, completed and accepted.

**Basis of Payment:** This work will be paid for at the contract unit price each for "Drilling Holes and Grouting Dowels", which price shall include drilling and preparing holes, and applying adhesive bonding material in the hole. It shall also include all material, except dowels, and all equipment, tools and labor incidental thereto.

Note: Dowels will be paid for under item "Deformed Steel Bars".

Pay Item	Pay Unit
Drilling Holes and Grouting Dowels	each

## **ITEM #0651311A - REPAIR EXISTING CULVERT**

The work under this item shall conform to the requirements of Section 6.51 supplemented and amended as follows:

**Article 6.51.01 – Description:** The work under this item shall also include the repair of the existing Mill Brook Culvert. The Mill Brook Culvert is an approximate 7’ wide by 1.5’ high culvert under an existing parking lot. The culvert was originally a stone lined channel that was covered with a concrete roof. Small sink holes have been developing along the outside edges of the culvert thought to be from stream water seeping out of the walls of the culvert, saturating the soil adjacent to the culvert and drawing the fines in the soil back into the culvert and carrying it downstream resulting in voids and sink hole along the sides of the culvert. The work consists of the furnishing and installing all necessary materials and providing the labor to seal the outside of the culverts stone walls with dry pack mortar and installing a concrete wall connected to the roof with steel reinforcing rods drilled and grouted into the sides of the concrete roof as shown on the plans, and/or as directed by the Engineer.

**Article 6.51.02 – Materials:** Epoxy adhesive used for concrete drill and grout shall be: SIKADUR 32 Hi-Mod, as manufactured by SIKA Corporation; or ULTRABOND 2000, as manufactured by Adhesives Technology Corp.; or FX-762, as manufactured by Fox Industries; or approved equivalent. The Contractor shall install materials in accordance with manufacturer’s recommendations. All reinforcement shall be ASTM A615, grade 60 unless noted otherwise.

**Article 6.51.03 – Construction Methods:** The Contractor is advised that the culvert is very old and can be easily damaged if not treated with care and that he will be held responsible for the repair of any damage to it that he causes by his negligence. The contractor shall take care in removing the asphalt and gravel along the two edges of the culvert exposing the concrete roof of the structure. The Contractor shall carefully excavate a two foot wide trench along both sides of the culvert down to the bottom of the stone walls of the culvert. He will then carefully rinse off the exposed stones with a water spray and then proceed to repair the outside of the wall to fill in any holes with stone and dry pack mortar He will then drill holes in the side of the roof slab and install reinforcing rods as shown in the plans. He will fill the trenches with concrete in two or three layers, allowing the lower layer firm up before pouring the layer above it. Once the concrete has cured he will install gravel and a temporary pavement patch to handle traffic until the time the parking lot is resurfaced. The contractor will do his work in such a way that vehicle access to the businesses using the parking lot is available during their hours of operation.

**Article 6.51.04 – Method of Measurement:** The work under this item shall be paid for under the contract lump sum price for the completion of all work specified.

**Article 6.51.05 – Basis of Payment:** The repair of the Mill Brook culvert shall be paid for as a contract lump sum price which price shall be full compensation for work necessary to perform the stated work, including, but not limited to, excavation, cleaning and repairing the existing walls, drilling into concrete, steel reinforcing, concrete, backfilling, compaction, gravel,

bituminous patch, restoring facilities destroyed or damaged during the work, and maintaining access to the abutting businesses.

Pay Item  
Repair Existing Culvert

Pay Unit  
1.s.

## **ITEM #0703029A - ROUNDED STONE RIPRAP**

**Description:** This work shall consist of the placement of native stream channel material for stabilization and scour protection at culvert outlets located in Mill and Manning Brooks. This work shall also apply to the construction of the Paved Channel (Item # 0803050A) for the enhancement of fish habitat and fish passage.

One foot of rounded riprap or native stream material over a base layer of riprap is specified at the following project locations:

- Inlet protection along Manning Brook upstream of the culvert under Route 31.
- Outlet protection along Mill Brook downstream of the culvert from the Fire Pond.

### **Materials:**

**1—General:** The materials for this item shall consist of the existing and/or naturally-formed boulders, cobbles and gravel from within the Mill and Manning Brook channels and adjacent flood plain areas within the impact limits. The material shall be sound, tough, and durable.

This material should be from areas where the action of the stream has already washed the soil and fine material from the deposits of aggregate. The total content, by weight, of particles smaller than 0.08" (sand, silt, clay and soil) and organic material shall not exceed 10%. No boulders larger than 36" will be accepted without the approval of the Engineer.

Rock excavated from ledge (bedrock) formations, or broken from larger boulders, will not be accepted. Broken concrete will not be accepted.

If an insufficient quantity of material is available from "Unclassified Excavation" at the Mill and Manning Brook sites, the Contractor shall furnish additional material meeting the requirements of this specification from other sources within the project limits, or from another approved source. Material the Contractor proposes to bring to the site from another source must be inspected and approved by the Engineer at the source prior to the excavation or hauling of the material.

Bank run gravel shall be uncrushed, conforming to the requirements of M.02.01—2.

**2—Rock Steps for the Paved Channel:** Footer boulders and step boulders shall weigh a minimum of 600 pounds. At least 50% of the boulders, by number, at each step shall weigh more than 800 pounds.

Small boulders and/or cobbles for bed retention sills must be large enough to key into the slot formed by the larger boulders without being forced through the slot by the stream flow. These rocks should not be larger than 12" in any dimension.

**3—Riprap:** The material shall conform to the following gradation requirements:

<b>Stone Size</b>	<b>% of the Mass</b>
Over 24"	0
14" to 24"	30
6" to 14 "	30
1" to 6 "	30
Less than 1"	10

Additional material as allowed in Subarticle 1, including uncrushed bank run gravel, may be mixed with the available on-site material to produce the required gradation.

**Construction Methods:**

**1—General:** The Contractor shall not place any Rounded Stone Riprap, including rock steps, pools and random boulders, unless the Engineer, Environmental Inspector, and/or a representative of the Department of Environmental Protection (DEP) is present. Coordinate all plans, material selections, and work efforts with those personnel prior to beginning any of this work. The Contractor must cooperate with DEP personnel to produce the desired effects. Materials and construction methods may be subject to revision based on the recommendations of environmental personnel and field conditions.

Mix materials from the site and additional material, as required, to produce the required gradation. Shape the channel bottom to be protected along its entire length prior to placing any geotextile or riprap material.

**2—Rock Steps:** Construct rock steps prior to placing stone in the remaining paved channel. Construct a total of 3 rock steps within the relocated channel according to the details provided, and as directed by the Engineer and/or a DEP representative. All rock steps should be curved into the flow, with the middle part of the arc upstream of the outer ends. Place the steps at varying intervals as directed in the plans.

**3—Riprap:** Place riprap to its full course thickness in one operation in such a manner as to produce a reasonably well-graded mass of rock without causing displacement of or damage to the underlying material. The finished surface shall be free from pockets of small stones and clusters of larger stones. Do not place this material by methods likely to cause segregation of the various sizes of stone. Rearrange individual stones by mechanical or hand methods to the extent necessary to obtain a reasonably well-graded distribution of the specified stone sizes, and for the placement of random boulders. Complete the course to the specified thickness and to the lines and grades as shown on the plans or as ordered by the Engineer or DEP representative.

**Method of Measurement:** Rounded Stone Riprap will be measured for payment by the number of cubic yards of native stream channel material placed and accepted, for the Manning and Mill Brook impact areas, including scour protection, rock steps, and paved channel.

**Basis of Payment:** Payment for this work will be made at the contract unit price per cubic yard for "Rounded Stone Riprap", completed in place, including all incidental materials, equipment, tools and labor. The price shall also include the following: furnishing all additional materials required to produced the necessary quantity and gradation, including bank run gravel, cobbles and boulders; all required mixing of on-site and additional materials; hauling of additional materials to the site; furnishing bank run gravel used at the rock steps; and placing and shaping the materials as directed, including constructing rock steps.

Excavation and stockpiling of native stream bottom material will be paid as "Unclassified Excavation".

All work required for handling water as described in the special provision for Item # 0204151A – "Handling Water" will be included in the lump sum price for that item.

All structural work required for the Fire Pond as described in the special provision for Item # 0803050A – "Paved Channel" will be included in the lump sum price for that item.

Pay Item	Pay Unit
Rounded Stone Riprap	cubic yard

## **ITEM #0705008A - CONCRETE MASONRY GRID PAVER**

**Article 7.05.01 - Description:** This item of work shall consist of supplying and installing precast concrete unit pavers for Concrete Masonry Grid Paver buffer strip including a sand setting bed and gravel or reclaimed miscellaneous aggregate base course. Concrete Masonry Grid Paver buffer strip dimensions and locations shall be as shown on the plans, in accordance with these specifications, and/or as required by the Engineer.

**Article 7.05.02 - Materials:** The supply Contractor shall provide the pavers as detailed and specified in this section and in quantities as indicated within the Drawings. The Contractor shall submit shop drawings, materials description, certified test results and manufacturer's colorant product information for pavers as applicable to the Engineer.

The Contractor shall submit at least (5) units of each paver to the representative to indicate each shape, size and color to be supplied. If the color selection is a blend, a sample consisting of no less than (12) units shall be submitted to indicate the color and range. The Contractor shall schedule field sample construction of 5 foot x 5 foot sample panels to be used including base course, so that the Engineer can review the sample a minimum of 30 days prior to installation of paving surfaces. Additional sample panels shall be required until panel is accepted by the Engineer. Sample panel shall be constructed in conjunction with concrete sidewalk sample panel. Final construction shall match approved samples. Upon acceptance the sample panel shall be included as part of the final sidewalk.

The Contractor shall submit a 3' section of edging material.

**1. Quality Assurance:** Maintain quality control of all batching, coloring, and forming of all units, supplemental unit parts, and in the delivery of said units. All manufacturers shall have a minimum of five (5) years in producing brick pavers. Manufacturer shall submit a list at least three (3) sites within a one hundred (100) mile radius of where their product has been installed and has been in use for minimum of one (1) year. All pavers shall conform to standards defined by ASTM: American Society for Testing and Materials with relation to requirements of materials and their performance standards. Units shall be free of cracks, chips, scratches and any other defect at the time of delivery. All units shall be placed in a storage area, protected from damage prior to and during transit to the Owner's or Contractor's site. Submit product data, maintenance data, samples and shop drawings for all products. Edging Material shall meet minimum requirements based on the Stork Method.

**2. Delivery, Handling, and Storage:** Deliver pavers to the site in steel banded, plastic banded, or plastic wrapped cubes capable of transfer by fork lift or clamp lift, with manufacturer's name and product brand. Store all materials in dry locations, protected from weather, stored off the ground, and secured on-site.

Polymeric sand shall be covered with waterproof covering to prevent exposure to rainfall or removal by wind. The covering shall be secured in place.

**3. Materials:** The pavers shall be meet or exceed North American industry standards, including the requirements of ASTM Specifications C 936-96 for Solid Concrete Interlocking Paving Stones and C-979 Specification for Pigments for Integrally Colored Concrete.

Nominal Size / Coverage: 8 inch x 4 inch  
 Thickness: 2 ¼ inch minimum  
 Compressive Strength: 8500 psi minimum  
 Water Absorption: 5% Maximum  
 Freeze / Thaw: No Effect  
 Slip resistance: Excellent to ADA

Acceptable Concrete Paver Units shall be one of the following or approved equal.

- |  |  |
|--|--|
| <p>1. Yankee Cobble – color Vineyard Blend<br/>                 Ideal Concrete block company<br/>                 Waltham - Hardscape Center<br/>                 232 Lexington Street<br/>                 Waltham, MA 02452<br/>                 P: 781-894-3200</p> | <p>3. Umbriano – color Autumn Sunset Unilock<br/>                 35 Commerce Drive<br/>                 Uxbridge, MA 01569<br/>                 Phone: 508-278-4536</p> |
| <p>2. Dublin Cobble Modular –color Brittany Beige<br/>                 Oldcastle Architectural Product Group<br/>                 375 Northridge Road, Suite 250<br/>                 Atlanta, GA 30350<br/>                 Phone: 877-235-4273</p>                   |  |

The Bedding and Joint Sand, also called polymeric sand, shall be clean, non-plastic, and free from deleterious or foreign matter. The sand shall be natural or manufactured from crushed rock. Grading of samples shall be done according to ASTM C136. The particles shall be sharp and conform to the grading requirements of ASTM C33 as shown below:

Grading Requirements for Bedding and Joint Sand

Sieve Size:	Percent Passing:
3/8in.	100
No. 4	95 to 100
No. 8	80 to 100
No. 16	50 to 85
No. 30	25 to 60
No. 50	10 to 30
No. 100	2 to 10

Plastic Edging ( Where pavers abut ex. or prop. plant bed or lawn)

Edging shall be rigid style for straight runs and gradual curves. Flexible style edging shall be used for sweeping and tight radius curves with the flexibility to create a radius as small as 24". Height shall be a minimum of 1 5/8".

Connection piece shall provide complete end-to-end contact on all pavement-facing edges without piece to piece slippage. Connection device shall extend beyond splice at least 2" in each direction from splice.

Edging shall be anchored with 10" long by 3/8" diameter steel landscape spikes. Maximum spike spacing for rigid style edging shall be 24" and maximum spike spacing for flexible style edging shall be 12".

Deformation:

Rigid style: Maximum Deformation = 0.0044" (0.112 mm)

Flexible style: Maximum Deformation = 0.0154" (0.4 mm)

Load

Rigid style: Minimum Load = 252 pounds force (1.1214 kilonewton)

Flexible style: Minimum Load = 230 lbf (1.0235 kN)

**Article 7.05.03 - Construction Methods:** Gravel borrow base shall be furnished and placed under requirements of Section 0304001 Processed Aggregate Base of the Standard Specifications, and the sections and elevations shown on the Drawings.

The setting bed for the pavers shall be as noted on the Drawings over the gravel borrow base. Spread the setting bed evenly over the base and screed to thickness noted on the Drawings.

Lay the pavers in the pattern(s) as shown on the drawings. Maintain straight and uniform pattern lines.

The pavers shall be hand placed paving units set with 1/8 inch joints. Mechanically vibrate pavers to uniform and true level to finish grade. Fill and sweep all joints with washed, clean concrete sand. Clean all paver surfaces.

Cut pavers shall be placed along the edge. Pavers shall be cut with a masonry saw.

The complete paver surface shall be swept clean and washed down with water to provide a finished installation according to manufacturer's recommendations. Any stains that occur during construction shall be removed prior to acceptance at no cost to the Owner.

Any damaged paving units found prior to project acceptance shall be removed. The paver replacement units shall match in color with adjacent units, at no additional cost to the Owner.

If installing edging before bedding sand and pavers:

Place edging on compacted base. Edging shall not be installed on top of the bedding layer. Spike rigid style edging using predrilled holes, with a maximum spacing of 24" between spikes. Spike placement may be placed through the back if needed. Installing flexible style edging with a maximum spacing between spikes of 12". Connect additional sections of edging as needed.

If installing edging after bedding sand & pavers:

Use a trowel or flat head shovel to cut down along the back of the paver, and pull away the excess bedding sand without disturbing the base material. Connect sections together. Place edging directly on the compacted base material. Slide the retention lip under the bedding layer. Edging shall not be installed on top of the bedding layer. Spike into place following the same spike placement specifications as noted above. Nail the spike at an angle with the point driven inward toward the pavement (toe-nailing) to keep edging tight to the pavement.

**Article 7.05.04 – Method of Measurement:** Item 0705008A Concrete Masonry Grid Paver will be measured for payment by the square yard, complete in place.

**Article 7.05.05 – Basis of Payment:** Item 0705008A Concrete Masonry Grid Paver will be paid at the Contract Unit Price per square yard, of the type and size specified which price shall include all labor, material, equipment, tools and labor incidental thereto, and incidental costs required to complete the work. No additional payment will be made for material or equipment necessary for the satisfactory completion of the work.

No separate payment will be made for polymeric sand setting bed, gravel or reclaimed aggregate base course or excavation but all costs in connection therewith shall be included in the Contract unit price bid.

Pay Item  
Concrete Masonry Grid Paver

Pay Unit  
Square Yard

## **ITEM #0714050A - TEMPORARY EARTH RETAINING SYSTEM**

**Description:** Temporary earth retaining system shall be any type of adequately braced temporary retaining wall such as temporary sheet piling which the Contractor elects to build to satisfy, and which does satisfy, the condition that existing facilities be properly retained during excavation or fill for the placement of substructure or other facilities. Temporary earth retaining system shall be designed by the Contractor and constructed where shown on the plans. This system shall be removed upon completion of the permanent work, except that some sections may be left in place when so ordered by the Engineer.

**Materials:** Materials of steel sheet piling shall conform to the requirement of ASTM A 328. Timber sheet piling shall conform to the requirements of Subarticle M.09.01-1. Materials other than steel or timber, or a combination of these may be used provided they are properly designed for the purpose intended. Systems utilizing other material(s) shall conform to the manufacturer's specifications and project specifications. The parts list shall be furnished for the proprietary system and the Contractor shall provide the material certificates for the parts.

**Construction Methods:** Temporary earth retaining system shall be safely designed and shall be carried to adequate depths and braced as necessary for proper performance of the work. Construction shall be such as to permit excavation or fill as required. Interior dimensions shall be such as to give sufficient clearance for construction of forms and their inspection and for battered pile clearance when necessary. Movements of the system or bracing which prevent the proper completion of the substructure shall be corrected at the sole expense of the Contractor. No part of the temporary earth retaining system or bracing shall be allowed to extend into the substructure without written permission of the Engineer.

Working drawings and design calculations for temporary earth retaining system shall be submitted in accordance with the requirements of Article 1.05.02(2). The working drawings and design calculations shall be prepared, sealed, and signed by a Professional Engineer, licensed in the State of Connecticut. The furnishing of such plans shall not serve to relieve the Contractor of any part of his responsibility for the safety of the work or for the successful completion of the project.

Unless otherwise ordered by the Engineer, all parts of the temporary earth retaining system shall be removed upon completion of the work for which it was provided. The excavation shall be backfilled and properly compacted, prior to removal of the system unless otherwise permitted by the Engineer. Temporary earth retaining system may be left in place at the option of the Contractor if so permitted by the Engineer, provided that it is cut off at an elevation as directed by the Engineer and the cutoffs removed from the site.

**Method of Measurement:** Temporary earth retaining system will be measured for payment by the number of square feet of temporary retaining wall completed and accepted, as computed from the horizontal and vertical payment lines shown on the plans or as ordered. If no payment limits are shown on the plans, the limits used for payment will be the actual horizontal limit of temporary earth retaining system installed and accepted, and the vertical limit as measured from

the bottom of the exposed face of the wall system to the top of the retained earth behind the system. The measurement for temporary earth retaining system which is used as a common wall for staged construction will be the horizontal payment limit shown on the plans and the greater vertical dimension of the common wall face.

No measurement will be made of end extensions or returns necessary for the safety of the retained facility. Earth retaining system ordered left in place by the Engineer shall be measured in accordance with "Earth Retaining System Left in Place."

Earth retaining systems left in place solely at the Contractor's option, and with the Engineer's permission, will not have an additional payment at the contract unit price per square foot for "Earth Retaining System Left in Place."

**Basis of Payment:** Payment for this work will be made at the contract unit price per square foot for "Temporary Earth Retaining System" measured as described above, which price shall include all design, materials, equipment and labor incidental to the construction and removal of the temporary earth retaining system required at the locations specified on the plans; including removal of obstructions, repair and correction, adjustments or reconstruction required by the plans. Any common earth retaining system required for staged construction will be measured for payment only once.

Pay Item	Pay Unit
Temporary Earth Retaining System	s.f.

## **ITEM #0803005A - PAVED CHANNEL**

**Description:** Work under this item shall consist of furnishing and installing a riprap stone revetment mortared together on a concrete base to form a continuous blanket or mat for the purpose of armoring the streambed against erosion and forming natural pools for vegetation and providing a habitat for fish. Also included in this item is excavation in excess of that required for reuse.

**Materials:** Granular fill shall conform to the requirements of Article M.02.01.

Concrete for this work shall conform to the requirements of Article M.03.01 for Class “A” Concrete.

Riprap for this work shall conform to the requirements of Item 0703029A – Rounded Stone Riprap.

Mortar for this work shall conform to the requirements of Article M.11.04.

Existing channel bottom material shall conform the requirements of the Special Provision for “Excavation and Reuse of Existing Channel Bottom Material”.

6 inch PVC pipes shall conform to the requirements of Article M.08.01.27.

**Construction Methods:** The Contractor shall not block the channel to perform work in the stream. The stream flow shall be diverted by means submitted to and approved by the Engineer in accordance with the requirements of special provision “Handling Water”.

The natural streambed material shall be excavated to the depth of the revetment system, but shall not exceed the elevation at the bottom of the wingwall footings. The material shall be temporarily stockpiled during preparation of the subgrade. If the subgrade is deemed unacceptable, granular fill shall be placed on the channel bottom to create the proper surface for the installation of the concrete slab of the revetment system. The Contractor shall notify the Engineer in writing of the area on which he plans to stockpile the excavated material. Concrete shall be placed on the prepared subgrade and the rounded stone riprap placed in a mortar bed neatly and accurately to the elevations and contours shown on the plans. 6” PVC pipes shall be placed within the concrete as shown on the plans with eight cubic feet of ¾” crushed stone wrapped in filter fabric below each pipe. After installation of the rounded stone riprap the stockpiled streambed material shall be distributed to fill in the gaps of the rounded stone riprap joints.

At the completion of this work, the Contractor shall remove from the job site and properly dispose of all remaining debris, waste materials, excess materials, and equipment. The area where streambed material was stockpiled shall be restored to a condition similar to or better than that which existed before stockpiling material there.

**Method of Measurement:** This work will be measured for payment by the number of square yards of revetment installed and accepted, the limits of which are shown on the plans.

**Basis of Payment:** This work will be paid for at the Contract unit price per square yard for “Paved Channel”, completed and accepted. This price shall include all materials, equipment, tools and labor incidental to the installation of the revetment. Excavation in excess of that required for reuse, grading of the streambed for placement of the revetment, furnishing, and installing, Granular fill, concrete, mortar, rounded stone riprap, 6” PVC pipes and bagged stone will be included for payment of this item.

Excavation for material for reuse shall be paid for under the item “Excavation and Reuse of Existing Channel Bottom Material”.

Work and materials required to divert stream flows and removal of same shall be paid for under the item “Handling Water”.

Placement of fill material on the existing subgrade below the concrete slab of the revetment system shall be paid for under the item “Granular Fill”.

Pay Item	Pay Unit
Paved Channel	Sq. Yards

**ITEM #0811002A - SPECIAL CONCRETE CURBING**

The work under this item shall conform to the requirements of Section 8.11 amended as follows:

**Article 8.11.01 – Description:** This item shall consist of the furnishing and installing of the special concrete curbing, constructed of precast reinforced concrete in accordance with the dimensions and details shown on drawings as part of the detail “Special Concrete Curb - - Sta. 26+78 LT to Sta. 28+22.8 LT”, as shown on the plans and/or as directed by the Engineer.

**Article 8.11.02 – Materials:** The work under this item shall conform to Article 8.11.02 of the Standard Specification.

**Article 8.11.03 – Construction Methods:** The work under this item shall conform to Article 8.11.03 of the Standard Specification.

**Article 8.11.04 – Method Of Measurement:** This work will be measured for payment along the top arris line of the curb and being the actual number of feet of concrete curbing completed and accepted.

**Article 8.11.05 – Basis Of Payment:** The work will be paid for at the contract unit price per linear foot for “Special Concrete Curbing” of the type specified, complete in place, which price shall include all materials, equipment, tools and labor incidental thereto; also all excavation, back filling, disposal of surplus material.

Pay Item	Pay Unit
Special Concrete Curbing	l.f.

**ITEM #0904482A - METAL BRIDGE RAIL (MODIFIED)**

**ITEM #0904487A - METAL BRIDGE RAIL (HANDRAIL)**

**Description:** Work under this item shall consist of fabricating and installing a metal bridge railing, consisting of extruded aluminum posts, rails and pickets connected to preset anchorages, as shown on the plans, as directed by the Engineer and in accordance with this specification.

**Materials:** Materials for this work shall conform to the following requirements:

Metal Bridge Rail: All bridge railing components including, base plates, posts, post caps, rails, bars, and pickets shall be extruded aluminum and conform to the requirements of ASTM D 3963.

Anodizing: All railing components shall be anodized in conformance to requirements of ASTM B580 Type A - Engineering Hard Coat. The color shall be Black.

Preset Anchorage: The preset anchorage shall be fabricated as detailed on the contract plans. Preset anchorages configured differently from those detailed on the plans may be used provided they utilize the same materials described below and are approved by the Engineer prior to fabrication.

The wire struts shall be cold-drawn and conform to ASTM A510, Grade 1030 with minimum tensile strength of 100,000 psi. These wire struts shall be securely welded to the ferrules with the welds capable of developing the tensile strength of the struts and the ferrules.

The ferrules, either open end or closed end, shall conform to ASTM A108, Grade 12 L 14. A plastic cap shall be provided for sealing the bottom of each open-end ferrule before placing concrete. Closed end ferrules shall provide the minimum full thread length shown on the plans. Removable plastic washers of the same diameter as the ferrules and approximately 3/32" in thickness shall be provided for the top of each ferrule and shall be left in place until the temporary supporting bolts are removed. Removable plastic caps shall be provided for sealing the top of each ferrule until the erection of railing posts.

After fabrication, the preset anchorage shall be hot-dip galvanized in accordance with ASTM A153. The bolts shall be "free running" in the ferrules after galvanization.

Bolts for the preset anchorage shall conform to the requirements of ASTM A193, Class 1 or Class 2, Grade B8 (AISI Type 304). The manufacturer's symbol and the grade shall be clearly marked on the bolt heads. All washers shall be standard size and conform to ASTM A167, Types 302 through 305.

Molded Pads: Molded pads shall be manufactured from new unvulcanized elastomer and unused synthetic fibers, with a weight proportion of fiber content equal to approximately one-half of the total weight of the pad. The pads shall be formed into single sheets of 1/8 inch minimum thickness,

with a tolerance of plus or minus 10 percent. Pads shall have a Shore 'A' Durometer hardness within the range of 70 to 90, and shall have a minimum compressive breakdown of 7,000 psi.

The Contractor shall furnish a Materials Certificate and a Certificate of Compliance in conformance with the requirements of Article 1.06.07 for the following materials: posts, rails, baseplates, preset anchorages, bolts and washers.

**Construction Methods:** Before fabricating any materials, the Contractor shall submit shop drawings to the Engineer for approval in accordance with Article 1.05.02(b). These drawings shall include but not be limited to the following information: The layout plan showing all railing post spacing, expansion joint locations, and material designations.

Aluminum welding shall be in accordance with the American Welding Society "Structural Welding Code-Aluminum", ANSI/AWS D1.2.

The preset anchorages shall be fabricated for installation perpendicular to the grade of the parapet. The anchorages shall be firmly and accurately held in position prior to and during the placing of concrete.

The railing posts shall be accurately fabricated and installed vertical plumb by the use of tapered molded pads as shown on the plans.

The railing assembly shall be carefully adjusted prior to fixing in place to insure proper matching at abutting joints and correct alignment and curvature throughout their length. After installation, all rails and posts shall be free of burrs, sharp edges and irregularities.

**Method of Measurement:** This work will be measured for payment by the actual number of linear feet of metal bridge rail completed and accepted, measured from centerline to centerline of end posts.

**Basis of Payment:** This work will be paid for at the contract unit price per linear foot for "Metal Bridge Rail (Modified)" or "Metal Bridge Rail (Handrail)", where indicated on the plans, complete and accepted in place, which price shall include all materials, equipment, tools, labor and work incidental thereto.

Pay Item	Pay Unit
Metal Bridge Rail (Modified)	L.F.
Metal Bridge Rail (Handrail)	L.F.

**ITEM #0906052A - ADJUST WOODEN RAILING**

The work under this item shall conform to the requirements of Section 9.06 amended as follows:

**Article 9.04.01 – Description:** The work under this items shall consist of the furnishing and installing all materials necessary to remove, modify, and reinstall a wooden railing in accordance with the dimensions and details shown on drawing MDS-6, as part of the detail “Adjust Wooden Railing – Sta. 22 + 35 LT”, as shown on the plans, and/or as directed by the Engineer.

**Article 9.04.02 – Materials:** The new materials furnished and selected for the work shall closely match the colors, shapes, and materials of the existing conditions.

**Article 9.04.03 – Construction Methods:** The work shall be done by a licensed carpenter. The carpenter shall temporarily support the end of the roof in such a way as to sensor it will not be strained under all condition that may be encountered including heavy winds and unexpected loading such as snow. The existing railing on the stairs will be removed. A new post shall be installed at the proposed bottom of the steps prior to removing the corner post and pouring the new sidewalk. The removed corner post will be shortened and reinstalled and the modified railing reattached.

**Article 9.04.04 – Method of Measurement:** The work under this item shall be paid for under the Contract lump sum price for the completion of all work specified.

**Article 9.04.05 – Basis of Payment:** The adjustment of Wooden Railing shall be paid for as a contract lump sum price which price shall be full compensation for work necessary to perform the stated work, including, but not limited to, excavation, backfilling, compaction, restoring facilities destroyed or damaged during the removal and salvaging existing materials, temporary support of the existing roof structure, and the removal, modification, the purchase and installation of new materials as needed, and re-installation of vertical posts and railing.

Pay Item  
Adjust Wooden Railing

Pay Unit  
l.s.

**ITEM #0909501A - TIMBER BEAM RAIL**

**Article 9.09.01 – Description:** The work under this item shall include the furnishing and installing Timber Beam Rail in accordance with the dimensions and details shown on drawing MDS-4, as part of the detail “Timber Beam Rail”, as shown on the plans, and/or as directed by the Engineer.

**Article 9.09.02 – Materials:** Wood for the timber beam rail shall be pressure treated in conformance with the requirements of AASHTO 14-133 and AWPA Standards C1, C2, and C3.

**Article 9.09.03 – Construction Methods:** Wood posts shall be set in holes, and the area adjacent to the posts shall be backfilled with suitable material and thoroughly compacted. Any surplus or unsuitable material remaining after the completed installation shall be removed and disposed of by the Contractor.

**Article 9.09.04 – Method of Measurement:** The work will be measured for payment along the top arris line of the timber beam including the sloped transition section, and being the actual number of feet of timber beam rail completed and accepted..

**Article 9.09.05 – Basis of Payment:** The work will be paid for at the contract unit price per linear foot for “Timber Beam Rail” of the type specified, complete in place, which price shall include all materials, equipment, tools, and labor incidental thereto, and also include the furnishing and installing of the bolts, sloped transition sections, backfill material, required restoration, and disposal of surplus material.

Pay Item  
Timber Beam Rail

Pay Unit  
l.f.

## **ITEM #0913952A - PROTECTIVE FENCE (5' HIGH)**

**Description:** Work under this item shall consist of fabricating and installing a chain link fence as shown on the plans, as directed by the Engineer, and in accordance with these specifications.

**Materials:** Materials for this work shall conform to the following requirements:

1. **Chain Link Fabric:** The fabric shall be Aluminum coated steel woven wire and be of the chain link type. It shall be No. 9 gage wire woven to form a continuous fabric having 2 inch mesh. The chain link fabric shall conform to the requirements in AASHTO M181, Section 3.1, Type II Aluminum Coated Steel Fabric with a knuckled selvage at the top and bottom.
2. **Posts and Rails:** Metal posts and rails shall be a standard steel pipe conforming to the requirements of ASTM A53, Type E or S, Grade B or with AASHTO M181, Grade 2. Posts and rails shall be galvanized after fabrication in conformance with Subarticle M.10.05-2.
3. **Fence Fittings:** The fittings shall be of standard design and be malleable iron, wrought iron, pressed steel or aluminum alloy. All ferrous fittings shall be galvanized in conformance to the requirements of ASTM A153.
4. **Base Plates:** Base plates shall conform to ASTM A36M and be galvanized in accordance with ASTM A123 after fabrication and shop welding. All burrs and sharp edges shall be removed and smoothed prior to galvanizing.
5. **Preset Anchorage:** The preset anchorage shall be fabricated as detailed on the contract plans. Preset anchorages configured differently from those detailed on the plans may be used provided they utilize the same materials described below and are approved by the Engineer prior to fabrication.

The wire struts shall be cold-drawn and conform to ASTM A510M, Grade 1030 with minimum tensile strength of 100,000 psi. These wire struts shall be securely welded to the ferrules with the welds capable of developing the tensile strength of the struts and the ferrules.

The ferrules, either open end or closed end, shall conform to ASTM A108, Grade 12 L 14. A plastic cap shall be provided for sealing the bottom of each open-end ferrule before placing concrete. Closed end ferrules shall provide a minimum full thread length of 2 inches. Removable plastic washers of the same diameter as the ferrules and approximately ¼ inch in thickness shall be provided for the top of each ferrule and shall be left in place until the temporary supporting bolts are removed. Removable plastic caps shall be provided for sealing the top of each ferrule until the erection of fence posts.

After fabrication, the preset anchorage shall be hot-dip galvanized in accordance with ASTM A123.

Bolts for the preset anchorage shall conform to the requirements of ASTM A307. The washers shall be standard circular washers conforming to ASTM F844. The bolts and washers shall be hot-dip galvanized in accordance with ASTM A153.

6. Tie Wires: Tie wires used to fasten the chain link fabric to the posts shall be not less than 6 gauge aluminum. The wires used to fasten the fabric to the rails shall be not less than 9 gauge aluminum.
7. Galvanizing Compound: The galvanizing compound, used to repair areas damage during construction, shall be zinc dust-zinc oxide paint in conforming to the requirements of Federal Specification TT-P-641b or Military Specification MIL-P-21035.

The Contractor shall furnish a Materials Certificate and a Certificate of Compliance in conformance with the requirements of Article 1.06.07 for the following materials: posts, rails, baseplates, preset anchorages, bolts and washers.

**Construction Methods:** The protective fence shall be accurately fabricated and installed in accordance with the plans and as directed by the Engineer.

Before fabricating any materials, the Contractor shall submit shop drawings to the Engineer for approval in accordance with Article 1.05.03(b). These drawings shall include but not be limited to the following information: a layout plan showing all post spacings, all fence and attachment details, materials list, material designations, and the name and telephone number of a person to contact in case of questions.

The preset anchorage shall be installed perpendicular to the grade of the wall. The preset anchorage shall be accurately positioned and restrained against movement during the placement of the concrete.

Posts, with bottoms cut to the required grade, shall be welded to the base plates and installed vertical plumb. All welding shall conform to the requirements of Subarticle 6.03.03-6.

All base plates shall provide full contact with the bearing surface when the posts are plumb and shall be caulked all around with a waterproof silicone rubber sealant. All rails shall be erected to produce a smooth, continuous appearance with posts placed vertically and with all rails parallel to the grade of the wall. The fabric shall be stretched tightly between end posts and securely fastened with stretcher bars bands. The fabric shall be attached to the rails and line posts as shown on the plans. Dome caps shall be installed on top of all posts.

Galvanized areas damaged during shipment or construction shall be given two coats of galvanizing compound.

**Method of Measurement:** This work will be measured for payment by the actual number of feet of protective fence, installed and accepted, measured from centerline to centerline of end posts.

**Basis of Payment:** This work will be paid for at the contract unit price per linear foot for "Protective Fence (5' High)", complete in place, which price shall include all materials, equipment, tools and labor incidental thereto.

Pay Item  
Protective Fence (5' High)

Pay Unit  
L.F.

## **ITEM #0921008A - BRICK SIDEWALK**

The work under this item shall conform to the relevant provisions of Section 9.21 amended as follows:

**Article 9.21.01 - Description:** This item of work shall consist of supplying and installing precast concrete unit pavers for brick sidewalk including a sand setting bed and gravel or reclaimed miscellaneous aggregate base course. Brick Sidewalk dimensions and locations shall be as shown on the plans, in accordance with these specifications, and/or as required by the Engineer.

**Article 9.21.02 - Materials:** The supply Contractor shall provide the pavers as detailed and specified in this section and in quantities as indicated within the Drawings. The Contractor shall submit shop drawings, materials description, certified test results and manufacturer's colorant product information for pavers as applicable to the Engineer.

The Contractor shall submit at least (5) units of each paver to the representative to indicate each shape, size and color to be supplied. If the color selection is a blend, a sample consisting of no less than (12) units shall be submitted to indicate the color and range. The Contractor shall schedule field sample construction of 5 foot x 5 foot sample panels to be used including base course, so that the Engineer can review the sample a minimum of 30 days prior to installation of paving surfaces. Additional sample panels shall be required until panel is accepted by the Engineer. Sample panel shall be constructed in conjunction with concrete sidewalk sample panel. Final construction shall match approved samples. Upon acceptance the sample panel shall be included as part of the final sidewalk.

The Contractor shall submit a 3' section of edging material.

Maintain quality control of all batching, coloring, and forming of all units, supplemental unit parts, and in the delivery of said units. All manufacturers shall have a minimum of five (5) years in producing brick pavers. Manufacturer shall submit a list at least three (3) sites within a one hundred (100) mile radius of where their product has been installed and has been in use for minimum of one (1) year. All pavers shall conform to standards defined by ASTM: American Society for Testing and Materials with relation to requirements of materials and their performance standards. Units shall be free of cracks, chips, scratches and any other defect at the time of delivery. All units shall be placed in a storage area, protected from damage prior to and during transit to the Owner's or Contractor's site. Submit product data, maintenance data, samples and shop drawings for all products. Edging Material shall meet minimum requirements based on the Stork Method.

The pavers shall be meet or exceed North American industry standards, including the requirements of ASTM Specifications C 936-96 for Solid Concrete Interlocking Paving Stones and C-979 Specification for Pigments for Integrally Colored Concrete.

Nominal Size / Coverage:	8 inch x 4 inch
Thickness:	2 ¼ inch minimum
Compressive Strength:	8500 psi minimum

Water Absorption: 5% Maximum  
 Freeze / Thaw: No Effect  
 Slip resistance: Excellent to ADA

Acceptable Concrete Paver Units shall be one of the following or approved equal.

- |  |   |
|--|---|
| <p>1. Yankee Cobble – color Vineyard Blend<br/>                 Ideal Concrete block company<br/>                 Waltham - Hardscape Center<br/>                 232 Lexington Street<br/>                 Waltham, MA 02452<br/>                 P: 781-894-3200</p> | <p>3. Umbriano – color Autumn Sunset<br/>                 Unilock<br/>                 35 Commerce Drive<br/>                 Uxbridge, MA 01569<br/>                 Phone: 508-278-4536</p> |
| <p>2. Dublin Cobble Modular –color Brittany Beige<br/>                 Oldcastle Architectural Product Group<br/>                 375 Northridge Road, Suite 250<br/>                 Atlanta, GA 30350<br/>                 Phone: 877-235-4273</p>                   |   |

The Bedding and Joint Sand, also called polymeric sand, shall be clean, non-plastic, and free from deleterious or foreign matter. The sand shall be natural or manufactured from crushed rock. Grading of samples shall be done according to ASTM C136. The particles shall be sharp and conform to the grading requirements of ASTM C33 as shown below:

Grading Requirements for Bedding and Joint Sand	
Sieve Size:	Percent Passing:
3/8in	100
No. 4	95 to 100
No. 8	80 to 100
No. 16	50 to 85
No. 30	25 to 60
No. 50	10 to 30
No. 100	2 to 10

Plastic Edging ( Where pavers abut ex. or prop. plant bed or lawn)  
 Edging shall be rigid style for straight runs and gradual curves. Flexible style edging shall be used for sweeping and tight radius curves with the flexibility to create a radius as small as 24". Height shall be a minimum of 1 5/8".

Connection piece shall provide complete end-to-end contact on all pavement-facing edges without piece to piece slippage. Connection device shall extend beyond splice at least 2" in each direction from splice.

Edging shall be anchored with 10" long by 3/8" diameter steel landscape spikes. Maximum spike spacing for rigid style edging shall be 24" and maximum spike spacing for flexible style edging shall be 12".

Deformation:

Rigid style: Maximum Deformation = 0.0044" (0.112 mm)

Flexible style: Maximum Deformation = 0.0154" (0.4 mm)

Load

Rigid style: Minimum Load = 252 pounds force (1.1214 kilonewton)

Flexible style: Minimum Load = 230 lbf (1.0235 kN)

**Article 9.21.03 - Construction Methods:** Deliver pavers to the site in steel banded, plastic banded, or plastic wrapped cubes capable of transfer by fork lift or clamp lift, with manufacturer's name and product brand. Store all materials in dry locations, protected from weather, stored off the ground, and secured on-site.

Polymeric sand shall be covered with waterproof covering to prevent exposure to rainfall or removal by wind. The covering shall be secured in place.

Gravel borrow base shall be furnished and placed under requirements of Section 0304001 Processed Aggregate Base of the Standard Specifications, and the sections and elevations shown on the Drawings.

The setting bed for the pavers shall be as noted on the Drawings over the gravel borrow base. Spread the setting bed evenly over the base and screed to thickness noted on the Drawings.

Lay the pavers in the pattern(s) as shown on the drawings. Maintain straight and uniform pattern lines.

The pavers shall be hand placed paving units set with 1/8 inch joints. Mechanically vibrate pavers to uniform and true level to finish grade. Fill and sweep all joints with washed, clean concrete sand. Clean all paver surfaces.

Cut pavers shall be placed along the edge. Pavers shall be cut with a masonry saw.

The complete paver surface shall be swept clean and washed down with water to provide a finished installation according to manufacturer's recommendations. Any stains that occur during construction shall be removed prior to acceptance at no cost to the Owner.

Any damaged paving units found prior to project acceptance shall be removed. The paver replacement units shall match in color with adjacent units, at no additional cost to the Owner.

If installing edging before bedding sand and pavers:

Place edging on compacted base. Edging shall not be installed on top of the bedding layer. Spike rigid style edging using predrilled holes, with a maximum spacing of 24" between spikes. Spike placement may be placed through the back if needed. Installing flexible style edging with a maximum spacing between spikes of 12". Connect additional sections of edging as needed.

If installing edging after bedding sand & pavers:

Use a trowel or flat head shovel to cut down along the back of the paver, and pull away the excess bedding sand without disturbing the base material. Connect sections together. Place edging directly on the compacted base material. Slide the retention lip under the bedding layer. Edging shall not be installed on top of the bedding layer. Spike into place following the same spike placement specifications as noted above. Nail the spike at an angle with the point driven inward toward the pavement (toe-nailing) to keep edging tight to the pavement.

**Article 9.21.04 – Method of Measurement:** Item 0921008A, Brick Sidewalk will be measured for payment by the square foot, complete in place.

**Article 9.21.05 – Basis of Payment:** Item 0921008A Brick Sidewalk will be paid at the Contract Unit Price per square foot, of the type and size specified which price shall include all labor, material, equipment, tools and labor incidental thereto, and incidental costs required to complete the work. No additional payment will be made for material or equipment necessary for the satisfactory completion of the work.

No separate payment will be made for polymeric sand setting bed, gravel or reclaimed aggregate base course or excavation but all costs in connection therewith shall be included in the Contract unit price bid.

Pay Item	Pay Unit
Brick Sidewalk	Square Foot

**ITEM #0922050A - DECORATIVE CROSSWALK**

**Description:** Stamp pattern for the Decorative Concrete Crosswalk shall be random ashlar pattern with 12” cobblestone soldier border stamp as shown on the plans. The contractor shall construct one sample crosswalk to be approved by the Town prior to installation of other crosswalks. A second shall be provided if the first is not accepted by the Town and shall be constructed at the direction of the Engineer. The cost of the mockup shall be included in the unit price for this item. Upon acceptance the sample shall be included as part of the final project. Contactor shall be required to furnish to the Engineer the locations of a minimum of five (5) similar crosswalk projects.

**Materials:** Decorative Crosswalk shall be a hot-applied, resin-based compound formulated with a color stable pigment throughout, which shall be surface textured as described on plans and details and specifically formulated for decorative roadway surfacing. The resin material shall be flexible with form stability consistent with the existing bituminous concrete and be formulated for use with appropriate traffic conditions.

Submit manufacturer’s product data describing the material and process to be used. The application contractor shall be required to furnish written verification that they are an accredited, installer of the approved material/process.

The resin material shall be flexible with form stability consistent with the existing bituminous concrete and be formulated for use with appropriate traffic conditions in conformance to the following minimum physical properties:

GRADE 60 (heavy traffic)

Average Temp. Range	25 – 140 degrees F
Wheel Tracking @ 113	less than 1 mm/hr
Wheel Tracking @ 140 F	less than 5 mm/hr
Density	2.12
Indent @ 104 F	50 dmm maximum
Indent @ 122 F	5 dmm maximum
Ash Content	90% maximum
Skid Resistance Value	55 - 70

**Construction Methods:** The section(s) of pavement to be replaced with the textured surface shall be precut in neat straight lines by saw cutting. The existing pavement surface shall be removed to an approximate uniform depth of between .50 and .75 inches. The area milled shall be protected throughout construction operations.

Residues resulting from this element of the work shall be immediately removed from the jobsites and disposed of in a legal manner.

All work sites must be properly prepared in accordance with the material manufacturer’s requirements. Pavement sections where the surface has been removed must be left in a neat and clean condition, satisfactory to the Engineer.

Contractor shall be responsible for the preparation, placement, and patterning of the resin according to the manufacturer' guidelines and subject to the approval of the Engineer. The contractor shall overlay in previously prepared recessed pavement surfaces as described above and/or other areas, as required by the Engineer.

Contractor must possess and be familiar with the specialized machinery required to perform the procedures as outlined and contained within these technical specifications, including, but not limited to, appropriate trucks, air compressors, miscellaneous asphalt equipment, dispensers, mixers, melters, applicators, heaters, cutters and/or specialized tools etc.

Using manufacturer prescribed methods and equipment the contractor shall adequately heat and uniformly mix the material(s) together with the desired colored pigment supplied by the manufacturer. Maximum heating temperature of the completed formulation is 325 degrees F. The contractor shall then apply the properly prepared, homogeneous material to the surface of a hardened, structurally sound bituminous concrete or cement concrete pavement, as required. The material shall be spread to the desired build thickness (not to exceed .75 inches) using ironing tools, heated sufficiently to smooth the surface to a state of readiness for patterning. No material shall be applied when precipitation is present.

The color and surface pattern options shall be in accordance with the drawings and specifications. Final forming will begin immediately after leveling has occurred, while the material is still hot enough to allow the mold selected, to adequately penetrate the surface and create the desired pattern.

Once the finished surface has cooled sufficiently the application area may be opened to vehicular and/or pedestrian traffic. Any residue resulting from this work shall be removed and disposed of in a proper manner. The completed work area is to be left in a neat and clean condition, satisfactory to the engineer.

The contractor shall take reasonable precautions and steps during crosswalk construction to prevent bodily harm or injury or damage to adjacent facilities such as new curb, sidewalks, drainage structures, or water supply facilities. If during the execution of the work, the Contractors operations damage public or private property, the cost of repair or replacement shall be the responsibility of the contractor at no expense to the owner.

Work shall commence upon approval without regard to the number of mobilizations that may be required to complete this work. Due to the logistical complications inherent to this type of specialized construction, given the general project size, scope, schedule and public safety concerns, the contractor may not assume that a single mobilization will be sufficient to complete this entire phase of the crosswalk work required in an orderly fashion. No separate payment shall be made for mobilization or demobilization.

**Method of Measurement:** Measurement for Item 0922050A Decorative Crosswalk, will be measured for payment per square foot, complete in place.

**Basis of Payment:** Payment for Item 0922050A Decorative Crosswalk, will be paid at the Contract Unit Price per square foot, of the type and size specified, which price shall include all labor, material, equipment, tools and labor incidental there to, and incidental costs required to complete the work. No additional payment will be made for material or equipment necessary for the satisfactory completion of the work.

Pay Item  
Decorative Crosswalk

Pay Unit  
Square Foot

**ITEM #0922502A - PROCESSED AGGREGATE BASE SURFACE DRIVEWAY**

**ITEM #0922503A - GRAVEL DRIVEWAY**

The work under these items shall conform to the requirements of Sections 3.04 and 9.22 amended as follows:

**Article 9.22.01 – Description:** These items shall consist of processed aggregate base surfaced driveways on a gravel or reclaimed miscellaneous aggregate base course, or gravel driveways in the locations and to the dimensions and details shown on the plans or as directed by the Engineer and in accordance with these specifications.

**Article 9.79.02 – Materials:** All materials for this work shall conform to the following requirements of Articles M.02.04 and M.05.01:

**Article 9.79.03 – Construction Methods:**

1. Excavation: Excavating shall be done to the required depth below the finished grade, as shown on the plans or as directed by the Engineer. All soft and yielding materials shall be removed and replaced with suitable materials.
2. Base Course: Gravel of reclaimed miscellaneous aggregate for the base course shall be uniformly spread to the required depth and thoroughly compacted with a roller with a mass of not less than 500 pounds.
3. Backfilling and Removal of Surplus Materials: The sides of the driveway shall be backfilled with suitable material thoroughly compacted and finished flush with the top of the driveway.

**Article 9.79.04 – Method of Measurement:** The work under these items will be measured by the actual numbers of square yards of completed and accepted driveway surface.

Excavation below the finished grade line of the driveway, backfilling, and disposal of surplus material will not be measured for payment; but the cost thereof shall be included in the price bid for driveway.

Gravel will not be measured for payment, but the cost thereof shall be included in the price bid for driveway.

**Article 9.79.05 – Basis of Payment:** The work under these items will be paid for under the contract unit price per square yard for “Processed Aggregate Base Surfaced Driveway” and “Gravel Driveway” as the case may be, complete in place, which price shall include all excavation as specified above, backfill, disposal of surplus material, gravel or reclaimed miscellaneous aggregate base, and all equipment, tools, labor and materials incidental thereto.

Rev. Date 12/10/13

Pay Item  
Processed Aggregate Base Surfaced Driveway  
Gravel Driveway

Pay Unit  
s.y.  
s.y.

**ITEM #0923001A - BITUMINOUS CONCRETE FOR PATCHING**

**Description:** The work under this item shall consist of patching of any pavement surfaces which have become rutted, broken, damaged, delaminated, or otherwise unserviceable, and at such other locations as the Engineer may designate, in order to provide a suitable surface for placement of a layer of bituminous concrete or other surfacing material. In areas where milling is proposed, this item is to be used only after any milling, fine milling, or micromilling has been completed.

**Materials:** The materials furnished and used in this work shall conform to the requirements of Section 4.06 and M.04. The specific material to be used for patching shall be as directed by the Engineer and shall be one of the following: Bituminous Concrete Class 2, HMA S0.25, HMA S0.375, PMA S0.25, or PMA S0.375. Tack coat material used for surface preparation shall conform to the requirements of Section 4.06 and M.04.

**Construction Methods:** Patching shall be done only at the locations and at such time as is deemed necessary by the Engineer. The Contractor shall perform all surface preparation prior to patching. The prepared surface shall be clean and dry prior to application of any material. The clean and dry surface shall receive an application of tack coat prior to placement of patching material. Patching material shall be placed by means acceptable to the Engineer and shall be compacted to the satisfaction of the Engineer.

**Method of Measurement:** The quantity of material to be included for payment will be determined by the net weight, in tons, measured in the hauling vehicles furnished by and at the expense of the Contractor. The scales shall be a type satisfactory to the Engineer and shall be sealed. An inspector, to be appointed and compensated by the Department, shall check the weight of all material entering into construction. The total weight will be the summation of the weigh slips of bituminous concrete actually incorporated in the work included under this item.

**Basis of Payment:** This work will be paid for at the contract unit price per ton for "Bituminous Concrete for Patching," complete in place and accepted by the Engineer, which price shall include furnishing all materials, equipment, tools, labor and work incidental thereto.

<u>Pay Items</u>	<u>Pay Unit</u>
Bituminous Concrete for Patching	ton (t)

**ITEM #0924002A - CONCRETE DRIVEWAY RAMP**

Concrete driveway ramps shall be constructed in accordance with Article 9.24, supplemented as follows:

**Article 9.24.01 - Description:** Add the following:

This item shall include furnishing and installing of concrete driveway ramps with a special scoring pattern as shown on the plans.

**Article 9.24.02 – Materials:**

As specified.

**Article 9.24.03 – Construction Methods:** Add the following:

Scoring patterns for the Concrete driveway ramp shall be as shown on the plans. Scoring shall not be saw cut, hand trowling is required.

**Article 9.24.04 - Method of Measurement:**

As specified.

**Article 9.24.05 - Basis of Payment:** As specified.

Pay Item	Pay Unit
Concrete Driveway Ramp	c.y.

**ITEM #0945060A - PINE BARK MULCH**

**Description:** This item of work shall conform to the relevant provisions of the Standard Specifications for Roads, Bridges and Incidental Construction and the following; it shall consist of supplying and installing materials for pine bark mulch in planting areas. Locations shall be as shown on the drawings, in accordance with these specifications, and/or as required by the Engineer.

**Materials:** A minimum of 30 days prior to scheduled installation provide product data for bark mulch to be used include origin of and verification that product meets required standard. Bark mulch shall be shredded pine bark aged a minimum of six (6) months. The mulch shall be dark brown in color, free of chunks and pieces of wood thicker than 1” (inch) and shall not contain, in the judgment of the Engineer, an excess of fine particles. Unless otherwise specified in these special provisions, bark mulch shall be incidental to the cost of the planting items. Do not use wood chips.

**Construction Method:** Bark Mulch shall be installed 3” deep at locations shown on drawings. Bark mulch shall be kept a minimum of 4” from the trunks or stems of woody plants. Bark mulch shall not be placed within 18” of structures with combustible facia where plant beds extend to the face of such structures pea gravel or crushed stone shall be substituted for bark mulch. It is the contractors responsibility to inspect plant beds at structures and determine where substitution is necessary.

**Measurement:** Item (0945060) Pine Bark Mulch will be measured for payment per square yard as called out on the plans or as directed by the Engineer.

**Basis of Payment:** Item (0945060) Pine Bark Mulch will be paid at the Contract Unit Price per each, of the type and size specified which price shall include all labor, material, equipment, tools and labor incidental thereto, and incidental costs required to complete the work. No additional payment will be made for material or equipment necessary for the satisfactory completion of the work.

Pay Item  
Pine Bark Mulch

Pay Unit  
Square Yard

## **ITEM #0947207A - BICYCLE STAND**

**Description:** This item of work shall conform to the relevant provisions of the Standard Specifications for Roads, Bridges and Incidental Construction and the following; it shall consist of supplying and installing materials for Bicycle Stand. Bicycle Stand locations shall be as shown on the drawings, in accordance with these specifications, and/or as required by the Engineer.

**Materials:** Contractor shall provide Product Data for each type of product indicated. Include construction details, material descriptions, dimensions of individual components and profiles, finishes, field-assembly requirements, and installation details.

Shop Drawings: Show fabrication and installation details, and attachments to other work.

Warranty period: minimum [1] year from date of substantial completion.

Steel shall be free from surface blemishes and complying with the following:  
Plates, Shapes, and Bars: ASTM A 36/A 36M.

Steel Pipe: Standard-weight Schedule 40 steel pipe complying with ASTM A 53, or electric-resistance-welded pipe complying with ASTM A 135.

The following are acceptable examples of Bicycle Stand for this project.

Bol-2-sf-p  
Madrax, Inc.  
1080 Uniek Drive, Waunakee, WI 53597  
608-849-1080

Model SB2  
Creative Pipe, Inc.  
P.O.Box2458  
Rancho Mirage, California 92270  
800-644-8467

Bike Hitch  
Dero Bike Rack Co.  
2657 32nd Ave S,  
Minneapolis, MN 55406  
800-891-9298

Or approved equal.

Finish shall be applied in factory electrostatically applied black polyvinyl powder coat.

**Construction Methods:** Prior to installation protect finishes on exposed surfaces from damage by applying a temporary protective covering or wrapping before shipping. Store materials to comply with manufacturer's directions to prevent deterioration from moisture, heat, cold, direct sunlight, or other causes.

Bicycle Stand shall include cast in place concrete footing in paver areas or flange anchored at finished grade to substrate where surface mounted on concrete pavement.

Metal Components: Form to required shapes and sizes with true, consistent curves, lines, and angles. Separate metals from dissimilar materials to prevent electrolytic action.

Welded Connections: Weld connections continuously. Weld solid members with full-length, full-penetration welds and hollow members with full-circumference welds. At exposed connections, finish surfaces smooth and blended so no roughness or unevenness shows after finishing and welded surface matches contours of adjoining surfaces.

Pipes [and Tubes]: Form simple and compound curves by bending members in jigs to produce uniform curvature for each repetitive configuration required; maintain cylindrical cross section of member throughout entire bend without buckling, twisting, cracking, or otherwise deforming exposed surfaces of handrail and railing components.

Exposed Surfaces: Polished, sanded, or otherwise finished; smooth all surfaces, free from burrs, barbs, splinters, and sharpness; all edges and ends rolled, rounded, or capped.

Factory Assembly: Assemble components in the factory to the greatest extent possible to minimize field assembly. Clearly mark units for assembly in the field.

Comply with manufacturer's written installation instructions, unless more stringent requirements are indicated. Complete field assembly of Bicycle Stands, where required.

Maintain adequate setback position (minimum 2 feet from parallel walls; 2'-6" from perpendicular walls) of the Stand with respect to adjacent building walls or other obstructions.

Contractor shall touch up any scratches after installation with paint supplied by manufacturer.

Provide minimum 4 feet at parking areas where vehicles overhang area between curbs or wheel stops and Bicycle Stands.

Install Bicycle stand level, plumb, true, and positioned at locations indicated on Drawings.

**Measurement:** Item (0947207A) Bicycle Stand will be measured for payment per each as called out on the plans or as directed by the Engineer.

**Basis of Payment:** Item (0947207A) Bicycle Stand will be paid at the Contract Unit Price per each, of the type and size specified which price shall include all labor, material, equipment, tools and labor incidental thereto, and incidental costs required to complete the work. No additional payment will be made for material or equipment necessary for the satisfactory completion of the work.

Pay Item  
Bicycle Stand

Pay Unit  
Each

## **ITEM #0949052A - TRANSPLANT TREE**

**Description:** The work under this item shall conform to the applicable requirements of Standard Specifications for Roads, Bridges and Incidental Construction Section 9.49 Furnishing, Planting and Mulching Trees, Shrubs, Vines and Groundcover Plants, Planting Items here in and the following; except as amended and supplemented as indicated on the drawings and as specified below.

The Contractor shall remove store and relocate plant material in locations as required by the Engineer. The work of this section includes, but is not limited to, the following:

- A. Excavation and removal of live plant material from construction sites.
- B. Stabilization, storage and maintenance of trees during construction.
- C. Installation of trees as directed by the Engineer.
- D. Plant care during 60-day Maintenance Period and one-year Establishment Period
- E. Replacement of defective or dead plants at End of Maintenance Period
- F. Replacement of defective or dead plants at End of Establishment Period

Transplanting shall be scheduled and executed to minimize the amount of time plants must be stored above ground. Trees stored above ground shall be kept in a location selected to minimize sun and wind exposure. They shall be treated with soil wetting agent and rootball shall be securely wrapped and stabilized and covered with woodchips. Trees shall be replanted according to Section 9.49 Furnishing, Planting and Mulching Trees, Shrubs, Vines and Groundcover Plants, Planting Items here in.

All Transplanted Trees shall be moved with the root systems in soil. Trees shall be wrapped with 8 ounce burlap, or equivalent. Rootballs shall remain intact during all operations. No plant will be accepted if the rootball has been badly cracked or broken prior to, or during, the process of transplanting. Rootballs shall be moist upon excavation and shall be kept moist until installation.

The Landscape Contractor shall have five years continuous experience and expertise in management, handling and installation of ornamental plant material in large-scale landscape construction projects. Site foreman shall have at least five years experience and shall be on-site during all times of plant installation.

References and Standards: The following standards shall apply to the Work of this Section.

Section 9.49 Furnishing, Planting and Mulching Trees, Shrubs, Vines and Groundcover Plants, of the Standard Specifications.

Tree and Shrub Transplanting Manual, E.B. Himelick, 1991, International Society of Arboriculture.

**Materials:** At least 30 days prior to ordering, the Contractor shall submit to the Engineer material specifications and (where applicable) installation instructions attesting that the following materials meet the requirements specified. No materials shall be ordered until submittals have been approved

by the Engineer. Delivered materials shall match the samples.

All material samples shall include supplier's literature and certification stating that material meets specifications. Submittals, including samples, material specifications, and installation specifications are as follows: Soil wetting agent: Submit supplier specifications and certification, Fungal mycorrhizae: Submit supplier specifications and certification, Biostimulant: supplier specifications and certification.

#### Planting Soil Mix

Planting soil for backfill shall meet the requirements of Section 9.49 Furnishing, Planting and Mulching Trees, Shrubs, Vines and Groundcover Plants, Planting Items here in.

#### Bark Mulch

Bark mulch shall be per Item (0945060) Pine Bark Mulch.

#### Water

The Contractor shall be responsible for furnishing the contractor's own supply of water to the site at no extra cost. All plants injured or damaged due to the lack of water, or due to the use of too much water, shall be the Contractor's responsibility to correct. Water shall be free from impurities injurious to vegetation.

#### Soil Wetting Agent

Soil Wetting Agent shall be a synthetic, non-toxic acrylic polyacrylamide or natural soluble plant extract. Application rates shall be per manufacturer's recommendations for container transplant.

#### Fungal Mycorrhizae

Each plant shall be planted with fungal mycorrhizae. Mycorrhizae shall include at least three species of vesicular arbuscular (endomycchorizal ) fungi as well as ectomycorrhizal fungi. Mycorrhizae shall be shipped in individual dosage packets.

#### Bio-stimulant

Biostimulant shall be a dry, water soluble product that contains nitrogen fixing, phosphorous solubilizing, and growth promoting bacteria. In addition, humic acid, cold processed kelp, B-Complex and K vitamins, amino acids and natural sugars shall be incorporated.

#### Fertilizer

Fertilizer shall not be used at the time of transplant, the need for and application of fertilization shall be assessed by the engineer upon completion of the establishment period.

**Construction Methods:** The Contractor shall be responsible for judging the full extent of work requirements involved. This responsibility includes, but is not limited to, the following: excavation, stabilization, transportation, temporary storage and maintenance of plants; plant rehandling prior to final installation; removal and off-site disposal of contaminated existing loam; purchase, transport, and supply of loam.

Seasons for Transplanting Planting

Spring:       Deciduous materials   March 1 through April 15  
                  Evergreen materials   March 1 through May 1

Fall:           Deciduous materials   Oct. 1 through Dec. 1  
                  Evergreen materials   Oct. 1 through Dec. 1

Requests for exceptions to this schedule shall be submitted in writing to the Engineer for approval.

No planting shall be done with frozen backfill or when the soil is in an unsatisfactory condition for working, as determined by the Engineer. Rock or obstructions shall be removed to the depth required to permit planting.

Plant Delivery and Installation

The Contractor shall mark out locations for all plants to be approved by the Engineer before any plant pits or plant beds are dug.

The Contractor shall locate all underground utilities within 10 feet of the proposed planting pits and notify the Engineer of any conflicts prior to digging plant pits.

The Contractor shall notify the Engineer 3 working days prior to the proposed installation of plant material on the site. Trees, stored on site shall be shaded from direct sunlight at all times and shall not be stored on paved surfaces. trees stored on site shall be watered regularly.

Planting

The Contractor shall take care when excavating for plant material to prevent damage to any utility. Any damage to utilities, and cost to repair damage, shall be the responsibility of the Contractor.

Prior to the installation of any plant material, the Contractor shall dig test pits to determine percolation rates. Pits shall be filled with water twice in succession. Conditions permitting the retention of water for more than 24 hours shall be brought to the Engineer's attention. Contractor shall recommend corrective measures to the Engineer for review and approval.

Plant pits shall not be excavated until the true depth of each individual root ball, with trunk flare exposed, is known. Contractor shall move each plant to its planting location. Unwrap tree root ball and remove all wrapping, including wire basket, burlap and ropes entirely.

Planting pits shall be dug for each tree based upon the true root ball depth. Pit shall be scarified to prevent glazed soils.

Trees and shrubs shall be placed plumb as shown on the plans, with the root flare and valleys exposed above finished grade. Handle plants carefully to prevent damaging roots or stems.

Fill pits half way full with backfill making sure to place soil under bottom portions of root ball that is not sitting firmly on compacted subgrade. Add soil wetting agent, mycorrhizal fungi,

biostimulant per manufacturer specifications. Add water until thoroughly saturated to settle soil. Add remainder of backfill. Do not over compact soil. Holes shall be provided around circumference of root ball. Add water until soil is thoroughly saturated.

After planting, the Contractor shall submit wetting agent and fungi dose packets to the Engineer to certify installation of material.

Shape edge of planting pit to form a saucer for holding water and test saucer for integrity before adding mulch.

Mulch shall not be applied until Engineer reviews plant installation. Mulch shall then be applied after soil surface is dry. Water once the mulch is placed. Do not cover the stems or flares and valleys of the plant materials with mulch.

Wounds shall not be painted but cleanly cut to allow healing.

Plant Care: Contractor shall provide plant care for the duration of the Maintenance and Establishment periods in accordance with Section 9.49 Furnishing, Planting and Mulching Trees, Shrubs, Vines and Groundcover Plants.

**Method of Measurement:** Item 0949052 Transplant Tree will be measured for payment per each as called out on the plans, complete in place.

**Basis of Payment:** Item 0949052 Transplant Tree will be paid at the Contract Unit Price per each, of the type and size specified, which price shall include all labor, material, equipment, tools and labor incidental thereto, and incidental costs required to complete the work. No additional payment will be made for material or equipment necessary for the satisfactory completion of the work.

No separate payment will be made for excavation, soil preparation, soil amendments, inoculants, tree watering bags, maintenance, disposal of unsuitable soils, and all other incidentals required for Transplanting trees, but all costs in connection therewith shall be included in the Contract unit price bid.

Pay Item	Pay Unit
Transplant Tree	Each

**ITEM #0949111A - PROTECTIVE FENCING**

**Description:** Work under this item shall conform to the relevant provisions of the Standard Specifications and the following:

This item of work shall consist of delivering, and installing plastic snow fence. Fence locations shall be as shown on the plans, in accordance with these specifications, and/or as required by the Engineer.

**Construction Methods:** Protective fence shall be 4' tall orange plastic snow fence mounted to 2 inch square hard wood stakes at max 8' on center per the sections and elevations shown on the Drawings or as directed by the engineer. Any portion of the fence damaged during construction operations shall be repaired immediately by the contractor at no additional cost.

When construction operations are completed or at the direction of the engineer, the protective fence shall be removed entirely from the site.

**Method of Measurement:** Measurement for Item 0949111 Protective Fencing, will be measured, per linear foot complete in place and accepted.

**Basis of Payment:** Payment for Item 0949111 Protective Fencing, will be paid for at the Contract Unit Price per linear foot, of the type and size specified which price shall include all labor, material, equipment, tools and labor incidental thereto, and incidental costs required to complete the work. No additional payment will be made for material or equipment necessary for the satisfactory completion of the work.

Pay Item  
Protective Fencing

Pay Unit  
Linear foot

## **ITEM #0949160A - SPECIAL SOIL PREPARATION**

**Description:** Work under this item shall conform to the relevant provisions of the Standard Specifications and the following. This work shall comply with Section 9.44 Top Soil, supplemented as follows: Preparation of sub grade and providing Top Soil to a minimum depth of 18 inches for plant bed establishment as shown on the environmental permit plates, construction plans, or as directed by the Engineer.

### **Materials:**

The Contractor shall submit laboratory certified test results of loam to be used as backfill per the requirements of Section 9.44 Top Soil of the Standard Specifications. Soil test shall include USDA textural classification, sieve and nutrient analysis.

Special Soil Preparation shall include providing Top Soil to meet the following criteria or Top Soil amended to meet these criteria as directed by the Landscape architect based upon the findings of the soil test.

1. USDA Soil textural classification shall be between the texture designation Loam to Sandy Loam.
2. pH range shall be between 6 and 7
3. Organic content between 5 and 10 percent
4. Macro nutrients shall be within standard average range for healthy plant growth.
5. Maximum of 7percent gravel
6. Mycorrhizae inoculation

### **Construction Methods:**

Sub Soil surface shall be brought to sub grade elevation, decompacted and scarified per the standard specification and approved by the Landscape Architect prior to placement of Top Soil.

Sufficient grade stakes be set for checking the finished grades. Top Soil shall be spread and compacted in three 6 inch lifts and adjusted to a final depth of 18 inches.

After loam has been spread, it shall be carefully prepared by scarifying or harrowing and hand raking. All large stiff clods, lumps, brush, glass, roots, stumps, litter and other foreign matter, and stones over 2 inch in diameter shall be removed from the soil.

The entire surface shall then be rolled with a hand roller weighing not more than one hundred (100) pounds per foot of width. During the rolling, all depressions caused by settlements or rolling shall be filled with additional planting soil and the surface shall be regraded and rolled until it presents a smooth and even finish to the required grade. Overall soil compaction shall not exceed 65% Proctor.

Contractor shall work areas from the inside out so as not to drive over and compact soil already in place. Once soil is in place, only wheel barrow and pedestrian traffic shall be allowed on the soil.

If Contractor needs to cross an area where loam has been spread, 4” of bark mulch shall be placed over filter fabric for vehicle access or mats specially designed for access to sensitive sites shall be used with the approval of the Engineer. No additional payment shall be made to the Contractor for providing these materials for access.

Seed, sod mulch or plantings shall be placed within 3 days after placing Topsoil. The Contractor shall not spread loam until soil cover is ready for installation.

**Method of Measurement:** This work will be measured for payment by the number of square yards of surface area of “Special Soil Preparation” (Top Soil) installed.

**Basis of Payment:** This work will be paid for at the contract unit price per square yard for “Special Soil Preparation” which price shall include all materials, maintenance, equipment, tools, labor, and work incidental thereto. Partial payment of up to 50% may be made for work completed, but not accepted. Full payment shall not be made until the area has been accepted by the Landscape Architect.

Pay Item	Pay Unit
Special Soil Preparation	S.Y.

## **ITEM #0949432A - ROOT PRUNING**

**Description:** Work under this item shall conform to the relevant provisions 9.15 of the Standard Specifications and the following:

This item of work shall consist of root pruning and stabilization prior to excavation. Locations shall be as shown on the plans, in accordance with these specifications, and/or as required by the Engineer.

**Materials:** Root Pruning may include the following materials where major roots or sections of root system are temporarily exposed.

Untreated 8 ounce burlap to be moistened and used to cover exposed root systems.

Soil Wetting Agent to be applied as a paste to severed root ends over 3" in diameter. Soil wetting agent shall be a synthetic, non-toxic acrylic polyacrylamide or natural soluble plant extract. Application rates shall be per manufacturer's recommendations for container transplant.

**Construction Methods:** The Contractor shall take due care to protect aerial branches from damage while performing work within the site. All low branching trees shall be protected from equipment damage and disturbance. Alternative operations shall be utilized to preserve smaller trees where required.

It shall be the responsibility of the Contractor and the Contractor's arborist to examine the relationship between existing root zones and the site improvements proposed to determine whether a tree will be significantly impacted and report this to the Engineer. Root zones identified as, at risk shall receive protective measures outlined here in.

The contractor's arborist shall be present during excavation within the tree drip zone areas and shall determine the best method for excavation around existing tree roots based upon the National Arborist Association standards of care.

Excavation in drip zone areas where roots are present shall not cause the tearing or ripping of tree roots. Roots shall first be cleanly severed as far from the trunk of the tree as possible prior to continuing with the excavation, or otherwise avoided to prevent damage to the root. Tree roots shall not remain exposed. Root ends shall be covered within two hours of exposure with soil or burlap and kept moist until the final backfill or grade is established.

The removal of existing sidewalk within the drip zone shall be prosecuted carefully. The existing subgrade material under the sidewalk shall be reused, if it is deemed appropriate by the Engineer, in order to avoid damage to the tree roots.

Root pruning shall be performed using tools and machines designed specifically for this purpose. The size and type of tools and machine used shall be governed by the referenced standards and as acceptable to the Engineer. Root pruning shall be completed prior to base or subgrade preparation.

Severed or temporarily exposed roots shall be protected throughout construction operations and kept moist.

Watering shall be provided if natural precipitation is not acceptable. Trees shall be watered when rainfall is less than 1 inch per week. Watering shall be by a slow flow method that will allow the water to percolate thoroughly into the soil. Methods shall be as approved by the Engineer.

Trees designated for protection shall receive continuous tree protection care. Such care shall include but shall not necessarily be limited to aerial (foliar) and injection fertilizing to repair damage to trees. The Contractor's Arborist, in conjunction with the Tree Warden, will inspect any trees suffering apparent significant damage for stability and vitality. For trees determined to be viable and stable, preservation care shall be provided as directed herein.

**Method of Measurement:** Measurement for Item 0949432A Root Pruning, will be measured, per linear foot complete in place and accepted.

**Basis of Payment:** Payment for Item 0949432A Root Pruning, will be paid for at the Contract Unit Price per linear foot, of the type and size specified which price shall include all labor, material, equipment, tools and labor incidental there to, and incidental costs required to complete the work. No additional payment will be made for material or equipment necessary for the satisfactory completion of the work.

Pay Item	Pay Unit
Root Pruning	Linear foot

## **ITEM #0950019A - TURF ESTABLISHMENT - LAWN**

**Description:** Work under this item shall conform to the relevant provisions of the Standard Specifications and the following. This work shall comply with Section 9.50 Turf Establishment, supplemented as follows: Providing an accepted stand of established lawn turf grasses by furnishing and placing seed as shown on the environmental permit plates, construction plans, or as directed by the Engineer.

**Materials:** All approved seed mixtures shall be obtained in sufficient quantities to meet the pure live seed (PLS) application rates as required by the seed analysis of the mixture.

The Contractor shall submit the Form for Affidavit-Seed (Official Stationery of Supplier) for the proposed seed mix to the Engineer a minimum of 10-days prior to the seeding date for the area(s) in order to verify that the seed mix is compliant with the specification. The seed mixture shall be delivered to the project in sealed containers/bags and inspected by the Engineer prior to seeding the specified site. Application of fertilizer, where necessary, will be directed by the Landscape Architect based on a soil analysis of the area to be seeded. The following mix shall be used for this item.

Lawn Turf Mix: Seed mix 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. Other proposed mixtures must be submitted to OEP and approved by the Landscape Architect prior to use. The materials certification for any proposed mixture that is different from that described below must be submitted a minimum of ten (10) days prior to delivery on site. This certification must match both the previously approved substitute mixture and the seed tags on the bags that are to be removed upon delivery. No seeding shall occur if all three items do not match.

- a. The grass seed mixture shall conform to the following:  
Metro Select Seed Mix  
Pure Seed:  
50% Turf type Perennial Ryegrass  
20% Shamrock Kentucky Bluegrass  
15% Foxfire Creeping Red Fescue  
15% Brittany or Shadow II Chewings Fescue

Under no circumstances should annual Ryegrass, Italian Rye or any other seed be added to the seed mixture.

**Construction Methods:** Construction Methods shall be those established as agronomically acceptable and feasible as determined by the Landscape Architect.

All areas to receive lawn turf seed mix shall be seeded during the spring, fall, or as directed by the OEP. Spring seeding must be performed between March 15<sup>th</sup> and June 15<sup>th</sup>. Fall seeding

must be performed between August 15<sup>th</sup> and October 15<sup>th</sup>. At the direction of the Landscape Architect, partial seeding of a site may be required in order to stabilize slopes that are finished prior to completion of the entire creation site.

Rate of application shall be minimum 6 lbs PLS per 1000 s.f. Where seed is not obtained based on PLS quantities, the actual application rate of approved and delivered seed mixture will be determined by calculating the amount of PLS from the information provided on the seed tags at delivery. The rate of application will be increased based on the actual percentage of PLS. The PLS formula is as follows:

$$(\text{Germination Percentage} \times \text{Purity Percentage}) / 100 = \text{Percentage PLS}$$

Soil surface shall be prepared per the standard specification and approved by the Landscape Architect prior to seeding.

The seed shall be temporarily stabilized with hay or cellulose fiber mulch. The application rate for hay mulch and fiber mulch shall be 3500 lbs per acre.

Following seeding, the entire area shall be rolled with a 100 pound manual landscape roller.

All Lawn Turf shall be maintained at a height of 3". Areas that fail to meet the requirements for Stand of Perennial Turf Grasses shall be lessened and over seeded and allowed to establish prior to any final acceptance by the Landscape Architect.

**Method of Measurement:** This work will be measured for payment by the number of square yards of surface area of accepted established Lawn Turf grasses as specified or by the number of square yards 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 "Lawn Turf Establishment" which price shall include all materials, maintenance, equipment, tools, labor, and work incidental thereto. Partial payment of up to 50% may be made for work completed, but not accepted. Full payment shall not be made until the area has been accepted by the Landscape Architect.

Pay Item  
Lawn Turf Establishment

Pay Unit  
S.Y.

## **ITEM #0950040A - CONSERVATION SEEDING FOR SLOPES**

**Description:** The work included in this item shall consist of providing an accepted stand of established conservation grasses by furnishing and placing seed as shown on the environmental permit plates, construction plans, or as directed by an Environmental Scientist from the Connecticut Department of Transportation's Office of Environmental Planning (OEP) within the wetland creation areas, habitat enhancement areas, and/or designated environmentally sensitive areas. Seeding shall be applied to all constructed slopes associated with the created wetlands, and/or specific areas designated by OEP.

**Materials:** All approved seed mixtures shall be obtained in sufficient quantities to meet the pure live seed (PLS) application rates as required by the seed analysis of the mixture.

The Contractor shall submit the Form for Affidavit-Seed (Official Stationery of Supplier) for the proposed seed mix to the Engineer a minimum of 10-days prior to the seeding date for the area(s) in order to verify that the seed mix is compliant with the specification. The seed mixture shall be delivered to the project in sealed containers/bags and inspected by the Engineer prior to seeding the specified site. Application of fertilizer, where necessary, will be directed by the Environmental Scientist based on a soil analysis of the area to be seeded. The following mix shall be used for this item.

### **Conservation Mix (for slopes):**

In order to preserve and enhance the diversity of native species, it is necessary that the source for seed mixtures used in created wetlands and/or designated environmentally sensitive areas be locally obtained within the Northeast USA including New England, New York, Pennsylvania, New Jersey, Delaware, or Maryland. One approved seed mixture is detailed. Other proposed mixtures must be submitted to OEP and approved by the Environmental Scientist prior to use. The materials certification for any proposed mixture that is different from that described below must be submitted a minimum of ten (10) days prior to delivery on site. This certification must match both the previously approved substitute mixture and the seed tags on the bags that are to be removed upon delivery. No seeding shall occur if all three items do not match.

<b><u>Pounds (lbs) of PLS per acre</u></b>	<b><u>Scientific Name</u></b>	<b><u>Common Name</u></b>
30	<i>Festuca rubra</i>	Creeping red fescue
20	<i>Lolium multiflorum</i>	Annual rye-grass
15	<i>Panicum clandestinum</i>	Deer tongue
10	<i>Chamaecrista fasciculata</i>	Partridge pea
15	<i>Schizachyrium scoparium</i>	Little bluestem
10	<i>Tridens flavus</i> var. <i>flavus</i>	Purple top

**Construction Methods:** Construction Methods shall be those established as agronomically acceptable and feasible as determined by the OEP. Rate of application shall be 100 lbs PLS per

acre. Where seed is not obtained based on PLS quantities, the actual application rate of approved and delivered seed mixture will be determined by calculating the amount of PLS from the information provided on the seed tags at delivery. The PLS formula will be used to determine the desired application rate to obtain a stand of even seed growth for each seed type to be applied within the seeded area(s). The rate of application will be increased based on the actual percentage of PLS for each species delivered to the site so that each species is seeded at 100 % PLS. The PLS formula is as follows:

$$(\text{Germination Percentage} \times \text{Purity Percentage}) / 100 = \text{Percentage PLS}$$

The Engineer shall determine and verify the actual application rate based on the PLS formula for the areas to be seeded with conservation mix.

The seed shall be temporarily stabilized with hay or cellulose fiber mulch. The application rate for hay mulch and fiber mulch shall be 3500 lbs per acre. Unless directed by OEP, absolutely no mowing shall be conducted within the areas that are seeded with conservation mix.

With the exception of wetland creation sites, all areas to receive conservation seed mix shall be seeded during the spring, fall, or as directed by the OEP. Spring seeding must be performed between March 15<sup>th</sup> and June 15<sup>th</sup>. Fall seeding must be performed between August 15<sup>th</sup> and October 15<sup>th</sup>. Specifically for wetland creation sites, the area shall be seeded during the fall seeding season immediately following construction of the site in accordance with the Item # 0949007A – Wetland Creation. At the direction of the Environmental Scientist, partial seeding of a site may be required in order to stabilize slopes that are finished prior to completion of the entire creation site.

**Method of Measurement:** This work will be measured for payment by the number of square yards of surface area of accepted established conservation grasses as specified or by the number of square yards 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 “Conservation Seeding for Slopes,” which price shall include all materials, maintenance, equipment, tools, labor, and work incidental thereto. Partial payment of up to 50% may be made for work completed, but not accepted. Full payment shall not be made until the area has been accepted by the Environmental Scientists.

<b>Pay Item</b>	<b>Pay Unit</b>
Conservation Seeding for Slopes	S.Y.

## **ITEM #0952051A - CONTROL AND REMOVAL OF INVASIVE VEGETATION**

**Description:** This work shall include all materials, labor and equipment necessary for the identification, eradication, removal, and disposal of unwanted vegetation in locations either indicated on the plan sheets or as directed by an Environmental Scientist from the Connecticut Department of Transportation's Office of Environmental Planning (OEP). While any and all invasive species, including those listed on the website for the Connecticut Invasive Plant Working Group's (CIPWG) Invasive Plants Council (<http://www.hort.uconn.edu/cipwg/IPC.html>), may be subject to eradication at the direction of the Environmental Scientist, the following species must always be eradicated: tree-of-heaven (*Ailanthus altissima*), Russian and autumn olive (*Elaeagnus angustifolia* and *E. umbellata*), smooth buckthorn (*Rhamnus cathartica*) and glossy buckthorn (*Frangula alnus*), multiflora rose (*Rosa multiflora*), Japanese barberry (*Berberis thunbergii*), winged euonymus (*Euonymus alata*), shrub honeysuckles (*Lonicera maackii*, *L. morrowii*, *L. tartarica*, *L. X bella*, *L. xylosteum*), privet (*Ligustrum obtusifolium*, *L. ovalifolium*, *L. sinense*, *L. vulgare*), Oriental bittersweet (*Celastrus orbiculatus*), Japanese knotweed (*Polygonum cuspidatum*), common reed (*Phragmites australis*), and reed canary grass (*Phalaris arundinacea*). If project-specific invasive species additional to those listed above need to be removed, the Environmental Scientist will give appropriate direction.

All vegetation designated for removal shall be eradicated in its entirety in accordance with the methods submitted by the Contractor and approved by the Environmental Scientist. Some work will be completed within areas where desirable species are present and will remain. The Contractor will be responsible for protection of desirable species that are to remain.

**Materials:** Mechanical removal shall consist of either manual labor, utilizing a weed wrench or other approved machine, or some other approved method that will enable removal of all root pieces and other parts of the target species while minimizing soil disturbance and avoiding any spread of invasive plant material. Where large infestations of invasive/unwanted vegetation are present and identified on the plans, removal via over-excavation of such vegetation and the underlying soils may be required.

All herbicides shall be registered for the species being treated and shall be formulated as applicable for target-species foliar treatment, cut surface, or injection applications. Where work in or immediately adjacent to wetlands is necessary, the product label(s) for any chemical/adjuvant formulation applied must indicate that the formulation is approved for aquatic environments.

**Construction Methods:** The Contractor shall have sole responsibility for identifying all invasive species present within the invasive removal areas called out in the contract documents prior to the Pre-Construction Meeting. The Contractor shall submit the required invasive removal plan at the Pre-Construction Meeting for the review and approval of the Environmental Scientist. This plan shall include a list of all invasive species present on site, along with a schedule of operations and an outline of construction methodologies for the required control and removal of invasive vegetation specific to each species listed.

While the Environmental Scientist will review the Contractor's delineation and removal plan, the Contractor must be competent to identify invasive vegetation at all times of the year and to prepare a plan for its eradication without assistance.

During the Pre-Construction Meeting, a field review shall be scheduled so that the Contractor and the Environmental Scientist can review the areas of invasive species removal, the specific species required to be removed, and the Contractor's submitted invasive species control plan. At this time, the Environmental Scientist may designate areas for removal that are additional to those shown on the plans. If changes are required to the originally submitted plan, these changes must be submitted to the Environmental Scientist at least 10 days prior to beginning work.

Upon receiving a Notice to Proceed, the Contractor will delineate all areas designated for invasive species removal. The Contractor will be responsible for maintaining this delineation throughout the life of the contract.

The Contractor will not be allowed to begin construction activities in the designated removal areas until all schedules, outlines, and methodologies are approved in writing by the Environmental Scientist. This schedule must take into consideration the time period required between herbicide application and the physical removal of the target species wherever such removal is to occur. No removal work can occur for a minimum of two weeks after herbicide application. In all cases, the submitted schedule shall consider mechanical methods for removal before proposing herbicide application.

The schedule and outline shall include:

- 1) The type(s) of invasive species identified in the designated area(s);
- 2) Species specific treatment methods describing a full course of treatment for each species to achieve eradication. These methods must show:
  - a. Removal methods planned (e.g. pulling, cutting, spraying, etc);
  - b. Types and concentrations of any herbicides to be used, including any adjuvants; and
  - c. Schedules showing dates and types of initial, intermediate and final treatments;
- 3) Any construction activities planned in designated removal area(s) during the eradication period;
- 4) Disposal methods, including:
  - a. Onsite methods and locations; and
  - b. Requests for off-site disposal locations;
- 5) Proof of DEP licensure for herbicide application;
- 6) A description of safety equipment required; and
- 7) Procedures for handling chemical spills.

The Contractor shall also:

- a. Maintain the labels for herbicides being used in his/her possession;
- b. Provide OEP with a 10 day work notice prior to proceeding so that the Environmental Scientist can schedule to be present when appropriate;
- c. Conduct all herbicide formulations and applications, including the addition of

- appropriate surfactants and other adjuvants, in strict conformance with the manufacturer's recommendation and per requirements of regulatory agencies; and
- d. Maintain a written record of herbicide application, including the formulation, concentration, area treated, and date for each application, to be provided by the commercial applicator and submitted to the Environmental Scientist following each treatment.

A “treatment period” for each designated area will be derived from the schedule submitted by the Contractor and determined by the following:

- 1) The first treatment date of the earliest treatable vegetation; and
- 2) The last treatment date of the latest treatable vegetation

It is anticipated that many species will require more than one season to obtain complete eradication. The treatment period must take into consideration those species that will require follow up treatments and more than one season for complete eradication. Upon completion of the treatment period, the Contractor shall notify the Environmental Scientist in writing of the status of eradication. If the eradication has not been successful, the Contractor shall also submit additional treatment plans. If the Contractor believes that eradication has been achieved, the Contractor shall request a site inspection by the Environmental Scientist for concurrence. If the Environmental Scientist concurs that eradication has been achieved, the area will be subject to a one (1) year warranty starting on the first day following the inspection by the Environmental Scientist. During this period the Contractor will be responsible for any further occurrences of the invasive species inside the delineated area.

The Contractor will be responsible for removal and eradication of all plant material deemed as invasive or unwanted within the delineated area(s) for the duration of the project or until relieved of responsibility of the removal item, and the delineation shall remain in place until this time.

Flush cut brush and trees shall not be more than 2 inches (50mm) above the ground line. Flush cutting shall be performed in a controlled manner that will prevent the spread of parts or seeds of invasive species. Brush hogging or any other clearing method that may promote the spread of invasive plant material is also not permissible.

Broadcast or uncontrolled spray application will not be permitted, and care must be taken to avoid contacting non-target species and/or deterring the recolonization of native species following application.

Remove all twining vines in treetops to the greatest extent possible without damaging the branches of the supporting desired vegetation. Cut and remove vines overtopping tree canopies. Climbing spikes will not be permitted for aerial work.

Prune out any branches on non-treatment plants that are damaged during removal of vegetation. All corrective pruning shall conform to the National Arborists Association Pruning Standards.

The site must be monitored by the Contractor and any new or regrowth treated prior to beginning

installation of any landscape plantings.

Processing and disposal of unwanted vegetation shall be done in a controlled manner so as not to spread invasive seed or plant parts within the surrounding areas. All cut invasive vegetation shall be separated from clearing and grubbing operations and all other cleared material. Invasive plant materials may be buried on site within the Department ROW provided that they are under a minimum of 10 feet (3.0 m) of cover on all sides for Japanese knotweed and phragmites and 3 feet (1 m) of cover on all sides for all other species and/or removed from the site and disposed of at the approved location(s) identified in the Contractor's submitted schedule and outline of construction methodologies.

No equipment or vehicles other than that required to complete the work will be permitted in the areas designated for invasive vegetation removal. Any equipment used to process invasive materials, such as chippers and transport vehicles, must be cleaned prior to further use. Processing equipment must also be cleaned prior to further transport.

Wherever removal operations result in exposed soils, disturbed areas must be vegetatively stabilized with the appropriate seed mix and protected with hay, cellulous fiber mulch, or erosion control matting. The application rate for hay mulch and fiber mulch shall be 3500 lbs per acre (3920 kg/hectare).

**Method of Measurement:** The control and removal of invasive vegetation will be measured by the number of square yards (square meters) of invasive and unwanted vegetation identified and eradicated as required above, including any required re-treatment of any regrowth or new growth. The area for removal will be delineated prior to treatment and measured for payment. After a review of the delineated areas, the Environmental Scientist may designate additional areas for removal that are not shown on the plans. These additional areas will be delineated, measured for payment, and included as part of the contract work.

Where selective removal is required, the drip line of the invasive vegetation will be measured for payment and shall include larger trees.

**Basis of Payment:** This work will be paid for at the contract unit price per square yard (square meter) for "Control and Removal of Invasive Vegetation". This payment shall include all labor, materials, tools, and equipment necessary for delineation of the invasive area(s); maintenance of the delineation throughout the project; species identification; and cutting, treating, re-treating, removal, and on or off-site disposal of designated invasive plant material. Off-site disposal of residue shall include the loading, transport, dumping, and fees associated with legal off-site disposal.

- Upon approval of the required schedules, the Contractor will receive a payment equal to 10% of all areas delineated.
- Upon initial treatment as it is described in the schedule of operations, the Contractor will receive a payment equal to 30% of all areas receiving initial treatment.
- Upon successful completion of the treatment period as determined during the site review by

the Environmental Scientist, the Contractor will receive a payment equal to 30% of all areas receiving final treatment.

- Upon successful completion of the 1 year warranty period covering all treated areas on the project, the contractor will receive a payment equal to 30% of the areas treated.

Where excavation is required for removal, this work shall be covered under the contract Item "Earth Excavation". All other vegetation removed shall be included in the Item "Clearing and Grubbing" in accordance with Section 2.01.

Vegetative stabilization of disturbed areas shall be paid for under the respective contract Items: "Turf Establishment", "Wetland Grass Establishment", and/or "Conservation Seeding for Slopes".

Pay Item	Pay Unit
Control and Removal of Invasive Vegetation	S.Y. (S.M.)

## **ITEM #0952102A - CONCRETE PLANTER**

**Description:** Work under this item shall conform to the relevant provisions of Section 5.06 Retaining Walls, Endwalls and Steps of the Standard Specifications and the following:

This item of work shall consist of supplying and installing Concrete Wall Units, Concrete wall Coping, Concrete Stair Treads, Compacted processed aggregate base, Topsoil planting medium, and mulch. Concrete Planter locations shall be as shown on the plans, in accordance with these specifications, and/or as required by the Engineer.

**Materials:** The Contractor shall provide the Concrete Planters as detailed and specified in this section and in quantities as indicated within the Drawings. The Contractor shall submit shop drawings, materials description, certified test results and manufacturer's colorant product information for Concrete Units as applicable to the Engineer.

The Contractor shall submit at least (5) units of each Concrete Wall Units, and Concrete wall Coping to the representative to indicate each shape, size and color to be supplied. If the color selection is a blend, a sample consisting of no less than (12) units shall be submitted to indicate the color and range. The Contractor shall schedule field sample construction of 2 foot x 5 foot sample panels to be used, so that the Engineer can review the sample a minimum of 30 days prior to installation of Concrete Planter. Additional sample panels shall be required until panel is accepted by the Engineer. Final construction shall match approved samples. Upon acceptance the sample panel shall be included as part of the final Concrete Planter wall.

Maintain quality control of all batching, coloring, and forming of all units, supplemental unit parts, and in the delivery of said units.

All manufacturers shall have a minimum of five (5) years in producing Concrete Wall Units, and Concrete wall Coping.

Manufacturer shall submit a list at least three (3) sites within a one hundred (100) mile radius of where their product has been installed and has been in use for minimum of one (1) year.

All Concrete Wall Units, and Concrete wall Coping shall conform to standards defined by ASTM: American Society for Testing and Materials with relation to requirements of materials and their performance standards.

Concrete Wall Units, and Concrete wall Coping shall be free of cracks, chips, scratches and any other defect at the time of delivery. All units shall be placed in a storage area, protected from damage prior to and during transit to the Owner's or Contractor's site.

Submit product data, maintenance data, samples and shop drawings for all products.

Deliver Concrete Wall Units to the site in steel banded, plastic banded, or plastic wrapped cubes capable of transfer by fork lift or clamp lift, with manufacturer’s name and product brand. Store all materials in dry locations, protected from weather, stored off the ground, and secured on-site.

The Concrete Wall Units and Concrete wall Coping shall be meet or exceed North American industry standards, including the requirements of ASTM Specifications and C-979 Specification for Pigments for Integrally Colored Concrete.

Acceptable Concrete Wall Units shall be one of the following or approved equal.

- |  |  |
|--|--|
| <p>1. Stone Wall – color Granite Grey<br/>Ideal Concrete block company<br/>Waltham - Hardscape Center<br/>232 Lexington Street<br/>Waltham, MA 02452<br/>P: 781-894-3200</p> | <p>3. VERSA-LOK Retaining Wall –<br/>color Grey<br/>VERSA-LOK of New England<br/>P.O. Box 6002<br/>Nashua, NH 03063<br/>(603) 883-3042</p> |
| <p>2. Concord – color Granite<br/>Unilock<br/>35 Commerce Drive<br/>Uxbridge, MA 01569<br/>Phone: 508-278-4536</p>   |  |

Top Soil shall conform to the requirements of Section 9.44 Top Soil of the Standard Specifications. And to the description of “Planting Soil Mix” the requirements of Items 0949009 through 0949500A of these special provisions.

Compacted Processed Aggregate Base shall conform to the requirements of item 0304001 Processed Aggregate Base.

SRW Adhesive (Segmental Retaining Wall Adhesive) shall be supplied per the recommendation of the Concrete Wall Unit manufacturer.

**Method of Measurement:** Measurement for Item 0950024A Concrete Planter, will be measured for payment per Lump Sum, complete in place and accepted.

**Basis of Payment:** Payment for Item 0950024A Concrete Planter, will be paid for at the Contract Unit Price per Lump Sum, of the type and size specified which price shall include all labor, material, equipment, tools and labor incidental thereto, and incidental costs required to complete the work. No additional payment will be made for material or equipment necessary for the satisfactory completion of the work.

Pay Item	Pay Unit
Concrete Planter	Lump Sum

**ITEM #0969062A - CONSTRUCTION FIELD OFFICE, MEDIUM**

**Description:** Under the item included in the bid document, adequate weatherproof office quarters will be provided by the Contractor for the duration of the work, and if required, for a maximum of ninety days thereafter for the exclusive use of ConnDOT forces and others who may be engaged to augment ConnDOT 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.

**Materials:** Materials shall be in like new condition for the purpose intended and shall be approved by the Engineer.

**Office Requirements:** The Contractor shall furnish the office quarters and equipment as described below.

	<b>Description:</b>
400 SF	Sq. Ft. of floor space with a minimum ceiling height of 7 ft. and shall be partitioned as shown on building floor plan as provided by the Engineer.
2 EA	Minimum number of exterior entrances.
7 EA	Minimum number of parking spaces.

**Office layout:** The office shall have a minimum square footage as indicated in the table above, and shall be partitioned as shown on building floor plan as provided by the Engineer. The underside of the office shall be fully skirted to the ground.

**Lavatory Facilities:** The Contractor shall furnish lavatory and toilet facilities at a location convenient to the office quarters for the use of Department personnel and such assistants as they may engage. He shall also 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 Department 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 and be slip resistant, with appropriate handrails.

**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.

The Contractor shall provide the following additional equipment, facilities, and/or services at the Field Office on this project to include at least the following to the satisfaction of the Engineer:

Parking Facility: Adequate parking spaces with adequate illumination on a paved surface, with surface drainage if needed. If paved parking does not exist adjacent to the field office, the Contractor shall provide a parking area of sufficient size to accommodate the number of vehicles indicated in the table above. Construction of the parking area and driveway, if necessary, will consist 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 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 computer 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 ConnDOT electrical inspector, must be contacted at 860-594-2240. (Do Not Call Local Town Officials)
- I. Prior to field office removal the ConnDOT Data Communications office 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.

The Following Furnishings and Equipment Shall Be Provided In The Applicable Field Office Type:

Qty	Description:
3 EA	Office desks (2.5 ft x 5 ft) with drawers, locks, and matching desk chairs that have

Qty	Description:
	pneumatic seat height adjustment and dual wheel casters on the base.
2 EA	Office Chairs.
1 EA	Fire resistant cabinets (legal size/4 drawer), locking.
1 EA	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.
2 EA	Personal computer tables (4 ft x 2.5 ft).
1 EA	Hot and cold water dispensing unit and supply of cups and bottled water shall be supplied by the Contractor for the duration of the project.
2 EA	Electronic office type printing calculators capable of addition, subtraction, multiplication and division with memory and a supply of printing paper.
2 EA	Telephone.
1 EA	Telephone answering machine.
1 EA	Plain paper facsimile (FAX) machine capable of transmitting via telephone credit card. All supplies, paper and maintenance shall be provided by the Contractor.
1 EA	Copier/Scanner - dry, plain paper with automatic feeder and reducing capability. All supplies, paper and maintenance shall be provided by the Contractor.
2 EA	Computer systems as specified below under <u>Computer Hardware and Software</u> . All supplies and maintenance shall be provided by the Contractor.
1 EA	Laser printer as specified below under <u>Computer Hardware and Software</u> . All supplies, paper and maintenance shall be provided by the Contractor.
2 EA	Digital Camera as specified below under <u>Computer Hardware and Software</u> . All supplies and maintenance shall be provided by the Contractor.
1 EA	Wastebaskets - 30 gal., including plastic waste bags.
3 EA	Wastebaskets - 5 gal., including plastic waste bags.
2 EA	Electric pencil sharpeners.
* EA	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.
1 EA	Vertical plan racks for 2 sets of 2 ft x 3 ft plans for each rack.
1 EA	Infrared Thermometer, including certified calibration, case, cleaning wipes.
1 EA	Concrete Curing Box as specified below under <u>Concrete Testing Equipment</u> .
1 EA	Concrete Air Meter as specified below under <u>Concrete Testing Equipment</u> .
1 EA	Concrete Slump Cone as specified below under <u>Concrete Testing Equipment</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.

Telephone Service: 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. The Contractor shall pay all charges except for out-of-state toll calls made by State personnel.

Data Communications Facility Wiring: Contractor shall install a Category 5e 468B patch panel in a central wiring location and Cat 5e cable from the patch panel to each PC station, terminating in a (category 5e 468B) 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 ConnDOT Data Center staff in coordination with the designated field office personnel as soon as the facility is in place. The ConnDOT Project Engineer will provide the Contractor with a copy of the current PC specifications, approved printer list and data wiring schematic as soon as possible after the contract is awarded.

Contractor to run a CAT 5e LAN cable a minimum length of 25 feet for each computer to LAN switch area leaving an additional 10 feet of cable length on each side with terminated RJ45 connectors. Each run / jack shall be clearly labeled with an identifying Jack Number.

The installation of a data communication circuit between the field office and the ConnDOT Data Communication Center in Newington will be coordinated between the ConnDOT District staff, ConnDOT Office of Information Systems and the local phone company. The ConnDOT District staff will coordinate the installation of the data communication service with ConnDOT PC Support once the field office phone number is issued. The Contractor shall provide the field office telephone number(s) to the ConnDOT Project Engineer as soon as possible to facilitate data line and computer installations.

Computer Hardware and Software:

The ConnDOT Project Engineer will provide the Contractor with a copy of the current PC specifications, approved printer list and data wiring schematic as soon as possible after the contract is awarded.

Before ordering the computer hardware and software, the Contractor must submit a copy of their proposed PC specifications and the type of printer to the ConnDOT Project Engineer for review by the ConnDOT Data Center. If the specification meets or exceeds the minimum specifications listed below, then the Contractor will be notified that the order may be placed.

Before any equipment is delivered to the Data Center, arrangements must be made a minimum of 24 hours in advance by contacting 860-594-3500. All software, hardware and licenses listed below shall be clearly labeled, specifying the (1) Project No., (2) Contractor Name, (3) Project Engineer's Name and (4) Project Engineer's Phone No., and shall be delivered to the ConnDOT Data Center, 2710 Berlin Turnpike, Newington, CT, where it will be configured and prepared for field installation. Installation will then be coordinated with ConnDOT field personnel and the computer system specified will be stationed in the Department's project field office.

The computer system furnished shall have all software and hardware necessary for the complete installation of the latest versions of the software listed, and therefore supplements the minimum specifications below. The Engineer reserves the right to expand or relax the specification to adapt to the software and hardware limitations and availability, the compatibility with current

agency systems, and to provide the Department with a computer system that can handle the needs of the project. This requirement is to ensure that the rapid changing environment that computer systems have experienced does not leave the needs of the project orphan to what has been specified. There will not be any price adjustment due to the change in the minimum system requirements.

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 each software producer for the duration of the Contract. The Contractor shall deliver to the Engineer all supporting documentation for the software and hardware including any instructions or manuals. The Contractor shall provide original backup media for the software.

The Contractor shall provide the computer system with all required supplies, maintenance and repairs (including labor and parts) throughout the Contract life.

Once the Contract has been completed, the computer will remain the property of the Contractor. Prior to the return of any computer(s) to the Contractor, field personnel will coordinate with the Data Center personnel for the removal of Department owned equipment, software, data, and associated equipment.

A) Computer – Minimum Specification:

Processor – Intel® Core 2 Duo Processor (2.00 GHz, 800 MHz FSB 2MB L2 Cache)

Memory – 2 GB DIMM DDR2 667MHz.

Monitor – 19.0 inch LCD color monitor.

Graphics – Intel Graphics Media Accelerator 3100. or equivalent.

Hard Drive – 160 GB Ultra ATA hard drive (Western Digital, IBM or Seagate).

Floppy Drive – 3.5 inch 1.44MB diskette drive.

Optical Drive – CD-RW/DVD-RW Combo.

Multimedia Package – Integrated Sound Blaster Compatible AC97 Sound and speakers.

Case – Small Form or Mid Tower, capable of vertical or horizontal orientation.

Integrated Network Adapter – comparable to 3COM PCI 10/100 twisted pair Ethernet.

Keyboard – 104+ Keyboard.

Mouse – Optical 2-button mouse with scroll wheel.

Operating System – Windows XP Professional Service Pack 2; Windows Vista Capable.

Application Software – MS Office 2007 Professional Edition.

Additional Software (Latest Releases, including subscription services for the life of the Contract.–

- Norton Anti-Virus and CD/DVD burning software (ROXIO or NERO),
- Adobe Acrobat Standard

Resource or Driver CD/DVD – CD/DVD with all drivers and resource information so that computer can be restored to original prior to shipment back to the contractor.

Uninterrupted power supply – APC Back-UPS 500VA.

Note A1: All hardware components must be installed before delivery. All software documentation and CD-ROMs/DVD for Microsoft Windows XP Professional, Microsoft

Office 2007 Professional Edition, and other software required software must be provided. Computer Brands are limited to Dell, Gateway and HP brands only. No other brands will be accepted. The ConnDOT Project Engineer will provide the Contractor with a copy of the current PC specifications and approved printer list as soon as possible after the contract is awarded.

Note A2: As of June 30, 2008, Microsoft will no longer distribute Windows XP for retail sale, although the date for specific computer manufacturers may be different. Please consult your manufacturer for details. The Department still requires Windows XP on all PCs. Microsoft has stated that any PCs that are purchased with either Windows Vista Business, or Vista Ultimate are automatically entitled to “downgrade rights”, which allow the PC to be rolled back to Windows XP. Please consult the specific manufacturer for details on downgrading new PCs to Microsoft Windows XP after June 30, 2008.

**B) Laser Printer – Minimum Specification:**

Print speed – 20 ppm.  
Resolution – 1,200 x 1,200 dpi.  
Paper size – Up to 216 mm x 355 mm (8.5 in x 14 in).  
RAM – 16 MB.  
Print Drivers – Must support HP PCL6 and HP PCL5e.  
Printer cable – 1.8 m (6 ft).

Note B1: Laser printer brands are limited to Hewlett-Packard and Savin brands only. The ConnDOT Project Engineer will provide the Contractor with a copy of the current PC specifications and approved printer list as soon as possible after the contract is awarded.

Note B2: It is acceptable to substitute a multi-function all-in-one printer/copier/scanner/fax machine listed on the approved printer list in place of the required laser printer and fax machine.

**C) Digital Camera – Minimum Specification:**

Optical – 5 mega pixel, with 3x optical zoom.  
Memory – 2 GB.  
Features – Date/time stamp feature.  
Connectivity – USB cable or memory card reader.  
Software – Must be compatible with Windows XP and Vista.  
Power – Rechargeable battery and charger.

The Contractor is responsible for service and repairs to all computer hardware. All repairs must be performed with-in 48 hours. If the repairs require more than a 48 hours then a replacement must be provided. All supplies, paper and maintenance for the computers, laptops, printers, copiers, and fax machines shall be provided by the Contractor.

**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. All testing equipment will remain the property of the Contractor at the completion of the project.

- 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 will 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.

Insurance Policy: The Contractor shall provide a separate insurance policy, with no deductible, in the minimum amount of twenty thousand dollars (\$20,000.00) 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 Department shall be an additional named insured on the policy. These losses shall include, but not be limited to: theft, fire, and physical damage. The Department will be responsible for all maintenance costs of Department owned computer hardware. In the event of loss, the Contractor shall provide replacement equipment in accordance with current Department 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 Department 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 Department will reimburse the Contractor for replacement costs exceeding the amount of the required coverage.

Maintenance: During the occupancy by the Department, 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, measured to the nearest month.

There will not be any price adjustment due to any change in the minimum computer system requirements.

**Basis of Payment:** The furnishing and maintenance of the construction field office will be paid at the listed unit price per month for the item “Construction Field Office, Medium”, which price shall include all material, equipment, labor, utility services and work incidental thereto.

The cost of providing the parking area, external illumination, trash removal and snow and ice removal shall be included in the monthly unit price bid for the respective item “Construction Field Office, Medium”.

The State will be responsible for payment of data communication user fees and for toll calls by State personnel.

<u>Pay Item</u>	<u>Pay Unit</u>
Construction Field Office, Medium	Month

**ITEM #0970006A - TRAFFICPERSON (MUNICIPAL POLICE OFFICER)**  
**ITEM #0970007A - TRAFFICPERSON (UNIFORMED FLAGGER)**

**9.70.01—Description:** Under this item the Contractor shall provide the services of Trafficpersons of the type and number, and for such periods, as the Engineer approves for the control and direction of vehicular traffic and pedestrians. Traffic persons requested solely for the contractor's operational needs will not be approved for payment.

9.70.03—Construction Method: Prior to the start of operations on the project requiring the use of Trafficpersons, a meeting will be held with the Contractor, Trafficperson agency or firm, Engineer, and State Police, if applicable, to review the Trafficperson operations, lines of responsibility, and operating guidelines which will be used on the project. A copy of the municipality's billing rates for Municipal Police Officers and vehicles, if applicable, will be provided to the Engineer prior to start of work.

On a weekly basis, the Contractor shall inform the Engineer of their scheduled operations for the following week and the number of Trafficpersons requested. The Engineer shall review this schedule and approve the type and number of Trafficpersons required. In the event of an unplanned, emergency, or short term operation, the Engineer may approve the temporary use of properly clothed persons for traffic control until such time as an authorized Trafficperson may be obtained. In no case shall this temporary use exceed 8 hours for any particular operation.

If the Contractor changes or cancels any scheduled operations without prior notice of same as required by the agency providing the Trafficpersons, and such that Trafficperson services are no longer required, the Contractor will be responsible for payment at no cost to the Department of any show-up cost for any Trafficperson not used because of the change. Exceptions, as approved by the Engineer, may be granted for adverse weather conditions and unforeseeable causes beyond the control and without the fault or negligence of the Contractor.

Trafficpersons assigned to a work site are to only take direction from the Engineer.

Trafficpersons shall wear a high visibility safety garment that complies with OSHA, MUTCD, ASTM Standards and the safety garment shall have the words "Traffic Control" clearly visible on the front and rear panels (minimum letter size 2 inches (50 millimeters)). Worn/faded safety garments that are no longer highly visible shall not be used. The Engineer shall direct the replacement of any worn/faded garment at no cost to the State.

A Trafficperson shall assist in implementing the traffic control specified in the Maintenance and Protection of Traffic contained elsewhere in these specifications or as directed by the Engineer. Any situation requiring a Trafficperson to operate in a manner contrary to the Maintenance and Protection of Traffic specification shall be authorized in writing by the Engineer.

Trafficpersons shall consist of the following types:

**1. Uniformed Law Enforcement Personnel:** Law enforcement personnel shall wear the high visibility safety garment provided by their law enforcement agency. If no high visibility safety garment is provided, the Contractor shall provide the law enforcement personnel with a garment meeting the requirements stated for the Uniformed Flaggers' garment.

Law Enforcement Personnel may be also be used to conduct motor vehicle enforcement operations in and around work areas as directed and approved by the Engineer.

Municipal Police Officers: Uniformed Municipal Police Officers shall be sworn Municipal Police Officers or Uniformed Constables who perform criminal law enforcement duties from the Municipality in which the project is located. Their services will also include an official Municipal Police vehicle when requested by the Engineer. Uniformed Municipal Police Officers will be used on non-limited access highways. If Uniformed Municipal Police Officers are unavailable, other Trafficpersons may be used when authorized in writing by the Engineer. Uniformed Municipal Police Officers and requested Municipal Police vehicles will be used at such locations and for such periods as the Engineer deems necessary to control traffic operations and promote increased safety to motorists through the construction sites.

**2. Uniformed Flagger:** Uniformed Flaggers shall be persons who have successfully completed flagger training by the American Traffic Safety Services Association (ATSSA), National Safety Council (NSC) or other programs approved by the Engineer. A copy of the Flagger's training certificate shall be provided to the Engineer before the Flagger performs any work on the project. Uniformed Flaggers shall conform to Chapter 6E, Flagger Control, in the Manual of Uniformed Traffic Control Devices (MUTCD) and shall wear high-visibility safety apparel, use a STOP/SLOW paddle that is at least 18 inches (450 millimeters) in width with letters at least 6 inches (150 millimeters) high. The paddle shall be mounted on a pole of sufficient length to be 6 feet (1.8 meters) above the ground as measured from the bottom of the sign.

Uniformed Flaggers will only be used on non-limited access highways to control traffic operations when authorized in writing by the Engineer.

**9.70.04—Method of Measurement:** Services of Trafficpersons will be measured for payment by the actual number of hours for each person rendering services approved by the Engineer. These services shall include, however, only such trafficpersons as are employed within the limits of construction, project right of way of the project or along detours authorized by the Engineer to assist the motoring public through the construction work zone. Services for continued use of a detour or bypass beyond the limitations approved by the Engineer, for movement of construction vehicles and equipment, or at locations where traffic is unnecessarily restricted by the Contractor's method of operation, will not be measured for payment.

Trafficpersons shall not work more than twelve hours in any one 24 hour period. In case such services are required for more than twelve hours, additional Trafficpersons shall be furnished and measured for payment. In cases where the Trafficperson is an employee on the Contractor's payroll, payment under the item "Trafficperson (Uniformed Flagger)" will be made only for those hours when the Contractor's employee is performing Trafficperson services.

Travel time will not be measured for payment for services provided by Uniformed Municipal Police Officers or Uniformed Flaggers.

Mileage fees associated with Trafficperson services will not be measured for payment.

Safety garments and STOP/SLOW paddles will not be measured for payment.

**9.70.05—Basis of Payment:** Trafficpersons will be paid in accordance with the schedule described herein.

There will be no direct payment for safety garments or STOP/SLOW paddles. All costs associated with furnishing safety garments and STOP/SLOW paddles shall be considered included in the general cost of the item.

**1. Uniformed Law Enforcement Personnel:** The sum of money shown on the Estimate and in the itemized proposal as "Estimated Cost" for this work will be considered the bid price even though payment will be made as described below. 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 for the contract.

The Department will pay the Contractor its actual costs for "Trafficperson (Municipal Police Officer)" plus an additional 5% as reimbursement for the Contractor's administrative expense in connection with the services provided.

The invoice must include a breakdown of each officer's actual hours of work and actual rate applied. Mileage fees associated with Trafficperson services are not reimbursable expenses and are not to be included in the billing invoice. The use of a municipal police vehicle authorized by the Engineer will be paid at the actual rate charged by the municipality. Upon receipt of the invoice from the municipality, the Contractor shall forward a copy to the Engineer. The invoice will be reviewed and approved by the Engineer prior to any payments. *Eighty (80%) of the invoice will be paid upon completion of review and approval. The balance (20%) will be paid upon receipt of cancelled check or receipted invoice, as proof of payment.* The rate charged by the municipality for use of a uniformed municipal police officer and/or a municipal police vehicle shall not be greater than the rate it normally charges others for similar services.

**2. Uniformed Flagger:** Uniformed flaggers will be paid for at the contract unit price per hour for "Trafficperson (Uniformed Flagger)", which price shall include all compensation, insurance benefits and any other cost or liability incidental to the furnishing of the trafficpersons ordered.

Pay Item	Pay Unit
Trafficperson (Municipal Police Officer)	est.
Trafficperson (Uniformed Flagger)	Hr.

## **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 follows and as limited in the Special Provision "Prosecution and Progress":

#### **ROUTE 31**

The Contractor shall maintain and protect the existing number of lanes of traffic each lane on a paved travelpath 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 will be allowed to maintain and protect at least an alternating one-way traffic operation on a paved travelpath not less than 12 feet in width. The length of the alternating one-way traffic operation shall not exceed 300 feet.

Excepted therefrom will be those periods, during the allowable periods, when the Contractor will be allowed to halt traffic for a period not to exceed ten minutes. The Contractor shall allow all stored vehicles to proceed through the work area before halting traffic for another ten-minute period.

The Contractor shall be allowed to maintain and protect traffic on an unpaved surface on Route 31 during full depth reconstruction as dictated in the Special Provision for Section 1.08 "Prosecution and Progress."

#### **ALL OTHER ROADWAYS**

The Contractor shall maintain and protect one lane of through traffic in each direction and turning lanes at intersections, each lane on a paved travelpath 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 will be allowed to maintain and protect at least an alternating one-way traffic operation on a paved travelpath not less than 11 feet in width. The length of the alternating one-way traffic operation shall not exceed 300 feet.

#### **STAGE CONSTRUCTION**

The Contractor shall maintain and protect traffic on all project roadways as shown on the Maintenance and Protection of Traffic Plans contained in the contract plans.

## **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. If, at the direction of the Engineer, the Contractor is asked to provide a temporary driveway to a commercial or residential driveway, the work will be paid for under Item 0406000A Temporary Pavement. If, at the discretion of the Engineer, the Contractor is asked to provide temporary signing for a commercial drive, it will be paid for under Item 1208928 Sign Face Sheet Aluminum (Type III Reflective Sheeting).

### **Article 9.71.03 - Construction Method is supplemented as follows:**

#### **General**

Unpaved travel paths will only be permitted for areas requiring full depth and full width reconstruction, in which case, the Contractor will be allowed to maintain traffic on processed aggregate for a duration not to exceed 5 calendar days. The unpaved section shall be the full width of the road and perpendicular to the travel lanes. Opposing traffic lane dividers shall be used as a centerline.

Notwithstanding the 5 day limitation, prior to Saturday of a work week, the Contractor shall place at least the first course of bituminous pavement on the unpaved travel paths.

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 (bridge) 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.

When the Contractor is excavating adjacent to the roadway, the Contractor shall provide a 3-foot shoulder between the work area and travel lanes, with traffic drums spaced every 50 feet. At the end of the workday, if the vertical drop-off exceeds 3 inches, the Contractor shall provide a temporary traversable slope of 4:1 or flatter that is acceptable to the Engineer.

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.

### **SIGNING**

The Contractor shall maintain all existing side-mounted signs throughout the project limits during the duration of the project. The Contractor shall temporarily relocate existing signs and sign supports as many times as deemed necessary and install temporary sign supports and foundations if necessary and as directed by the Engineer. When all work is completed, the Contractor shall remove existing signs and install new signs as shown on the Signing and Pavement Marking Plans contained in the contract plans.

### **FLASHING BEACON**

The Contractor shall keep the flashing beacon at the intersection of Route 31 and Route operational at all times during construction.

### **Requirements for Winter**

The Contractor shall schedule a meeting with representatives from the Department including the offices of Maintenance and Traffic, and the Town/City 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**

### **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, shoulder 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, shoulder 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; shoulder 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**

In accordance with Section 12.10 entitled "Epoxy Resin Pavement Markings, Symbols, and Legends," the Contractor should install permanent Epoxy Resin Pavement Markings on the final course of bituminous concrete pavement by the end of the work day/night. If the permanent 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 permanent Epoxy Resin 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 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.

NOTE: Painted pavement markings will not be allowed as a substitution for either the permanent Epoxy Resin Pavement Markings or the Temporary Plastic Pavement Marking Tape on the final course of bituminous concrete pavement.

### **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 advanced 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 advanced 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) Under certain situations when the safety of the traveling public and/or that of the workers may be compromised due to conditions such as traffic volume, speed, roadside obstructions, or sight line deficiencies, as determined by the Engineer and/or State Police, traffic may be briefly impeded while installing and/or removing the advanced warning signs and the first ten traffic cones/drums only. Appropriate measures shall be taken to safely slow traffic. If required, traffic slowing techniques may be used and shall include the use of Truck Mounted Impact Attenuators

(TMAs) as appropriate, for a minimum of one mile in advance of the pattern starting point. Once the advanced warning signs and the first ten traffic cones/drums are installed/removed, the TMAs and sign crew shall continue to install/remove the pattern as described in Section 4c and traffic shall be allowed to resume their normal travel.

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 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 “Type ‘D’ Portable Impact Attenuation System”. 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. When it is used as a TMA and is in the proper location as specified, and then it should be paid at the specified hourly rate for “Type ‘D’ Portable Impact Attenuation System”. 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 then is used as a Flashing Arrow, the unit should be paid as a “Type ‘D’ Portable Impact Attenuation System” for the hours used to install and remove the pattern, typically 2 hours (1 hour to install and 1 hour to remove), and is also paid for the day 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).

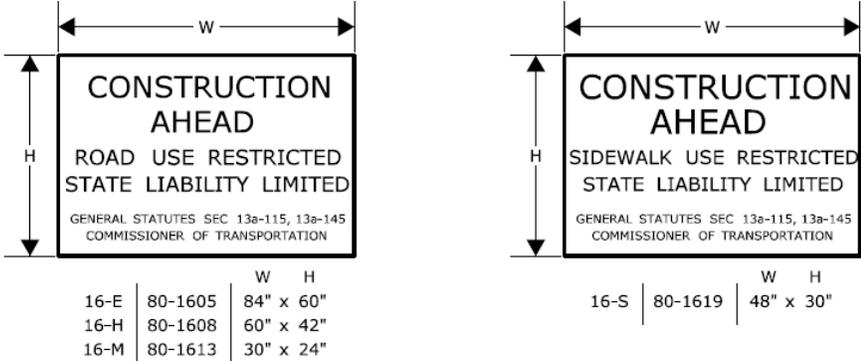
7.h) Messages that need to be displayed for long periods of time, such as during stage construction, should be displayed with construction signs. For special signs, please coordinate with the Office of Construction and the Division of Traffic Engineering for the proper layout/dimensions required.

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.

**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.

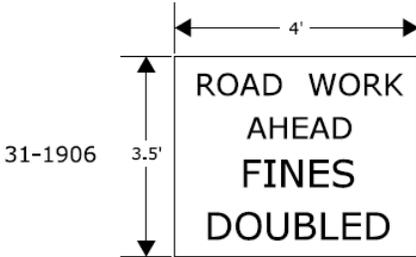
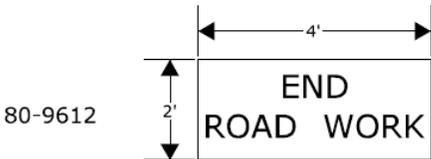
**REGULATORY SIGN "ROAD WORK AHEAD, FINES DOUBLED"**

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**

## 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

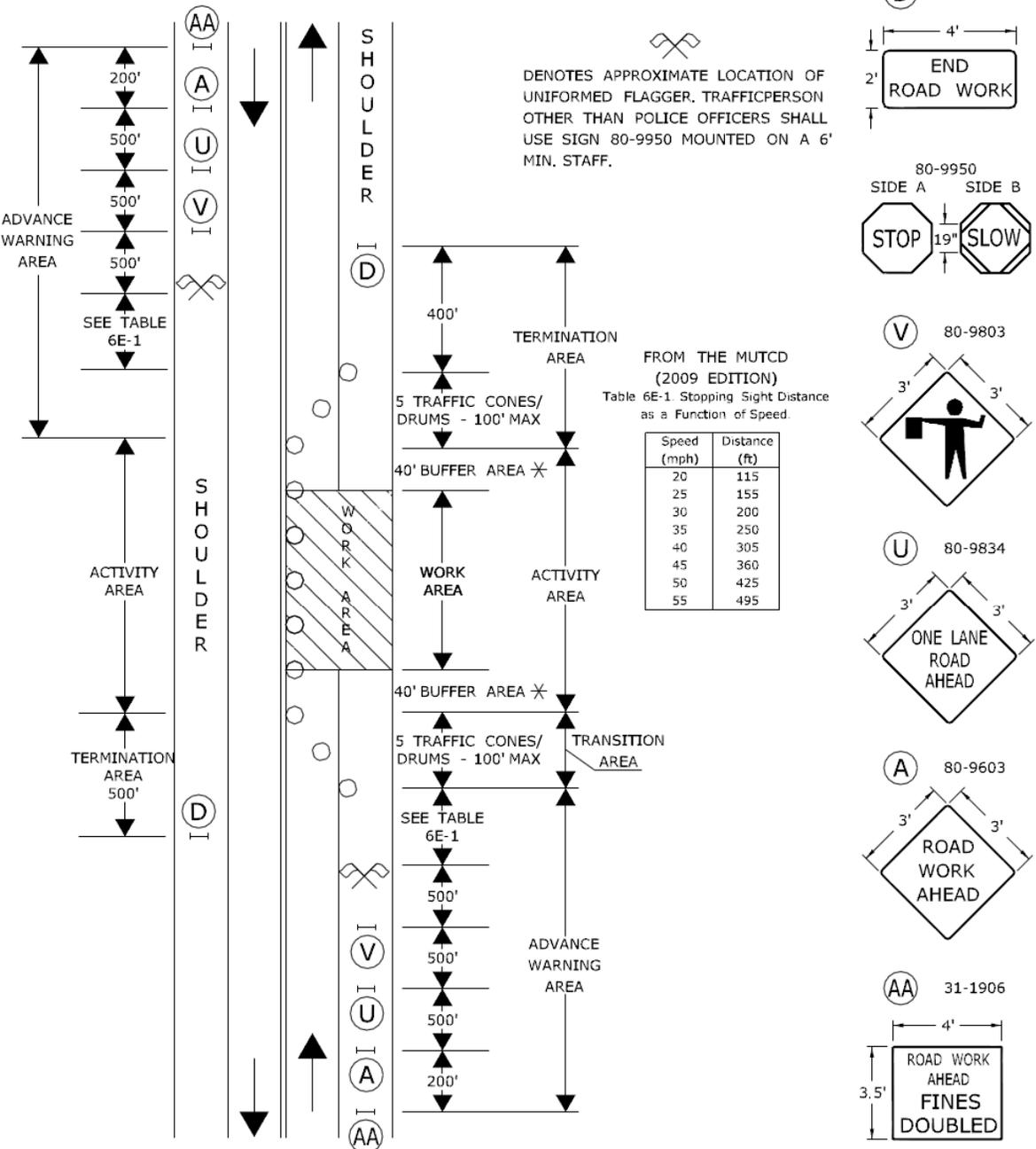
APPROVED

*Charles S. Harlow*  
PRINCIPAL ENGINEER

Charles S. Harlow  
2012.06.05 15:50:35-0400

# WORK IN TRAVEL LANE AND SHOULDER TWO LANE HIGHWAY ALTERNATING ONE-WAY TRAFFIC OPERATIONS

SIGN FACE  
108 SQ. FT (MIN.)



- TRAFFIC CONE **OR** TRAFFIC DRUM
- ✱ OPTIONAL ✕ TRAFFIC DRUM — PORTABLE SIGN SUPPORT
- ← HIGH MOUNTED INTERNALLY ILLUMINATED FLASHING ARROW



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*  
PRINCIPAL ENGINEER  
Charles S. Harlow  
2012.06.05 15:55:23-04'00"

# 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

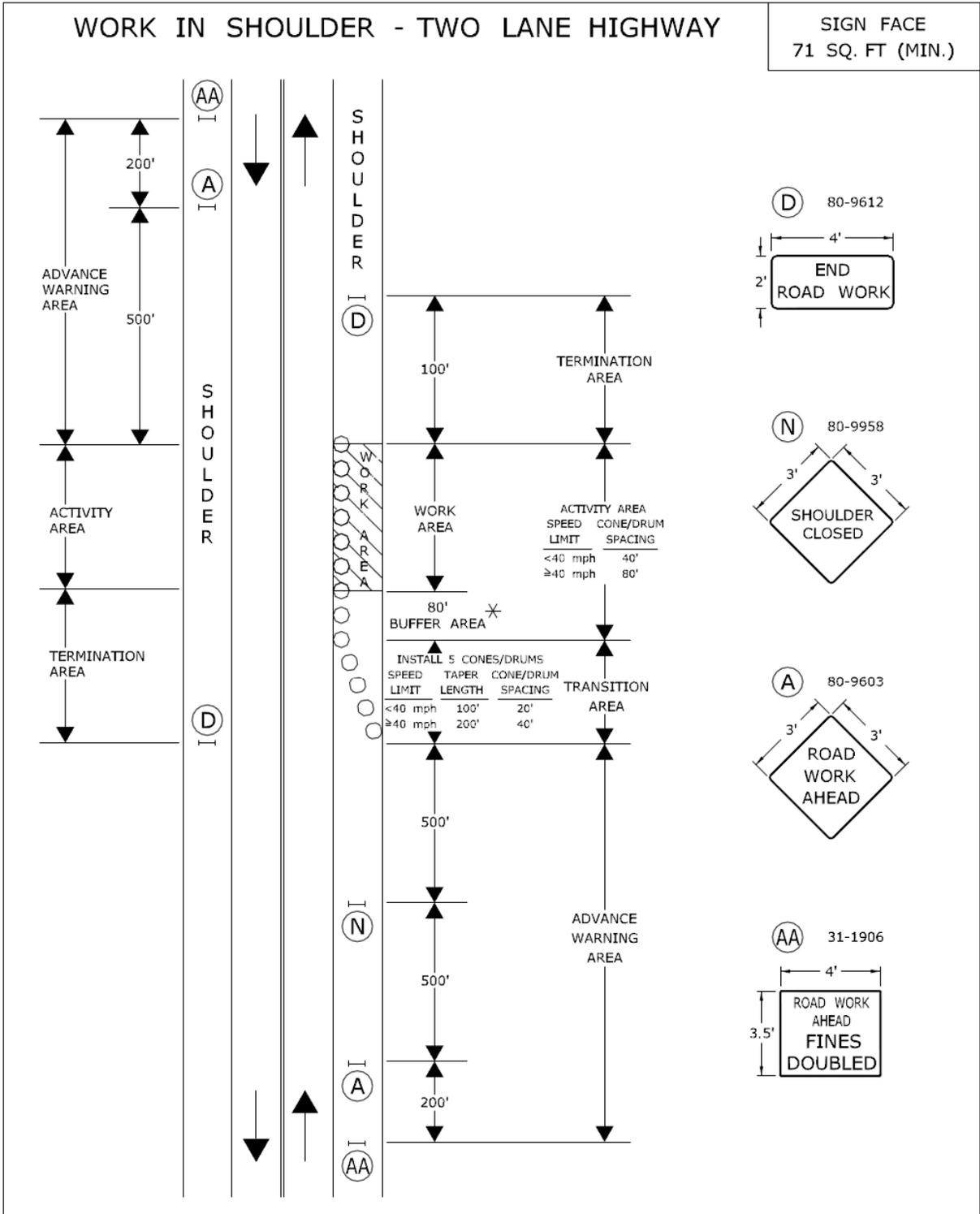


SCALE: NONE

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*  
PRINCIPAL ENGINEER  
Charles S. Harlow  
2012.06.05 15:55:45-04'00'



○ TRAFFIC CONE **OR** TRAFFIC DRUM  
 ✱ OPTIONAL ⊗ TRAFFIC DRUM — PORTABLE SIGN SUPPORT  
 ◀ HIGH MOUNTED INTERNALLY ILLUMINATED FLASHING ARROW



SCALE: NONE

CONSTRUCTION TRAFFIC CONTROL PLAN

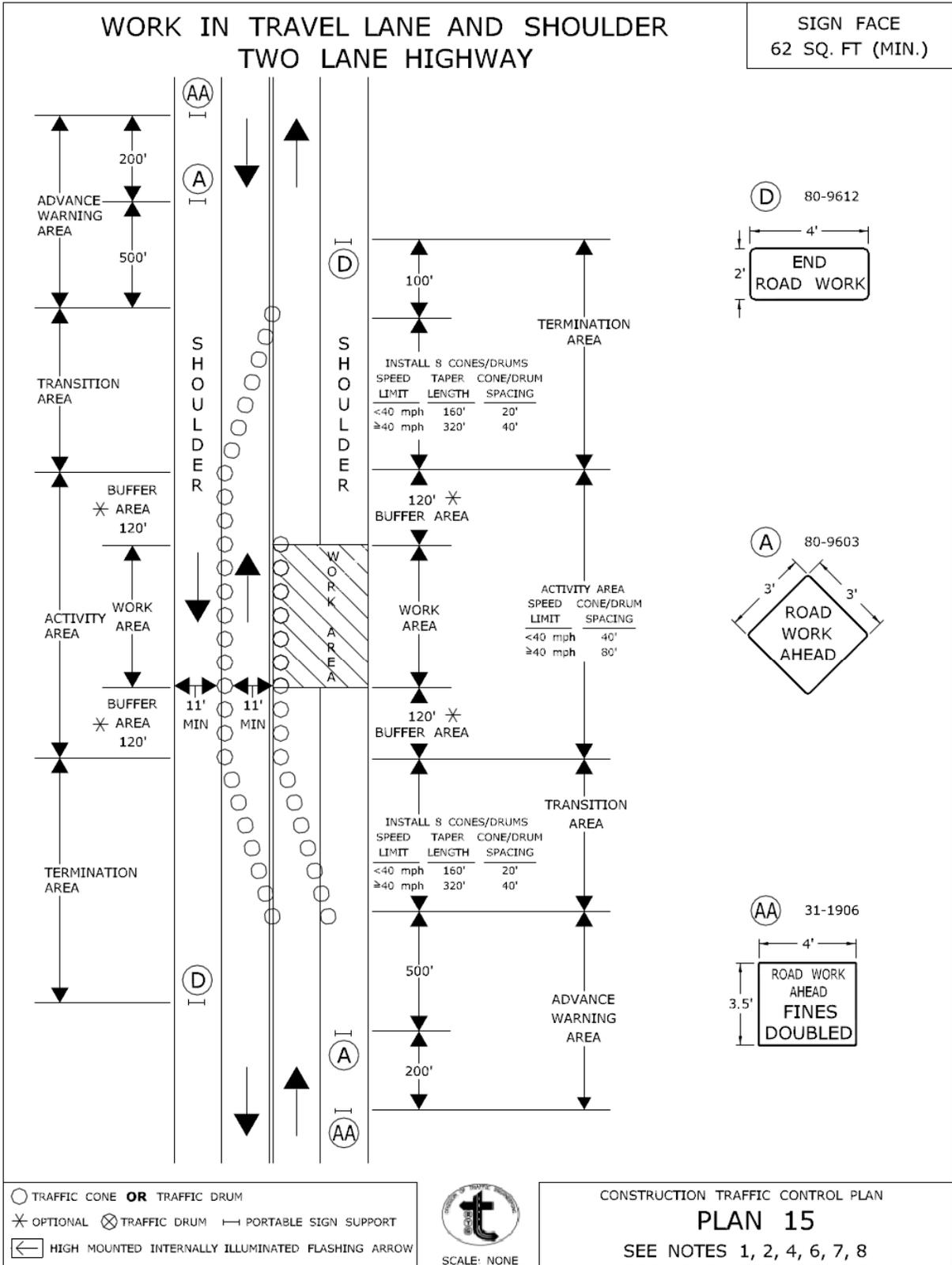
## PLAN 14

SEE NOTES 1, 2, 4, 7, 8

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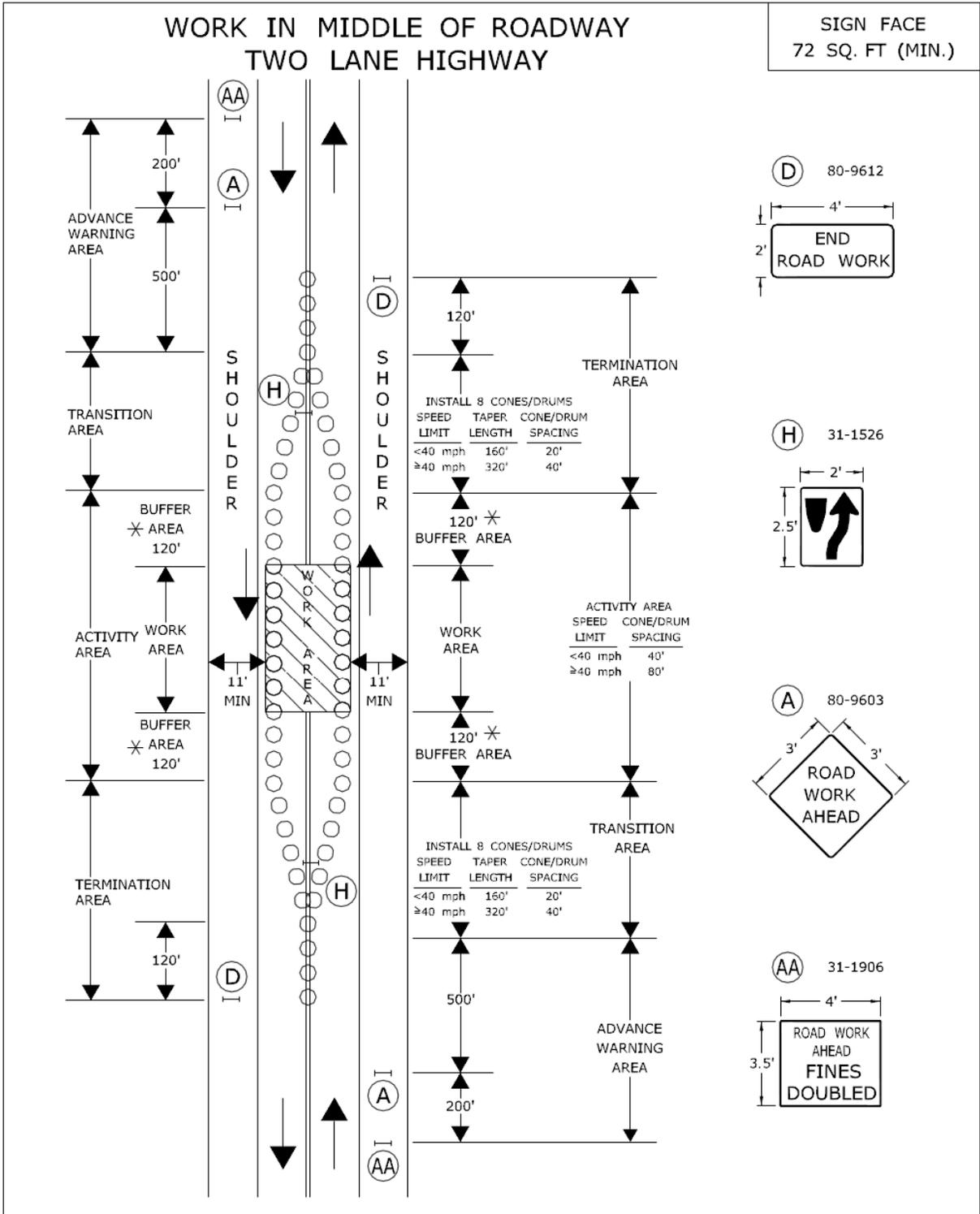
APPROVED

*Charles S. Harlow*  
 Charles S. Harlow  
 2012.08.05 15:56:09-04'00"  
 PRINCIPAL ENGINEER



APPROVED *Charles S. Harlow* Charles S. Harlow  
 2012.06.05 15:56:29-04'00"  
 PRINCIPAL ENGINEER

CONNECTICUT DEPARTMENT OF TRANSPORTATION  
 BUREAU OF ENGINEERING & CONSTRUCTION



- TRAFFIC CONE **OR** TRAFFIC DRUM
- ✱ OPTIONAL ⊗ TRAFFIC DRUM — PORTABLE SIGN SUPPORT
- ◀ HIGH MOUNTED INTERNALLY ILLUMINATED FLASHING ARROW

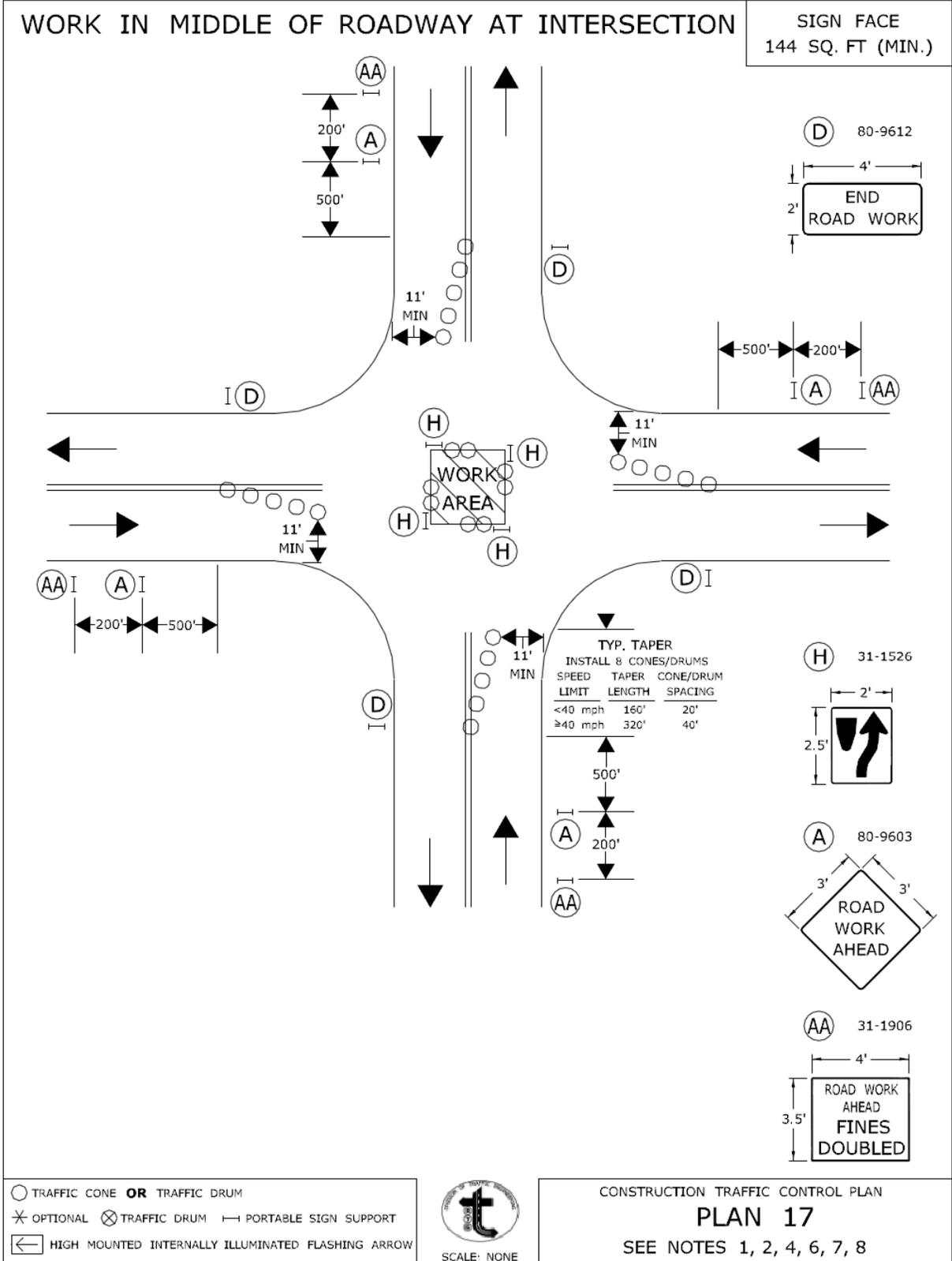


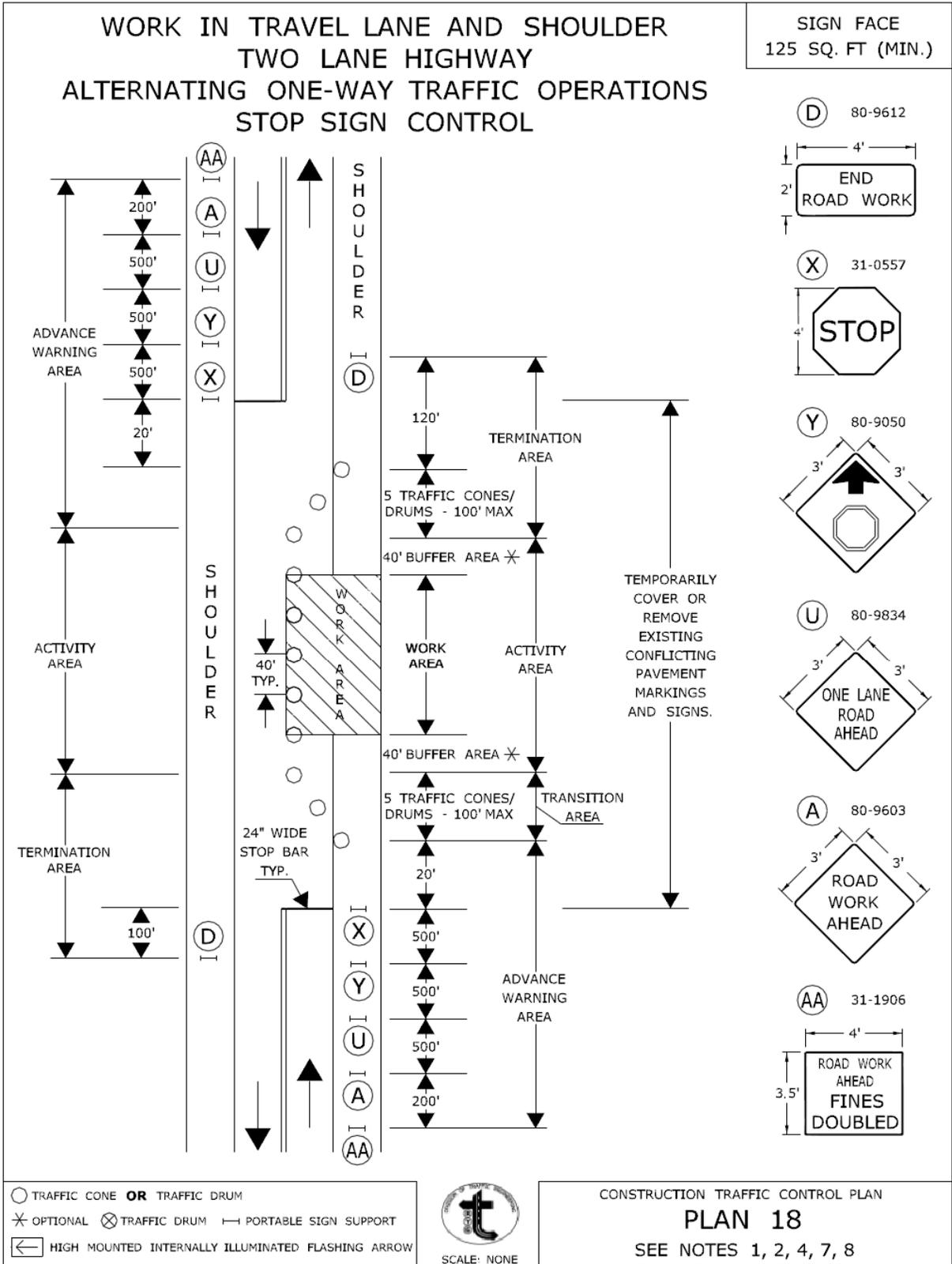
SCALE: NONE

CONSTRUCTION TRAFFIC CONTROL PLAN  
**PLAN 16**  
SEE NOTES 1, 2, 4, 6, 7, 8

CONNECTICUT DEPARTMENT OF TRANSPORTATION  
BUREAU OF ENGINEERING & CONSTRUCTION

APPROVED *Charles S. Harlow*  
PRINCIPAL ENGINEER  
Charles S. Harlow  
2012.08.05 15:56:51-04'00"





**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 4H:1V traversable slope shall be paid for under the item “Maintenance and Protection of Traffic.”

**ITEM #0974001A - REMOVAL OF EXISTING MASONRY**

Work under this item shall conform to the requirements of Section 9.74 amended as follows:

**Article 9.74.02 – Construction Methods:** Add the following:

The concrete shall be saw cut to delineate the removal limits. Pneumatic hammers or any other method approved by the Engineer may be used to remove the concrete. Maximum 30 pound hammers shall be used for general removal while maximum 15 pound hammers shall be used near reinforcing steel that is to remain. Pneumatic tools shall not be placed in direct contact with the reinforcing steel that is to remain. Removal of concrete by blasting will not be permitted.

The Contractor shall take necessary precautions to prevent any damage to the portions of the structure to remain. Any damage shall be repaired by the Contractor, as directed by the Engineer, and at no cost to the State.

When removing the concrete and reinforcing steel, the Contractor shall take necessary precautions to prevent debris from dropping to areas below the structure into the River.

All debris shall be disposed of, from the site, by the Contractor.

**Article 9.74.05 – Basis of Payment:** Delete in its entirety and replace with the following:

This work will be paid for at the contract unit price per cubic yard for “Removal of Existing Masonry”, which price shall include all equipment, tools and labor incidental thereto.

## **ITEM #0981101A - OPPOSING TRAFFIC LANE DIVIDER**

### **Article 9.81.01 - Description:**

This item shall include furnishing, installing, resetting, and removing Opposing Traffic Lane Dividers. Opposing Traffic Lane Dividers will be used to separate opposing traffic on a two-lane two-way roadway. The legend on the divider shall be two opposing arrows.

The Opposing Traffic Lane Divider shall meet the requirements of Federal Highway Administration's Strategic Highway Research Program (SHRP). The Opposing Traffic Lane Divider shall be 12 inch wide by 18 inch high sign panels mounted back to back on a flexible support post. The post shall be mounted to a base.

A series of these devices shall be placed on the center line of a temporary two-way operation. The support shall be designed to recover automatically to a vertical position if struck by a vehicle.

The opposing Traffic Lane Divider is covered in Section 6F.76 of the Manual on Uniform Traffic Control Devices (2009 Edition).

### **Article 9.81.02 - Materials:**

- 1) Panel - The vertical panel shall be constructed of a flexible material resistant to ultraviolet light, ozone and hydrocarbons. The surface shall be smooth and suitable for adherence of appropriate reflective sheeting. The reflective sheeting shall be Type III or Type VI reflective sheeting in accordance with Section M.18.09.01.
- 2) Support Post - The support post shall be made of a material resistant to ultraviolet light, ozone, and hydrocarbons. The post shall have sufficient stiffness to remain rigid in windy conditions. The support shall be designed to recover automatically to a vertical position or manually restored (when fastened to the roadbed), if struck by a vehicle.
- 3) Base - The base shall consist of a metal ballast plate fastened to a rubber base. For long-term use, the metal ballast plate can be fastened directly to the roadbed. When fastened to the roadbed, the post will need to be manually reset when hit. The base shall meet the requirements of the Federal Highway Administration's Strategic Highway Research Program (SHRP).

### **Article 9.81.03 - Construction Methods:**

The Opposing Traffic Lane Dividers shall be spaced every 30 feet apart or as directed by the Engineer. The Contractor shall insure that the devices are kept clean and bright. Any devices that are missing, damaged, or defaced so that they are not effective, as determined by the Engineer and in accordance with the American Traffic Safety Services Association (ATSSA) guidelines contained in "Quality Standards for Work Zone Traffic Control Devices", shall be replaced by the Contractor at no cost to the State. When no longer required, they shall remain the property of the Contractor.

**Article 9.81.04 - Method of Measurement:**

This work will be measured for payment by the number of opposing traffic lane dividers furnished, installed and accepted on the project. Replacement devices shall not be measured for payment. Devices relocated to a different location in accordance with the Engineer shall not be measured.

**Article 9.81.05 - Basis of Payment:**

This work will be paid for at the contract unit price each for "Opposing Traffic Lane Divider" which price shall include all materials, equipment, tools, labor and work incidental to furnishing, installing, maintaining and removing the units.

## **ITEM #0992090A - BENCH**

**Description:** This item of work shall conform to the relevant provisions of the Standard Specifications for Roads, Bridges and Incidental Construction and the following; it shall consist of supplying and installing materials for Benches. Bench locations shall be as shown on the plans, in accordance with these specifications, and/or as required by the Engineer.

Comply with applicable requirements of the following standards. Where these standards conflict with other specified requirements, the most restrictive requirements shall govern.

All metal shall conform to the provisions of Division III M.06.02 Structural Steel and Other Structural Materials

ASTM – American Society for Testing and Materials;  
AWS – American Welding Society;  
SSPC – Steel Structures Painting Council

**Materials:** Contractor shall submit shop drawings and manufacturers' product data and shop drawings shall include plans, sections and details as required to show all materials and reinforcing, layout, dimensions, jointing, method of connection and assembly, fabrication and tolerances for types of materials, types and details of connections and openings, cuts, holes, bolts, plates, concrete footings, reinforcing and finishing, anchors and fasteners, attachment details, and painting and finishing.

Submit manufacturer's certification that each unit piece of Site Furniture has been constructed/installed to conform to design, materials, and construction equivalent to requirements for labeled construction.

Units shall be free of cracks, chips, scratches and any other defect at the time of delivery. All units shall be placed in a storage area, protected from damage prior to and during transit to the Owner's or Contractor's site.

Cutting, painting (other than touch-up), and welding in the field will not be permitted.

Contractor shall provide to the Department the written maintenance and operational instructions, all warranties, and guarantees provided by the Manufacturers for the specific improvements and finishes, for a minimum of one year after Final Acceptance. If Manufacturer does not provide warranty for materials installed, Contractor shall assume all cost for replacement of specified material, if product fails during warranty period.

Contractor shall provide a guarantee of minimum of one year after acceptance of Workmanship and against defect as determined by the Department, and shall completely replace or repair site improvements at their own expense within two months after item is identified in the field.

Acceptable Bench shall be one of the following or approved equal.

Steel Bench 93 series-8'  
Dumor Site Furnishings  
P.O. Box 142  
Mifflintown, PA 17059  
800-598-4018

Steel Sites RB-28, 8ft.  
Victor Stanley  
P.O. Drawer 330  
Dunkirk, MD 20754  
800 368-2573

Bench shall meet the visual illustration shown on the Drawings and shall be manufactured of solid milled steel bars, bands, plates, and pipes to the dimensions and quantities shown on the Drawings. Bars shall be 5/16 inch minimum thickness. Side supports shall be of one-piece construction.

All welds shall be continuous and ground smooth and watertight, without compromising the structural integrity of the weld.

Anchoring for Bench shall be as shown on the Drawings with stainless steel anchor bolts to dimensions and requirements of the manufacturer. Zinc plated bolts will not be accepted.

All bolts shall receive an ornamental cover to hide bolt form view.

Provide all materials from new stock, free from defects impairing strength, durability and appearance, and of best commercial quality for the purpose specified.

Supply all equipment hardware and required accessories required for complete, operating and installed site improvement item specified herein.

Provide all exposed fasteners of the same material, color and painted finish as the fastened material unless otherwise indicated in the Drawings and specified herein. Exposed fasteners shall be vandal-proof (spanner-head type), unless otherwise noted in the Drawings or specified herein. Some items will require removal for regular maintenance or for other uses. Provide fasteners and sleeves that allow for removal without damaging the fasteners or the item.

All hardware shall be fabricated from steel conforming to ASTM A36 and shall be galvanized by the hot-dip process in conformity with ASTM A153-73 for Zinc Coating (Hot-Dip) on Iron and Steel Hardware, unless otherwise specified as stainless steel conforming to ASTM Type 316 and 317 stainless steel bolts, anchors, clips, and fasteners shown on the Drawings and indicated herein.

Unit shall be either coated with hot dip galvanizing before painting or finish shall be an epoxy prime coat and polyester powdercoat, semi-gloss finish, with a minimum of three topcoats or an electrostatically applied powder coat. Thickness of finish coat shall be 8-10 mils. Color shall be black.

**Construction Methods:** Deliver units to the site in manufacturer's original, unopened containers and packaging. Upon delivery examine packages immediately to ensure all products are complete and undamaged. Remove and replace damaged items.

Store units in covered, dry locations, protected from weather, stored off the ground, and secured on-site. Avoid use of protective materials that trap heat and moisture

Protect all stored and installed Benches from damage, use, theft or vandalism until acceptance. Contractor shall adjust, repair, or replace damaged, missing, or unacceptable items at their own expense. Site items shall be clean, and finishes as specified as condition of acceptance. Clean with non-abrasive means. Protect product's finish from damage during handling and installation. Any scratches shall be touched up with manufacturer supplied paint.

Install Bench in accordance with manufacturer's instructions. Refer to the specific site elements and the Drawings for horizontal and vertical alignment. Anchor Bench securely and according to manufacturer's instructions and the Drawings, to concrete paving or concrete footing below pavers with stainless steel anchor bolts and fasteners with lock-tight washers.

Any items damaged by excavation, which are to remain or are newly installed shall be replaced or repaired to existing conditions by the Contractor at no cost to the Department.

Contractor shall finish all concrete surfaces which will remain at finished grade by toweling all surfaces smoothly to drain away from installed item, tooling all edges neatly with rolled edges and corners and protecting surfaces from the sun, wind and vandalism until cured. Wrap and protect all imbedded anchor bolts.

The contractor shall provide adequate surveillance for all poured-in-place concrete pavements until concrete has set firmly, to prevent unwarranted markings of the concrete surface. Unauthorized marking or graffiti in the finished surfaces shall be cause for rejection, and replacement by the contractor at no additional cost.

Gravel borrow base shall be furnished and placed under requirements of Section 0304001 Processed Aggregate Base of the Standard Specifications, and the sections and elevations shown on the Drawings.

Where benches are installed over Brick Sidewalk anchor bolts shall extend to concrete pad below pavers.

Bench shall be securely installed to a 1/8 inch tolerance overall and shall be installed per manufacturer's directions, plumb and level, unless otherwise shown in the Drawings. Items that fall outside of this tolerance shall be required to be reset to meet tolerance, as a condition of acceptance. Bolts and fasteners shall be trimmed to safe length, as applicable and with review by the Engineer.

**Method of Measurement:** Item (0992090A) Bench will be measured for payment per each as called out on the plans complete in place or as directed by the Engineer.

**Basis Of Payment:** Item (0992090A) Bench will be paid at the Contract Unit Price per each, of the type and size specified which price shall include all labor, material, equipment, tools and labor incidental thereto, and incidental costs required to complete the work. No additional payment will be made for material or equipment necessary for the satisfactory completion of the work.

Pay Item  
Bench

Pay Unit  
Each

## **ITEM #0992103A - TRASH CAN**

**Description:** This item of work shall conform to the relevant provisions of Standard Specifications for Roads, Bridges and Incidental Construction and the following; it shall consist of supplying and installing materials for Trash Cans. Trash Can locations shall be as shown on the plans, in accordance with these specifications, and/or as required by the Engineer.

Comply with applicable requirements of the following standards. Where these standards conflict with other specified requirements, the most restrictive requirements shall govern.

All metal shall conform to the provisions of Division III M.06.02 Structural Steel and Other Structural Materials

ASTM – American Society for Testing and Materials;  
AWS – American Welding Society;  
SSPC – Steel Structures Painting Council

**Materials:** Contractor shall provide Product Data for each type of product indicated. Include construction details, material descriptions, dimensions of individual components and profiles, finishes, field-assembly requirements, and installation details.

Submit manufacturer's certification that each unit has been constructed to conform to design, materials, and construction equivalent to requirements.

Units shall be free of cracks, chips, scratches and any other defect at the time of delivery. All units shall be placed in a storage area, protected from damage prior to and during transit to the Owner's or Contractor's site.

Cutting, painting (other than touch-up), and welding in the field will not be permitted.

Contractor shall provide to the Engineer the written maintenance and operational instructions, all warranties, and guarantees provided by the Manufacturers for the specific improvements and finishes, for a minimum of one year after Final Acceptance. If Manufacturer does not provide warrantee for materials installed, Contractor shall assume all cost for replacement of specified material, if product fails during warrantee period.

Contractor shall provide a guarantee of minimum of one year after acceptance of Workmanship and against defect as determined by the Department, and shall completely replace or repair site improvements at their own expense within two months after item is identified in the field.

Deliver units to the site in manufacturer's original, unopened containers and packaging. Upon delivery examine packages immediately to ensure all products are complete and undamaged. Remove and replace damaged items.

Store units in covered, dry locations, protected from weather, stored off the ground, and secured on-site. Avoid use of protective materials that trap heat and moisture. Protect product's finish from damage during handling and installation. Secure all items from damage for any reason, including vandalism, and theft.

Acceptable Trash Cans shall be one of the following or approved equal.

Receptacle 57-32-BT  
Dumor Site Furnishings  
800-598-4018

Iron Sites 424, 36 gal.  
Victor Stanley  
P.O. Drawer 330  
Dunkirk, MD 20754  
800 368-2573

Provide all materials from new stock, free from defects impairing strength, durability and appearance, and of best commercial quality for the purpose specified.

Supply all equipment hardware and required accessories required for complete, operating and installed site improvement item specified herein.

All hardware shall be fabricated from steel conforming to ASTM A36 and shall be galvanized by the hot-dip process in conformity with ASTM A153-73 for Zinc Coating (Hot-Dip) on Iron and Steel Hardware, unless otherwise specified as stainless steel conforming to ASTM Type 316 and 317 stainless steel bolts, anchors, clips, and fasteners shown on the Drawings and indicated herein.

Provide all exposed fasteners of the same material, color and painted finish as the fastened material unless otherwise indicated in the Drawings and specified herein. Anchoring for unit shall be floor mounted with stainless steel anchor bolts to dimensions and requirements of the manufacturer.

Provide all exposed fasteners vandal-proof (spanner-head type), unless otherwise noted in the Drawings or specified herein. Some items will require removal for regular maintenance or for other uses. Provide fasteners and sleeves that allow for removal without damaging the fasteners or the item.

Trash Can shall meet the visual illustration shown on the Drawings and shall be manufactured of solid milled steel bars, bands, plates, and pipes to the dimensions and quantities shown on the Drawings.

Bars shall be 5/16 inch minimum thickness. Trash Can, shall have a high density plastic liner provided by the manufacturer.

All welds shall be continuous and ground smooth and watertight, without compromising the structural integrity of the weld.

Finish shall be an epoxy prime coat and polyester powdercoat, semi-gloss finish, with a minimum of three topcoats or an electrostatically applied powder coat. Thickness of finish coat shall be 8-10 mils. Color shall be black.

**Construction Methods:** Any items damaged by excavation, which are to remain or are newly installed shall be replaced or repaired to existing conditions by the Contractor at no additional cost.

Concrete footing placement, curing, testing, reinforcing and protection and form work shall be as specified, except as modified in the drawings or as specified below.

Contractor shall finish all concrete surfaces which will remain at finished grade by toweling all surfaces smoothly to drain away from installed item, tooling all edges neatly with rolled edges and corners and protecting surfaces from the sun, wind and vandalism until cured. Wrap and protect all imbedded anchor bolts.

The contractor shall provide adequate surveillance for all poured-in-place concrete pavements until concrete has set firmly, to prevent unwarranted markings of the concrete surface. Unauthorized marking or graffiti in the finished surfaces shall be cause for rejection, and replacement by the contractor at no additional cost.

Gravel borrow base shall be furnished and placed under requirements of Section 0304001 Processed Aggregate Base of the Standard Specifications, and the sections and elevations shown on the Drawings.

Install Site Furniture in accordance with manufacturer's instructions. Refer to the specific site elements and the Drawings for horizontal and vertical alignment. Anchor site furnishings, securely and according to manufacturer's instructions and the Drawings, to concrete pads with stainless steel anchor bolts and fasteners with lock-tight washers.

Where Trash Cans are installed over Brick Sidewalk anchor bolts shall extend to concrete pad below pavers.

Units shall be securely installed to a 1/8 inch tolerance overall and shall be installed per manufacturer's directions, plumb and level, unless otherwise shown in the Drawings. Items that fall outside of this tolerance shall be required to be reset to meet tolerance, as a condition of acceptance. Bolts and fasteners shall be trimmed to safe length, as applicable and with review by the Engineer.

Protect all stored and installed units from damage, use, theft or vandalism until acceptance. Contractor shall adjust, repair, or replace damaged, missing, or unacceptable items at their own

expense. Site items shall be clean, and finishes as specified as condition of acceptance. Clean with non-abrasive means, careful not to damage finishes.

**Method of Measurement:** Item (0992103A) Trash Can will be measured for payment per each which price shall include all labor, material, equipment and incidental costs required to complete the work.

**Basis of Payment:** Item (0992103A ) Trash Can will be paid at the Contract Unit Price per each, of the type and size specified which price shall include all labor, material, equipment, tools and labor incidental thereto, and incidental costs required to complete the work. No additional payment will be made for material or equipment necessary for the satisfactory completion of the work.

Pay Item  
Trash Can

Pay Unit  
Each

**ITEM #1002110A - DECORATIVE LIGHT POLE FOUNDATION**

The work under this item shall conform to the requirements of Section 10.02 amended as follows:

**10.02.01—Description:** The work under this item shall consist of the furnishing and installing of precast concrete foundations and grounding rod for decorative light poles of the type called for at these locations, in accordance with the dimensions and details shown on drawing ILL-06, as part of the detail “Base - Decorative Light Pole / Precast Concrete – Round” and “Installation of Concrete Foundation and Pole”, as shown on the plans, and/or as directed by the Engineer, and in conformity with these specifications.

A detail for a typical concrete base is provided on ILL-06 for bidding purposes. The Contractor shall provide drawings and details of concrete bases for use with proposed poles and luminaires, based on local field conditions, stamped by a Professional Engineer, registered in the State of Connecticut.

**10.02.03—Construction Method:** The work under this item shall conform to Article 10.02 of the Standard Specifications.

**10.02.04—Method of Measurement:** The foundations of the type specified shall be measured for payment by the number of units installed and accepted.

**10.02.05—Basis of Payment:** The work under this item shall be paid for at the Contract unit price each for the “Decorative Light Pole Foundation”, which price shall include all materials, equipment, forms, excavation, disposal of surplus materials, concrete, ground rod sleeve, ground rod and installation, electrical sweeps extending two feet outside of the foundation.

Pay Item	Pay Unit
Decorative Light Pole Foundation	ea.

**ITEM #1003585A - DECORATIVE LIGHT POLE WITH SINGLE LUMINAIRE**

**DESCRIPTION:** This item shall consist of furnishing and installing a decorative light pole and accessories with a single decorative LED luminaire, complete, and installed in accordance with the plans and specifications.

**MATERIALS:** The decorative light pole, luminaire and accessories shall be manufactured by one of the following manufacturers or approved equivalent.

Luminaire:

Holophane/AEL  
Granville Business Park  
Building A, 3825 Columbus Rd  
Granville, Ohio 43023  
Phone: (508) 544-1570

Luminaire model# GPD-40-4K-AS-M-B-3-N-S-B-FCVR-B

King Luminaire  
1153 State Route 46N  
Jefferson, OH 44047  
Phone (800) 268 7809

Luminaire model # K124R-R1-AR-III-40-SSL-1042-120-K24-\_-\_-SST-BK-#1

Amerlux  
Reflex Lighting Group  
7 Tide Street  
Boston MA 02210  
T: 617-269-4510

Luminaire model# D136/ASR26-AC-T3-AVI-4L-BLK

The Luminaire shall meet the following minimum criteria, it shall meet IES “cut-off” requirements. The luminaire shall have a Type 3 asymmetric light distribution as called for on the plans. For LED luminaires other than the ones indicated above, the Contractor shall submit a sample fixture, catalog cut, IES photometrics on disk, and a complete point by point footcandle analysis of the roadways using the submitted luminaire. A catalog cut will be required for all submitted luminaires. The Department reserves the right to disapprove any alternate luminaire based solely on photometric performance, lumen maintenance, and construction.

The housing of the luminaire shall be heavy-duty cast aluminum with a maximum effective projected area (EPA) of less than 1.38 square feet. The LED luminaire shall weigh approximately 64 lbs. and shall be CSA listed for wet locations and shall be IP rated. The diecast aluminum housing shall feature integral hinges for tool-less entry. The housing shall feature black polyester powder coat paint. The fixture shall be designed to mount on a 3” tenon and shall have a stainless steel set screw. The finish color shall be Black.

LED optics shall consist of a cast, Fixture shall have an IP66 rating. The luminaire optics shall provide warm white light at a standard 4000K CCT. The LEDs shall operate at a drive current of 215mA. The luminaire shall provide a minimum initial delivered lumen output of 3,460 lumens or greater, and shall provide an IESNA Type III distribution as called for on the plans. The luminaire shall produce a minimum of 92 lumens per watt. Aluminum heat sinks shall incorporate both conduction and natural convection to transfer heat rapidly away from the LED source.

The LED luminaire shall have a multi-tap ballast (120/208/240/277 volts) and consume 45 watts or less. LED drivers shall hard mount to the die-cast aluminum back casting for optimal heat sinking and operation efficiency. The LED luminaire shall be provided with integral 10kV surge suppression protection. The electrical components shall have a quick disconnect harness. The LED luminaire shall be suitable for temperature up to 40°C (104°F). The luminaire’s LM70 rating shall be greater than 100,000 hours at 25°C.

The LED luminaire shall carry a limited 5 year warranty on the LEDs and the Driver.

Pole:

Holophane  
Granville Business Park  
Building A, 3825 Columbus Rd  
Granville, Ohio 43023  
Phone: (508) 544-1570

North Yorkshire series, model NYA-14-F4C-17-P07-ABG-BK- R162C-S114C,

King Luminaire  
1153 State Route 46N  
Jefferson, OH 44047  
Phone (800) 268 7809

Carolina series model# KM20FF-14-BK-FH-GFCI/WIU-FH-GFCI/WIU-BK

Amerlux  
 Reflex Lighting Group  
 7 Tide Street  
 Boston MA 02210  
 T: 617-269-4510

San Diego series Model # DSD1703-14-BLK-CGFI-FPH-4

The pole shall meet the following minimum criteria, it shall be 6063 aluminum, .125" wall thickness, heat treated to a T6 condition after welding. The anchor base shall be A356 cast aluminum alloy, heat treated to a T6 condition after welding. The base plate shall be 17" round, shall telescope the shaft, and shall be circumferentially welded at the top and bottom. The finish color shall be Black.

The decorative base shall be integral to the pole and shall have a 17" diameter base and shall be 25" tall. The decorative clamshell base shall be equipped with a 3"x5" handhole with cover for wiring access. The finish color shall be Black.

The flag pole holder shall meet the following minimum criteria, it shall be once piece construction and consist of a piece of aluminum tubing welded at 45 Degrees to the mounting plate. The holder for the pole shall be 3/4" with bolt on mounting. The flag pole holder shall be aluminum, ASTM 6061 alloy, heat treated to a T6 temper. All hardware shall be stainless steel. All welding shall be per ANSI/AWS D1.2-90. All welders shall be certified per ANSI/AWS D1.2-90 Section 5. The flag pole holder shall be mounted at 13'-6" measured from the base of the pole. The finish color shall be Black.

The weatherproof receptacle shall meet the following minimum criteria, it shall be rated for in-use wet location. The receptacle shall be 20 amp, 120V, ground fault circuit interrupter duplex receptacle mounted in the post. The receptacle shall be UL listed according to E-48380 and UL 943 Class A and UL 498. The receptacle shall have a cast aluminum UL Listed cover that is suitable for wet locations while not in use. The receptacle and cover shall mount to an outlet opening, in the post shaft, with a gasket and stainless steel screws. The receptacle shall be mounted at 13'-6" measured from the base of the pole. The finish color shall be Black.

Conductors from the pole base to the luminaire shall be #12 AWG in accordance with Article M.15.11 of the Standard Specifications. Insulation shall be THHN/THWN.

Fuse holders shall have a rubber or molded plastic housing which is watertight. Fuse holders shall be rated for 600 volts. Conductor terminals shall be crimp type on the load side and copper set screw (double terminal) on the line side. Fuse holders shall be Bussman model HEB-A-K or approved equal. Fuses shall be UL listed, fast-acting, current limiting and rated at 6 amp, 600 volt, 100,000 AIC. For the neutral conductor, a brass slug shall be inserted in lieu of a fuse.

**CONSTRUCTION METHOD:** The decorative light pole shall be installed on the foundation at the locations as indicated on the plans. The pole shall be securely bolted to the anchor bolts of

the foundation with all required hardware as supplied by the pole manufacturer. The completely assembled light pole shall be erected plumb with the aid of aluminum shims, if necessary. The light standard shall be grounded as indicated on the plans and in conformance with NEC requirements.

The decorative luminaire shall be installed on the tenon mount of the pole and shall be leveled, securely fastened, properly oriented, connected to power supply conductors, cleaned, and ready for operation.

Conductors shall be run from the ballast primary in the luminaire to the distribution circuit in the pole base. Conductors shall be connected to the distribution circuit using approved fuse connectors fused at 6 amps.

**METHOD OF MEASUREMENT:** This work will be measured for payment by the number of decorative light poles with single luminaire installed, complete and accepted.

**BASIS OF PAYMENT:** This work will be paid for at the contract unit price each for "Decorative Light Pole With Single Luminaire" of the type and size specified, complete and accepted in place, which price shall include all materials including pole, luminaire, electronic driver, LED light bars, surge suppression, intergral clamshell base, flag pole holder, weatherproof receptacle, conductors, fuses, connections, grounding, and all labor, tools, equipment and work incidental thereto.

Pay Item	Pay Unit
Decorative Light Pole with Single Luminaire	Ea.

## **ITEM #1003596A - DECORATIVE POLE**

**Description:** Work under this item shall conform to the relevant provisions of Section 10.03 Light Standards of the Standard Specifications and the following:

This item of work shall consist of fabricating, supplying and installing Decorative Poles.

Decorative Pole locations shall be as shown on the plans, in accordance with these specifications, and/or as required by the Engineer.

**Materials:** Provide Wind Load Calculations. The General Contractor shall coordinate with light manufacturer and precast foundation manufacturer to provide calculations, stamped by a structural engineer, that verify that the fixtures (including luminaire, banners, brackets, pole and footing) meet or exceed accepted wind loads required by the state building code or AASHTO standards, whichever is more stringent.

Verify all dimensions in the field before shop drawings are submitted.

Shop drawings shall include plans, sections and details as required to show all materials and reinforcing, layout, dimensions, jointing, method of connection and assembly, fabrication and tolerances for types of materials, types and details of connections and openings, cuts, holes, bolts, plates, concrete footings, reinforcing and finishing, anchors and fasteners, attachment details, painting and finishing.

Certificate of Compliance: Submit manufacturer's certification that each unit piece of Site Furniture has been constructed/installed to conform to design, materials, and construction equivalent to requirements for labeled construction.

Decorative Poles shall match the style, profile and finish of Decorative Light Pole model Holophane North Yorkshire series, Model NYA-14-FAC-17-P07-ABG-BK-R162C-S162A-S114C or approved equivalent.

Finish for pole, pole base, banner arm and mounting bracket shall be industrial grade polyester powder coat sufficient to withstand salt spray, or equivalent. Dry Film Thickness shall be 3.0 mils (0.003") minimum. The coating shall be electrostatically applied.

Color shall be black.

Banner arms shall be as shown on the drawings. Banner arm set shall be heat tempered cast aluminum bracket with stainless steel banding. Breakaway banner arms shall be sufficient to withstand wind loads of up to 80mph, with banner as shown. Banner arm bracket and band shall match color and finish of pole.

Banners shall be provided by the city and installed by the Contractor.

Refer to Section item 1002100A Decorative Light Pole Foundation for submittal requirements for footings.

**Method of Measurement:** Measurement for Item 1003596A Decorative Pole, will be measured for payment per each, complete in place.

**Basis of Payment:** Payment for Item 1003596A Decorative Pole, will be paid at the Contract Unit Price per each, of the type and size specified, which price shall include all labor, material, equipment, tools and labor incidental thereto, and incidental costs required to complete the work. No additional payment will be made for material or equipment necessary for the satisfactory completion of the work.

Pay Item  
Decorative Pole

Pay Unit  
Each

**ITEM #1010039A - PRECAST POLYMER CONCRETE HANDHOLE TYPE II  
(17" x 30")**

**ITEM #1010040A - PRECAST POLYMER CONCRETE HANDHOLE TYPE II  
(11" x 18")**

**DESCRIPTION:** This item shall consist of furnishing and installing Polymer Concrete Handhole of the type called for at the location and to the dimensions and details shown on the plans, or as ordered by the Engineer and in conformity with these specifications.

The Precast Polymer Concrete Handhole Type II refers to 11" (w) X 18" (d) X 30" (h) and Precast Polymer Concrete Handhole Type II refers to 17" (w) X 30" (d) X 30" (h) handholes.

**REQUIRED SUBMITTALS:**

Shop Drawings:

Submit 5 copies of shop drawings for handholes and covers in accordance with the contract general requirements.

Material Certificate of Compliance:

Submit 5 copies of material certificate of compliance for hand holes and covers in accordance with the contract general requirements.

**MATERIALS:** The materials for this work shall conform to the following specifications.

Precast Polymer Concrete Hand hole: These handholes shall be as manufactured by "Quazite" or City approved equal. Enclosures, covers and extensions shall be of monolithic material construction; components of dissimilar materials shall not be used. All products shall conform to all test provisions of ANSI/SCTE 77 "Specification for Underground Enclosures Integrity" for Tier 15 (heavy duty) applications (Design/Test Load = 15,000/22,500 lbs). The following requirements shall apply:

All components in an assembly (box & cover) shall be manufactured using matched surface tooling. All covers are required to have a minimum coefficient of friction of 0.50 in accordance with ASTM C 1028. Enclosures are to be UL listed.

Covers (Design Test Load = 15,000/22,500 lbs) shall be secured with two stainless steel bolts. Bolts shall be self retaining and shall withstand a minimum of 70 ft. lbs. torque and have a minimum 750 lbs. pull out strength. Nuts shall be floating and shall provide a minimum of 1/2" movement from the center of the nut.

The LOGO on the Polymer Concrete Handhole shall indicate “Lighting” for illumination projects unless shown otherwise on the Plans, and shall be indicated as such in the submitted shop drawing.

**CONSTRUCTION METHODS:** Precast Polymer Concrete Handhole: Excavation shall be 42 inches deeper than finished grade level. Crushed rock or gravel shall be installed in the excavation to a depth of 12 inches. With the box set in place and cover installed, soil is to be back filled and compacted around the box. At final installation the box and cover shall be flush with finished grade. When the hand hole is placed in the sidewalk the back fill shall be replaced with the trap-rock as fill material.

The areas disturbed by the excavation for the hand holes shall be neatly graded to conform to the adjacent surface and contours. Where topsoil has been removed, it shall be replaced to its original depth (except that in no case shall this depth be less than four inches) and the area shall be fertilized, seeded and mulched.

Where hand holes are shown in sidewalk or paved areas, the concrete hand hole shall be set flush and the surrounding area shall be replaced with the same type of material as removed.

All conduits entering the hand hole shall be bonded together by means of a jumper running from ground bushings on the conduit ends. All open conduit entrances in the walls of precast hand hole shall be grouted to prevent the surrounding sand or dirt entering into the hand hole.

When handhole is placed in sidewalk areas, the sidewalk shall be sawcut at the nearest joint and the complete slab(s) of sidewalk shall be removed and replaced. When hand hole is placed in brick sidewalk areas, the sidewalk shall be restored matching the existing Pattern.

**METHOD OF MEASUREMENT:** This work will be measured for payment by the number of handholes of the type specified, complete and accepted in-place.

**BASIS OF PAYMENT:** This work will be paid for at the contract price each for “PRECAST POLYMER CONCRETE HANDHOLE (SIZE)” of the type called for, complete in-place, which price shall include a precast polymer concrete handhole, cover, crushed stone, excavating, backfilling and replacement of all surrounding areas including sidewalk, pavement, grading and placing topsoil, seeding, fertilizing, mulching and equipment, tools, labor and work incidental thereto. The contract unit price shall also include locating and intercepting existing conduit at those locations shown on the plans, and cutting exiting conduit and installing copper bonding jumpers in accordance with the details.

<u>PAY ITEM</u>	<u>DESCRIPTION</u>	<u>PAY UNIT</u>
1010039A	Precast Polymer Concrete Handhole Type II (17” x 30”)	EA
1010040A	Precast Polymer Concrete Handhole Type II (11” x 18”)	EA

**ITEM #1118012A - REMOVAL AND/OR RELOCATION OF TRAFFIC SIGNAL EQUIPMENT**

The work under this item shall conform to the requirements of Section 11.18 amended as follows:

**11.18.01—Description:** The work under this item shall include the removal and/or relocation of the traffic signal control equipment at Main Street at approximately Sta. 18 + 54 and Sta. 18 + 69 whereby the Contractor shall remove and dispose of the attached flashing arrow signs as called for at this location, as directed by the Engineer, and in conformity with these specifications.

**11.18.02—Materials:** None required.

**11.018.03—Construction Method:** The contractor shall notify the Utility Company two weeks in advance that the service will no longer be required and that they should disconnect and remove it from the pole. The existing flashers, signs, mounting equipment, foundations, conduit, and wiring shall be removed and discarded and the excavations backfilled and patches with the appropriate materials to match the adjacent surface.

**11.18.04—Method of Measurement:** The Removal and/or Relocation of Traffic Signal Control Equipment shall be paid for at the Contract Lump Sum price for the completion of the work specified.

**11.18.05—Basis of Payment:** The work under this item shall be paid for at the Contract lump sum price each for the “Removal and /or Relocation of Traffic Signal Equipment”, which price shall include the removal and disposal of the traffic signal equipment, the chevron sign panels and supports, the under- and above-ground conduit, and the disconnect and removal of the power connection to the electrical power source by the electrical utility company, and any utility fees.

Pay Item	Pay Unit
Modification of Traffic Control Foundation	l.s.

## **ITEM #1206023A - REMOVAL AND RELOCATION OF EXISTING SIGNS**

Section 12.06 is supplemented as follows:

**Article 12.06.01 – Description is supplemented as follows:** Work under this item shall consist of the removal and/or relocation of designated extruded aluminum and sheet aluminum side-mounted signs, sign posts, sign supports, and foundations where indicated on the plans or as directed by the Engineer.

**Article 12.06.03 – Construction Methods is supplemented as follows:** The Contractor shall take care during the removal 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.

Sheet aluminum signs designated for removal are to be salvaged if they are in suitable condition as determined by the Engineer. The Contractor shall sort all salvaged sheet aluminum signs by size and shall stack ten signs to a bundle. Each bundle shall be bound by tape or metal strap and the bundles shall be stacked on pallets. The Contractor shall confirm intended delivery of the salvaged sheet aluminum signs at least seven days in advance and shall deliver the signs to the following address:

D.O.T. Sign Shop  
1107 Cromwell Avenue  
Rocky Hill, CT 06067  
Attention: Jeffrey Adams (Phone # 860-258-4675)

Extruded aluminum signs, sheet aluminum signs not suitable for salvage, sign posts, sign supports, and foundations 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 signing.

**Article 12.06.04 – Method of Measurement is replaced 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 side-mounted signs, sign posts, and sign supports designated for relocation, all sheet aluminum side-mounted signs designated for salvage, all extruded aluminum and sheet aluminum signs, sign posts, sign supports, and foundations designated for removal and disposal, and all work and equipment required.

**Article 12.06.05 – Basis of Payment is replaced 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 side-mounted signs, sign posts, and sign supports, removing and disposing of designated extruded aluminum and sheet aluminum side-mounted signs, sign posts, sign supports, and foundations, and all equipment, material, tools and labor incidental thereto. This price shall also include the loading, transporting, and unloading of sheet aluminum side-mounted signs designated for salvage and all equipment, material, tools and labor incidental thereto.

Pay Item  
Removal and Relocation of Existing Signs

Pay Unit  
L.S.

**ITEM #1210101A - 4" (100 mm) WHITE EPOXY RESIN PAVEMENT MARKINGS**

**ITEM #1210102A - 4" (100 mm) YELLOW EPOXY RESIN PAVEMENT MARKINGS**

**ITEM #1210105A - EPOXY RESIN PAVEMENT MARKINGS, SYMBOLS AND LEGENDS**

**SECTION 12.10 – EPOXY RESIN PAVEMENT MARKINGS, SYMBOLS AND LEGENDS is amended as follows:**

*Delete "SYMBOLS AND LEGENDS" from the title of the section.*

**SECTION 12.10.03 – Construction Methods is amended as follows:**

*Delete the entire sections titled "3. Performance and Warranty:" and "WARRANTY:" and replace them with the following:*

**3. Initial Performance:** The retroreflectivity of the markings applied must be measured by the Contractor three (3) to fourteen (14) days after installation. A Certified Test Report (CTR), in accordance with Section 1.06.07, must be submitted to the Engineer no later than ten (10) days after the measurements are taken using the procedures and equipment detailed below:

Test Lots - The following test lots shall be randomly selected by the Engineer to represent the line markings applied:

Table 3.1: Line Test Lots

Length of line	Number of Lots	Length of Test Lot
< 1.0 mi. (1.5 km)	1	1000 ft. (300 m)
≥1.0 mi. (1.5 km)	1 per 1.0 mi. (1.5 km)	1000 ft. (300 m)

**Measurement Equipment and Procedure**

Portable Retroreflectometer

1. Skip line measurements shall be obtained for every other stripe, taking no more than two readings per stripe with readings no closer than 20 in. (0.5 m) from either end of the marking.

2. Solid line test lots shall be divided into ten sub-lots of 100 ft. (30 m) length and measurements obtained at one randomly select location within each subplot.
3. For symbols and legends, 10 percent of each type shall be measured by obtaining five (5) measurements at random locations on the symbol or legend.
4. The Apparatus and Measurements shall be made in accordance with ASTM E1710 (Standard Test Method for Measurement of Retroreflective Pavement Marking Materials with CEN-Prescribed Geometry Using a Portable Retroreflectometer) and evaluated in accordance with ASTM D7585/D7585M (Standard Practice for Evaluating Retroreflective Pavement Markings Using Portable Hand-Operated Instruments).

#### Mobile Retroreflectometer

1. Calibration of the instruments shall be in accordance with the manufacturer's instructions.
2. Retroreflectivity shall be measured in a manner proposed by the Contractor and approved by the Engineer. The basis of approval of the test method will be conformance to a recognized standard test method or provisional standard test method.

The measurements shall be obtained when the pavement surface is clean and dry and shall be reported in millicandellas per square foot per foot candle - mcd/ft<sup>2</sup>/fc (millicandelas per square meter per lux (mcd/m<sup>2</sup>/lux)). Measurements shall be obtained sequentially in the direction of traffic flow.

#### **Additional Contents of Certified Test Report**

The CTR shall also list:

- Project and Route number
- Geographical location of the test site(s), including distance from the nearest reference point.
- Manufacturer and model of retroreflectometer used.
- Most recent calibration date for equipment used.
- Grand Average and standard deviation of the retroreflectivity readings for each line, symbol or legend.

#### **Initial Performance:**

In order to be accepted, all epoxy resin pavement markings must meet the following minimum retroreflectivity reading requirement:

**White Epoxy:** minimum retroreflectivity reading of 400 mcd/ft<sup>2</sup>/fc (mcd/m<sup>2</sup>/lux)

**Yellow Epoxy:** minimum retroreflectivity reading of 325 mcd/ft<sup>2</sup>/fc (mcd/m<sup>2</sup>/lux)

At the discretion of the Engineer, the Contractor shall replace, at its expense, such amount of lines, symbols and legends that the grand average reading falls below the minimum value for retro-reflectivity. The Engineer will determine the areas and lines to be replaced. The cost of replacement shall include all materials, equipment, labor and work incidental thereto.

**ITEM #1302047A - RESET GATE BOXES**

The work under this item shall conform to the requirements of Section 5.07, amended as follows:

**5.07.01—Description:** The work under this item shall consist of the removing and resetting of gate valve boxes, as shown on the plans, and/or as directed by the Engineer, and in conformity with these specifications.

**5.07.03—Construction Methods:** The work under this item shall conform to Article 5.07 of the Standard Specifications.

**5.07.04—Method of Measurement:** The number of gate boxes specified shall be measured for payment by the number of units removed and reset.

**5.07.05—Basis of Payment:** The work under this item shall be paid for at the Contract unit price Each for the “Reset Gate Boxes”, which price shall include excavation, pervious materials, backfill, cutting of pavement, removal and replacement of roadway pavement structure, and all materials, tools, labor incidental thereto, equipment, and disposal of surplus materials.

Pay Item	Pay Unit
Reset Gate Boxes	ea.

**ITEM #1302050A - RESET CURB BOX**

The work under this item shall conform to the requirements of Section 5.07, amended as follows:

**5.07.01—Description:** The work under this item shall consist of the removing and resetting of curb boxes or service boxes, as shown on the plans, and/or as directed by the Engineer, and in conformity with these specifications.

**5.07.03—Construction Methods:** The work under this item shall conform to Article 5.07 of the Standard Specifications.

**5.07.04—Method of Measurement:** The number of curb boxes specified shall be measured for payment by the number of units removed and reset.

**5.07.05—Basis of Payment:** The work under this item shall be paid for at the Contract unit price Each for the “Reset Curb Box”, which price shall include excavation, pervious materials, backfill, cutting of pavement, removal and replacement of sidewalk pavement structure, and all materials, tools, labor incidental thereto, equipment, and disposal of surplus materials.

Pay Item  
Reset Curb Box

Pay Unit  
ea.

**ITEM #1400003A - TRENCH EXCAVATION 0'-10' DEEP (SANITARY SEWER)**

**ITEM #1400004A - ROCK IN TRENCH EXCAVATION 0'-10' DEEP (SANITARY SEWER)**

**ITEM #1400005 A - TRENCH EXCAVATION 0' - 15' DEEP (SANITARY SEWER)**

**ITEM #1400006 A - ROCK IN TRENCH EXCAVATION 0' - 15' DEEP (SANITARY SEWER)**

**ITEM #1400102A - 8" POLYVINYL CHLORIDE PIPE (SANITARY SEWER)**

**ITEM #1400103A - 10" POLYVINYL CHLORIDE PIPE (SANITARY SEWER)**

**ITEM #1400107A - 15" POLYVINYL CHLORIDE PIPE (SANITARY SEWER)**

**14.00.01 - Description:** Work under these items for sanitary sewer excavation and sanitary sewer pipe construction shall conform to the requirements of Section 2.05 and 6.51 respectively as supplemented and amended as follows:

The work will include all pipe, labor, equipment, appliances and materials required for the construction of sanitary sewer service at the locations and to the lines and grades indicated and/or as directed, including all pipe, pipe fittings and accessories, connections to other piping and structures, testing of pipelines and material tests, jointing and jointing materials, installation, bedding materials, services of manufacturer's representatives and all other related and appurtenant work, complete in place and accepted, in accordance with the drawings and specifications, and as directed by the Owner.

**14.00.03 – Construction Methods:** Sewer flows shall be maintained throughout the work. Earthwork shall conform to Section 2.05. Arrange for installing green warning tapes directly over piping and at outside edges of underground structures.

**Submittals:** Submit the following:

Material Certificates and Product Data for pipe, fittings and miscellaneous connection appurtenances.

Two (2) copies of the CCTV sewer inspection DVD in color on high quality format for playback on a standard DVD player.

The Contractor shall furnish to the Owner notarized test reports from the pipe and gasket manufacturers including methods of tests by an approved independent testing laboratory to show compliance of all materials furnished under this section of the specifications with

all specification requirements. A copy of each test report is to be attached to the shipping list of each shipment itemizing by size; class and wall type, serial number and date of manufacture. All required testing of pipe materials furnished under this section of the specifications shall be provided by the Contractor at no additional expense to the Owner.

Field quality-control test reports: The Contractor shall furnish to the Owner all field quality-control test reports and a certified statement indicating all on-site testing procedures have been completed and met the specification requirements.

**Project Conditions:** Maintain flow of wastewater throughout duration of the Work.

**14.00.02 – Materials:** Polyvinyl Chloride (PVC) Sewer Pipe and Fittings shall conform to the following:

NPS 15 and Smaller: ASTM D 3034, SDR 35; bell-and-spigot gasketed joints.

Integral Bell Joint: ASTM D 3212,

Gaskets: ASTM F477 elastomeric seals; resistant to common sewage and industrial wastes.

Fittings: PVC Materials shall conform to PVC material shall have a cell classification of 12454-B or C as defined in ASTM D-1784. Fitting shall conform to the requirements of

ASTM D3034, ASTM D1784, Joint design shall conform to ASTM D3212.

Fittings in sizes through 8" shall be molded in one piece with all the elastomeric joints.

Bedding Material: Bedding material shall consist of ¾" clean crushed stone that is free from fines.

Filter Fabric: Form 816, Section M.08.01-26.

**Installation, General:** Install piping beginning at low point, true to grades and alignment indicated with unbroken continuity of invert. Place bell ends of piping facing upstream. Install gaskets, seals, sleeves, and couplings according to manufacturer's written instructions for using lubricants, cements, and other installation requirements. Install and support pipes and fittings with bedding material. Do not use saddles, blocking or stones as pipe supports. In structures, cut pipe flush with face of inside wall. Fill joint with annular space filler. When work is not in progress, close open ends of pipe to prevent entry of groundwater, earth, or foreign materials.

Sewer Pipe Stub Connections: Extend connection a minimum of 48 inches beyond sewer manhole unless directed otherwise by the Engineer. Install bell end with cap or plug at end of pipe stubs. Use plugs of same material as pipe. Arrange for inspection by Engineer prior to backfilling.

No cutting of the final pavement course will be allowed. All sewer construction is to be constructed and tested prior to final paving.

**Pipe Joint Construction and Installation:** PVC Sewer Pipe and Fittings: Join pipe and fittings with gaskets according to ASTM D 2321 and manufacturer's written instructions. If full entry of pipe joint is not achieved, remove pipe and replace with new unit and gasket. Join piping made of different materials or dimensions with couplings made for this application. Use couplings that are compatible with and that fit both systems' materials and dimensions. Close terminal ends of pipe and fittings with PVC stoppers secured in place.

**Bedding Material:** Work under these items shall conform to the requirements of Section 6.51 as supplemented here in and as detailed

**Field Quality Control:**

General: Clear interior of newly installed piping and structures of dirt and superfluous material as work progresses. Place plug in end of incomplete piping at end of day and when work stops. Flush piping between manholes and other structures to remove collected debris.

Inspection: Inspect interior of gravity sewer piping and structures to determine whether line displacement or other damage has occurred. Inspect after completion of backfill and compaction.

1. Submit reports for each system inspection.
2. Defects requiring correction include the following:
  - a. Alignment: Less than full diameter of inside of pipe is visible between structures.
  - b. Deflection: Flexible piping with deflection that prevents passage of 5 percent deflection gage meeting ASTM D3034.
  - c. Crushed, broken, cracked, or otherwise damaged piping.
3. Replace defective piping using new materials, and repeat inspections until defects are within allowances specified.
4. Re-inspect and repeat procedure until results are satisfactory.

Testing: Test new structure and piping systems, and parts of existing systems that have been altered, extended, or repaired, for leaks and defects. The contractor shall evaluate the construction sequence and in some cases be prepared to use packers in order segmentally test new pipes

1. Perform testing upon completion of structure-to-structure sewer system segments.

Provide by-pass pumping and cleaning of piping segment. Inspect mainline pipe joints

2. Schedule tests and inspections with Engineer; provide at least one business day advance notice.
3. Submit separate reports for each test.
4. Perform tests as follows:

a. New System Test - PVC Gravity Sewer Low-Pressure Air Test:

1) Plastic Pipe: Perform air test according to ASTM F 1417, Time Pressure Drop Method, modified as follows.

a) Minimum Allowable Time for 1.0 PSIG

Pipe Dia (Inch)	Minimum Time (minutes)	Length (ft) for Min Time	Time (sec) for Longer Length (L) (Ft.)
6	5:40	398	0.854L
8	7:34	298	1.52L
10	9:27	239	2.374L
12	11:20	199	3.418L
15	14:10	159	5.342 (L)

b) Calculate time for longer test lengths only when test length exceeds the lengths shown in the above table.

If test section fails, recompute time to include lateral lengths not included in previous calculation. Use the following formula:

$$T = \frac{0.085[(D_1L_1 + D_2L_2 \dots + D_nL_n)]}{(D_1L_1 + D_2L_2 \dots + D_nL_n)K/Q}$$

Where

T = Shortest time allowed for air pressure to drop 1.0 psig, seconds

K = 0.000419 (D<sub>1</sub>L<sub>1</sub> + D<sub>2</sub>L<sub>2</sub> .....+ D<sub>n</sub>L<sub>n</sub>), but not less than 1.0

Q = 0.0015 cfm/sf

D<sub>1</sub>, D<sub>2</sub>, etc. = Nominal diameter of different size of pipe being tested

L<sub>1</sub>, L<sub>2</sub>, etc. = Respective lengths of different size pipes being tested

c) Modify air test pressure when groundwater is above top of sewer line. Install 6 inch or 8 inch diameter well points adjacent to manhole installations. Measure groundwater

elevation prior to testing. Add to air pressure the following:

$$P = H / 2.3$$

Where

P = Pound of additional pressure

H = Height of groundwater elevation above sewer line, in feet

- Do not exceed 9.0 psig for total air pressure.

5. Leaks and loss in test pressure constitute defects that must be repaired.
6. Replace leaking piping using new materials, and repeat testing until leakage is within allowances specified.

**14.00.04 - Method of Measurement:** Sewer Pipe will be measured for payment by the linear feet of the various sizes and types of material measured in place along the invert of the piping including any fittings, bends, reducers, couplings, and adaptors, completed and accepted. In measuring the lengths of pipe for payment, deduct the lengths of manhole inverts, as measured between inside faces of manhole walls. No separate measurement will be made for marking tape, filter fabric and vertical drops.

Excavation for Trench: Measured for payment in accordance with Article 2.05.04.

Bedding Material: No separate measurement will be made for Bedding Material. The cost of the bedding material shall be included in the associated cost of the item it is incorporated with.

**14.00.05 - Basis of Payment:** Sewer Line (Gravity Sewer System): Paid for at the Contract Unit Price per linear feet of the appropriate pipe diameter, complete in place, including temporary excavation support system, dewatering, bedding, pipe laying, filter fabric, impervious backfill where directed, fittings (including bends, reducers, couplings, adaptors), cleaning, testing, and all materials, labor, tools, and equipment incidental to the Work.

No additional payment will be made for shoring, bracing, pumping and bailing.

Trench Excavation: Paid for in accordance with Article 2.05.05 at the contract unit price per cubic yard for "Trench Excavation" of the applying depth.

<u>Pay Item</u>	<u>Pay Unit</u>
Trench Excavation 0'-10' Deep (Sanitary Sewer)	Cubic Yard
Rock In Trench Excavation 0'-10' Deep (Sanitary Sewer)	Cubic Yard
Trench Excavation 0'-15' Deep (Sanitary Sewer)	Cubic Yard
Rock In Trench Excavation 0'-15' Deep (Sanitary Sewer)	Cubic Yard
8" Polyvinyl Chloride Pipe (Sanitary Sewer)	Linear Feet

10" Polyvinyl Chloride Pipe (Sanitary Sewer)  
15" Polyvinyl Chloride Pipe (Sanitary Sewer)

Linear Feet  
Linear Feet

**ITEM #1401054A - HANDLING SANITARY SEWAGE (SANITARY SEWER)**

**ITEM #1401240A - 6-INCH DUCTILE IRON PIPE**

**ITEM #1401243A - 10-INCH DUCTILE IRON PIPE**

**ITEM #1401246A - 16" DUCTILE IRON PIPE (SANITARY SEWER)**

**ITEM #1401375A - TRENCH DRAINAGE WATERSTOP (SANITARY SEWER)**

**ITEM #1401622A - POLYVINYL CHLORIDE TEES OR WYES (SANITARY SEWER)**

**ITEM #1401637A - SERVICE LATERAL (SANITARY SEWER)**

**ITEM #1401648A - 6" CLEAN OUT (SANITARY SEWER)**

**14.01.01 - Description:** Work under these items for sanitary sewer excavation and sanitary sewer pipe construction shall conform to the requirements of Section 2.05 and 6.51 respectively as supplemented and amended as follows:

This Section includes all pipe, labor, equipment, appliances and materials required for the construction of sanitary sewer service at the locations and to the lines and grades indicated and/or as directed, including all pipe, pipe fittings and accessories, connections to other piping and structures, testing of pipelines and material tests, bypass pumping, jointing and jointing materials, installation, bedding materials, services of manufacturer's representatives and all other related and appurtenant work, complete in place and accepted, in accordance with the drawings and specifications, and as directed by the Owner.

This work shall consist of the installation of a ductile iron pipe sanitary sewer under the stone box culvert to serve the Four T Realty building at 1265 Main Street as shown on the plans.

**14.01.02 – Materials:** Polyvinyl Chloride (PVC) Sewer Pipe and Fittings shall conform to the following:

NPS 15 and Smaller: ASTM D 3034, SDR 35; bell-and-spigot gasketed joints.

Integral Bell Joint: ASTM D 3212,

Gaskets: ASTM F477 elastomeric seals; resistant to common sewage and industrial wastes.

Fittings: PVC Materials shall conform to PVC material shall have a cell classification of 12454-B or C as defined in ASTM D-1784. Fitting shall conform to the requirements of

ASTM D3034, ASTM D1784, Joint design shall conform to ASTM D3212.

Fittings in sizes through 8" shall be molded in one piece with all the elastomeric joints.

Ductile Iron Pressure Pipe and Fittings:

Pipe: AWWA C151, Class 53, for push-on joints.

Compact Fittings: AWWA C153, for push-on joints.

Gaskets: AWWA C111, rubber.

Exterior Coating: Standard bituminous coating of either coal tar or asphalt base, 1 mil thick minimum.

Bedding Material: Bedding material shall consist of ¾" clean crushed stone that is free from fines.

Filter Fabric: Form 816, Section M.08.01-26.

Trench Drainage Waterstop: Materials shall conform to naturally occurring clay or a blend of sand and Bentonite Grout, certified to ANSI/NSF Standard 60. The blended bentonite grout shall be thoroughly dry mixed with a ratio of 2 parts sand to 1 part of bentonite.

Pre-insulated DI Pipe: The insulation shall be a foamed in place closed cell polyurethane which completely fills the annular space between the carrier pipe and the exterior casing. The insulation shall have the following physical properties:

Minimum Density (lb./cu. ft.) 2.0 ASTM D-1621

"K" Factor BTU/Hr. sq. ft. °F/in. . 147 ASTM C-177

90-95 % Closed Cell ASTM D-2856

The exterior casing shall be seamless, High Density Polyethylene (H.D.P.E.) ASTM D- 1248 with the following physical properties:

ASTM D-638.....Ultimate Elongation 850%

ASTM D-638.....Tensile Yield Strength 3300 psi

ASTM D-3350.....Resin Type III, Grade P34

ASTM D-790.....Tangent Flexural

No tape casings will be allowed.

**14.01.03 – Construction Methods:** Sewer flows shall be maintained throughout the work. Earthwork shall conform to Section 2.05. as amended by Section 14.00.

**Submittals:** Submit the following:

Material Certificates and Product Data for pipe, insulation, fittings, cleanouts and miscellaneous connection appurtenances.

Two (2) copies of the CCTV sewer inspection DVD in color on high quality format for playback on a standard DVD player.

The Contractor shall furnish to the Owner notarized test reports from the pipe and gasket manufacturers including methods of tests by an approved independent testing laboratory to show compliance of all materials furnished under this section of the specifications with all specification requirements. A copy of each test report is to be attached to the shipping list of each shipment itemizing by size; class and wall type, serial number and date of manufacture. All required testing of pipe materials furnished under this section of the specifications shall be provided by the Contractor at no additional expense to the Owner.

The Contractor shall furnish to the Owner a certified statement indicating all on-site testing procedures have been completed and met the specification requirements.

**Sewer Construction Plan:** The Contractor shall furnish to the Owner a sewer construction plan showing sequences of construction and if needed, by-pass pumping layout. The overall sewer construction plan shall be reviewed and stamped by a Connecticut Professional Engineer. The Contractor shall investigate and verify sanitary sewer flows with the Town of Coventry to evaluate the scope of facilities required for the proper conveyance and maintenance of said flows.

Sanitary sewer service and flows shall remain fully operational during construction.

The plan shall indicate all equipment, personnel and materials with suitable backup pumping capacity stored on site. Shop drawings shall be submitted for all pumps, piping, and appurtenances for all types and sizes of equipment required to perform the flow diversion and/or bypass pumping work as required herein.

A detailed proposal of noise prevention measures for bypass pumping operations shall be submitted. Emergency contact information shall also be supplied.

The Owner will review the Contractor's plan and once found to be acceptable, approve it prior to implementation. The Contractor shall make revisions to plan as needed in order to provide an acceptable plan for the Owner's approval.

The Contractor shall furnish, at no additional expense to the Owner, the services of any manufacturer's representatives for such lengths of time as may be necessary to properly instruct the Contractor's personnel in the proper handling and installation of materials in accordance with the printed recommendations of the manufacturer.

Notifications: Property owner and resident notifications shall be submitted and approved by the owner prior to distribution.

**Project Conditions:** Maintain flow of wastewater throughout duration of the Work.

Notify property owners and residents affected by sewer service operations of approved installation schedule one month before start of anticipated construction; identify potential periods of interrupted service in notice.

Provide an additional 2-business day written notification to owners and residents of buildings immediately before scheduled interruption to service.

Coordinate with other project work, including other subcontractors, occurring within the project area.

### **Sewage Flows**

Protect against surcharging of sewer system upstream of the work area by installing adequate temporary by-pass facilities to handle dry weather and wet weather wastewater flows. Do not allow wastewater to discharge to storm drainage systems surface, or surface or ground water bodies.

If by-pass pumping is required to handle dry weather flows also provide stand-by pump(s) for each pump size capable of pumping equivalent wastewater flows and stand-by power that may be required for emergency use. This stand-by equipment shall be provided on site prior to beginning sanitary construction.

Indefinite dry-running sewage pumps are to be provided that shall adequately handle sewage, slurries, and liquids. The contractor shall use plan and profile sheets with allowable contingencies for his determination of Total Dynamic Head (TDH), control systems and pipe bypass lengths. Reduced noise level pumps (63 dBA at 30' or less) and/or attenuating noise structures shall be utilized.

Coordinate with the Owner for appropriate time of by-pass. Provide personnel on site at all times during bypass pumping operations. Provide power source to operate bypass pumps at no additional cost.

Inclement Weather Forecasts: Take additional and appropriate measures to protect the Work and to prevent release of wastewater when weather reports forecast potential conditions that may increase flow exceeding bypass pump capacity.

The normal dry weather Average Daily Flow (ADT) is estimated at 90,000 gallons per day with a Peaking factor of 3.

Wet weather Average Daily Flow (ADT) is estimated at 180,000 gallons per day.

By-pass configuration shall be based upon the construction phasing and Contractor operations.

**Installation, General:** Install piping beginning at low point, true to grades and alignment indicated with unbroken continuity of invert. Place bell ends of piping facing upstream. Install gaskets, seals, sleeves, and couplings according to manufacturer's written instructions for using lubricants, cements, and other installation requirements. Install and

support pipes and fittings with bedding material. Do not use saddles, blocking or stones as pipe supports. In structures, cut pipe flush with face of inside wall. Fill joint with annular space filler. When work is not in progress, close open ends of pipe to prevent entry of groundwater, earth, or foreign materials. Arrange for installing green warning tapes directly over piping and at outside edges of underground structures.

**Sewer Pipe Stub Connections:** Extend connection a minimum of 48 inches beyond sewer manhole unless directed otherwise by the Engineer. Install bell end with cap or plug at end of pipe stubs. Use plugs of same material as pipe. Arrange for inspection by Engineer prior to backfilling.

Install bell end with cap or plug at end of lateral sewer pipes, fittings, and pipe stubs. Use plugs of same material as pipe. Mark terminal ends with 2 inch by 3 inch lumber end markers that extend from invert to final grade. Install markers plumb. Leave end of marker exposed. In areas where marker cannot be exposed, fasten a steel plate or reinforcement rod to end of marker. Arrange for inspection by Engineer prior to backfilling.

All sewer construction is to be constructed and tested prior to final paving.

### **Sanitary Sewer Laterals:**

The Contractor shall verify all lateral locations to be capped, connected to the new sanitary sewer or to be extended to the street line as the main line sanitary sewer is installed. The locations where laterals are determined to be extended per the contract documents shall be field marked and recorded by the Contractor and approved by the Town or their agents as the new sewer main work proceeds. The contractor shall submit his proposed operation to verify the inactive or active status of the individual sewer laterals encountered during the construction of the main line sewer work to the Engineer for approval prior to connecting or capping the existing lateral.

Pre-insulated ductile Iron lateral pipe shall not be installed in standing water. Trenches shall be maintained dry until final field closure is complete. The installing contractor shall handle the piping system in accordance with the directions furnished by the manufacturer and as approved by the architect and engineer. The service piping shall be hydrostatically tested as specified in this section. The insulated pipe shall backfilled with A 4-inch layer of sand or fine gravel, less than 1/2" in diameter, and shall be placed and tamped in the trench to provide uniform bedding for the Ductile system. Once the system is in place, the trenches shall be carefully backfilled with similar material and hand tamped in 6" layers until a minimum of 12" above the top of the pre-insulated pipe has been achieved. The remainder of the backfill shall be as Section 14.01.

**Pipe Joint Construction and Installation:** PVC Sewer Pipe and Fittings: Join pipe and fittings with gaskets according to ASTM D 2321 and manufacturer's written instructions. If full entry of pipe joint is not achieved, remove pipe and replace with new unit and gasket. Join piping made of different materials or dimensions with couplings made for this application. Use couplings that are compatible with and that fit both systems' materials and dimensions. Close terminal ends of pipe and fittings with PVC stoppers secured in place.

**Bedding Material:** Work under these items shall conform to the requirements of Section 6.51 as supplemented here in and as detailed

**Trench Drainage Waterstop:** When indicated on plans or directed by the Engineer pipe bedding material shall be eliminated and replaced with naturally occurring clay or a bentonite grout mixture. Trench drainage waterstop materials shall be placed as detailed and in the same manner as the bedding material it replaced.

**Field Quality Control:**

General: Clear interior of newly installed piping and structures of dirt and superfluous material as work progresses. Place plug in end of incomplete piping at end of day and when work stops. Flush piping between manholes and other structures to remove collected debris.

Inspection: Inspect interior of gravity sewer piping and structures to determine whether line displacement or other damage has occurred. Inspect after completion of backfill and compaction.

1. Submit reports for each system inspection.
2. Defects requiring correction include the following:
  - a. Alignment: Less than full diameter of inside of pipe is visible between structures.
  - b. Deflection: Flexible piping with deflection that prevents passage of 5 percent deflection gage meeting ASTM D3034.
  - c. Crushed, broken, cracked, or otherwise damaged piping.
3. Replace defective piping using new materials, and repeat inspections until defects are within allowances specified.
4. Re-inspect and repeat procedure until results are satisfactory.

Testing: Test new structure and piping systems, and parts of existing systems that have been altered, extended, or repaired, for leaks and defects. The contractor shall evaluate the construction sequence and in some cases be prepared to use packers in order segmentally test new pipes

1. Perform testing upon completion of structure-to-structure sewer system segments.

Provide by-pass pumping and cleaning of piping segment. Inspect mainline pipe joints

2. Schedule tests and inspections with Engineer; provide at least one business day advance notice.
3. Submit separate reports for each test.
4. Perform tests as follows:

a. New System Test - PVC Gravity Sewer Low-Pressure Air Test:

- 1) Plastic Pipe: Perform air test according to ASTM F 1417, Time Pressure Drop Method, modified as follows.

a) Minimum Allowable Time for 1.0 PSIG

Pipe Dia (Inch)	Minimum Time (minutes)	Length (ft) for Min Time	Time (sec) for Longer Length (L) (Ft.)
6	5:40	398	0.854L
8	7:34	298	1.52L
10	9:27	239	2.374L
12	11:20	199	3.418L
15	14:10	159	5.342 (L)

- b) Calculate time for longer test lengths only when test length exceeds the lengths shown in the above table.

If test section fails, recompute time to include lateral lengths not included in previous calculation. Use the following formula:

$$T = \frac{0.085[(D_1^2L_1 + D_2^2L_2 \dots + D_n^2L_n)]}{(D_1L_1 + D_2L_2 \dots + D_nL_n)]K/Q}$$

Where

T = Shortest time allowed for air pressure to drop 1.0 psig, seconds

K = 0.000419 (D<sub>1</sub>L<sub>1</sub> + D<sub>2</sub>L<sub>2</sub> .....+ D<sub>n</sub>L<sub>n</sub>), but not less than 1.0

Q = 0.0015 cfm/sf

D<sub>1</sub>, D<sub>2</sub>, etc. = Nominal diameter of different size of pipe being tested

L<sub>1</sub>, L<sub>2</sub>, etc. = Respective lengths of different size pipes being tested

- c) Modify air test pressure when groundwater is above top of sewer line. Install 6 inch or 8 inch diameter well points adjacent to manhole installations. Measure groundwater elevation prior to testing. Add to air pressure the following:

$$P = H / 2.3$$

Where

P = Pound of additional pressure

H = Height of groundwater elevation above sewer line, in feet

- Do not exceed 9.0 psig for total air pressure.

5. Leaks and loss in test pressure constitute defects that must be repaired.
6. Replace leaking piping using new materials, and repeat testing until leakage is within allowances specified.

**14.01.04 - Method of Measurement:** Sewer Pipe will be measured for payment by the linear feet of the various sizes and types of material measured in place along the invert of the piping including any fittings, bends, reducers, couplings, and adaptors, completed and accepted. This includes ductile iron pipe placed at drop manholes or used as sewer laterals. In measuring the lengths of pipe for payment, deduct the lengths of manhole inverts, as measured between inside faces of manhole walls. No separate measurement will be made for marking tape, vertical drops or pre-insulated pipe systems.

Wyes and tees will be measured for payment on a per each basis regardless of PVC size. No separate measurement will be made for ductile iron wyes and tees. These shall be considered measured as part linear feet of the various pipe sizes.

Sanitary sewer laterals shall be measured for payment by the linear feet of the various sizes and types of material measured in place along the invert of the piping, from the end of the tee/wye provided on the mainline to the connection with the existing service, complete in place and accepted. This item does not include the lateral service connections constructed of ductile iron pipe. No separate measurement will be made for marking tape; and fittings including bends, reducers, couplings, adaptors. This work shall be included as part of the associated work.

Trench drainage waterstop will be measured for payment by the cubic yard of material placed as detailed or directed by the Engineer.

Excavation for Trench: Measured for payment in accordance with Article 2.05.04.

Bedding Material: No separate measurement will be made for Bedding Material. The cost of the bedding material shall be included in the associated cost of the item it is incorporated with.

Pre-insulated Ductile Iron Pipe: No separate measurement will be made for Pre-insulated Ductile Iron Pipe. The cost of the insulation system shall be included in the associated cost of the ductile iron pipe it is incorporated with.

Handling Sanitary Sewage (Sanitary Sewer): Measurement is not required for this Lump Sump item. The value of this item will be earned after the Sewer Construction Plan is accepted by the Town and all equipment and materials as set forth in the Town accepted Sewer Construction Plan are provided on site. This will include the construction of temporary cleanouts to facilitate access to temporary by-pass piping.

**14.01.05 - Basis of Payment:** Sewer Line (Gravity Sewer System): Paid for at the Contract Unit Price per linear feet of the appropriate pipe diameter, complete in place, including temporary excavation support system, dewatering, bedding, pipe laying, filter fabric, impervious backfill where directed, fittings (including bends, reducers, couplings, adaptors), cleaning, testing, and all materials, labor, tools, and equipment incidental to the Work. No additional payment will be made for shoring, bracing, pumping and bailing.

Wyes and tees will be measured for payment on a per each basis regardless of PVC size, complete in place, including temporary excavation support system, dewatering, bedding, pipe laying, filter fabric, impervious backfill where directed, fittings (including bends, reducers, couplings, adaptors), cleaning, testing, and all materials, labor, tools, and equipment incidental to the Work. No additional payment will be made for shoring, bracing, pumping and bailing.

Sanitary Sewer Laterals: Paid for at the Contract Unit Price per linear feet, complete in place, including temporary excavation support system, dewatering, bedding, pipe laying, filter fabric, impervious backfill where directed, fittings (including bends, reducers, couplings, adaptors), cleaning, testing, and all materials, labor, tools, and equipment incidental to the Work. No additional payment will be made for pre-insulated pipe system, shoring, bracing, pumping, or bailing.

The work to connect existing laterals to remain in service and laterals to be abandoned and capped shall be included in the cost of PVC Pipe (Sanitary Sewer) of the size specified.

Trench drainage waterstop will be paid for at the contract unit price per cubic yard that is measured and accepted including all excavation and compaction, impervious materials, labor equipment and incidentals to the work:

Cleanouts: Paid for at the Contract Unit Price per each, regardless of size or type complete in place, including temporary excavation support system, dewatering, bedding, filter fabric, connection to sewer mains and building services, cleaning, testing and all materials, equipment,

tools and labor incidental thereto. No additional payment will be made for shoring, bracing, pumping, or bailing.

Trench Excavation: Paid for in accordance with Article 2.05.05 at the contract unit price per cubic yard for "Trench Excavation" of the applying depth.

Handling Sanitary Sewage (Sanitary Sewer): Paid for at the contract lump sum price for Handling Sanitary Sewage in accordance with the value earned including the preparation of the Sewer Construction Plan, along with the materials, tools, and equipment incidental to the Work that is indicated as part of the Sewer Construction Plan. This will include the construction of temporary cleanouts to facilitate access to temporary by-pass piping. Labor to implement the plan will be included for payment under the item "Temporary Sanitary Sewer Bypass".

<u>Pay Item</u>	<u>Pay Unit</u>
Handling Sanitary Sewage (Sanitary Sewer)	Lump Sum
6-Inch Ductile Iron Pipe (Sanitary Sewer)	Linear Feet
10-Inch Ductile Iron Pipe (Sanitary Sewer)	Linear Feet
16-Inch Ductile Iron Pipe (Sanitary Sewer)	Linear Feet
Trench Drainage Waterstop (Sanitary Sewer)	Cubic Yard
Polyvinyl Chloride Tees Or Wyes (Sanitary Sewer)	Each
Service Lateral (Sanitary Sewer)	Linear Feet
6" Clean Out (Sanitary Sewer)	Each

**ITEM #1403001A - MANHOLE (SANITARY SEWER)**

**ITEM #1403002A - MANHOLE OVER 10 FT DEEP (SANITARY SEWER)**

**ITEM #1403010A - MANHOLE FRAME AND COVER (SANITARY SEWER)**

**ITEM #1403011A - DROP MANHOLE (SANITARY SEWER)**

**ITEM #1403012A - DROP MANHOLE OVER 10 FT DEEP (SANITARY SEWER)**

**ITEM #1403094A - 60" ID MANHOLE (SANITARY SEWER)**

**ITEM #1403501A - RESET SANITARY MANHOLE (SANITARY SEWER)**

**14.01.01 - Description:** Work under these items for sanitary sewer excavation and sanitary sewer manhole construction shall conform to the requirements of Section 2.05 and 5.07 respectively as supplemented and amended as follows:

This Section includes all pipe, labor, equipment, appliances and materials required for the construction of sanitary sewer manholes at the locations and to the lines and grades indicated and/or as directed, including all accessories, connections to piping, structures, testing of structures and material tests, jointing and jointing materials, installation, bedding materials, adjusting castings to grade, and services of manufacturer's representatives and all other related and appurtenant work, complete in place and accepted, in accordance with the drawings and specifications, and as directed by the Owner.

**14.01.02 – Materials:** Precast Concrete Manholes shall conform to the following:

ASTM C 478, precast, reinforced concrete, of depth indicated, with provision for rubber gasketed joints.

Provide monolithic combination base and riser section. Increase thickness of precast concrete sections or add concrete to base section, as required to prevent flotation. Fabricate pipe openings and sleeves to accommodate outside diameter of pipe to be connected.

Provide base sections of the diameter and depth indicated. Provide standard bases or dog house bases as indicated.

Provide riser sections of lengths to provide depth indicated. Provide top sections of eccentric-cone type, unless concentric-cone or flat-slab-top type is indicated. Provide top of cone of size that matches diameter of grade rings.

Joint Seal / Gasket Seal: Rubber Gaskets ASTM C 443 and ASTM C923, butyl rubber.

ITEM #1403001A, 1403002A, 1403010A,  
1403011A, 1403012A, 1403094A, 1403501A

Steps shall be manufactured from deformed, 1/2-inch steel reinforcement rod complying with ASTM A 615/A 615M and encased in polypropylene complying with ASTM D 4101. Include pattern designed to prevent lateral slippage off step. Cast into sidewalls with steps at 12-inch to 16-inch intervals. Approved products include M.A. Industries, Model PS-2-PF-SL; Press Seal Gasket, Model 14850; or equal.

Bedding Material: Bedding material shall consist of ¾" clean crushed stone that is free from fines.

Pipe Connectors: For new structures, connectors shall meet ASTM C923, resilient, of size required, for each pipe connecting to manhole section. Approved products include Lock Joint Flexible Manhole Sleeve by Interpace Corporation; KOR-N-SEAL; or approved equal.

Pipe Connectors: For existing structures, connectors shall meet ASTM C923, resilient, of size required, for each pipe connecting to manhole section. Approved products include Kwik-Seal; Press Boot by Press Seal; or approved equal.

Manhole Frames and Covers: Provide frames and covers of gray cast-iron conforming to ASTM A 48, Grade 30, H-20 Load Rated. Include raised diamond design with lettering "SEWER" 3-inches high cast into cover. Approved products include LeBaron Foundry, LA328; Campbell Foundry, Pattern No. 1012B; or approved equal.

Concrete: Provide cast-in-place concrete according to ACI 318, ACI 350R, and the following:

Cement: ASTM C 150, Type II.

Fine Aggregate: ASTM C 33, sand

Coarse Aggregate: ASTM C 33, crushed gravel

Water: Potable.

Portland Cement Design Mix: 4000 psi minimum, with 0.45 maximum water-cementitious materials ratio.

Structure Channels and Benches: Factory or field formed from concrete. Portland cement design mix, 4000 psi minimum, with 0.45 maximum water-cementitious materials ratio. Include channels and benches in manholes.

Channels: Concrete or brick invert, formed to same width as connected piping, with height of vertical sides to three-fourths of pipe diameter. Form curved channels with smooth, uniform radius and slope. Eliminate protrusions that may impede flow of solids.

Benches: Concrete or brick, sloped to drain into channel.

Ballast and Pipe Supports: Portland cement design mix, 3000 psi minimum, with 0.58 maximum water-cementitious materials ratio.

Reinforcement Bars: ASTM A 615/A 615M, Grade 60, deformed steel.

Miscellaneous:

Brick: ASTM C32, Grade MS except Grade SS for manhole shelves.

Mortar: Composed by volume, of one part portland cement and two parts sand. Do not add lime to mortar.

Grout: Form 816, Section M.03.01-14.

Filter Fabric: Form 816, Section M.08.01-26.

Flexible Epoxy Gel: Hydrocide 700 by Degussa Building Systems; Parsonpoxy FG by Parson Environmental Products, Inc.; or approved equal.

Flexible Annular Space Filler: Manufactured by KOR-N-SEAL, Interpace, or approved equal.

Protective Coatings: Shall be two-coat, approved asphalt coating; 15-mil minimum thickness, unless otherwise indicated; factory or field applied to concrete manhole exterior surfaces.

Manhole Collar Wraps: The external joint seal shall meet or exceed the requirements of ASTM C- 877, type II. External joint seals shall consist of a collar 24" wide with an outer layer of polyethylene, with a minimum tensile strength of 4000 psi and a minimum tear resistance of 1500 psi, and an under layer of rubberized mastic that is reinforced with a woven polypropylene fabric. Two 5/8" steel straps shall be located within the collar 3/4 inches from each edge. The straps shall be confined in tubes that isolate them from the mastic and allow them to slip freely with mechanically tightened and locked around the manhole joint. The collar shall be furnished with a minimum of 6" overlap and a closing flap to cover any remaining exposed strap. External joint seals shall be Cretex Wrap External Manhole Joint Seals or approved equal.

**14.03.03 – Construction Methods:** Earthwork shall conform to Section 2.05. No cutting of the final pavement course will be allowed. All sewer construction is to be constructed and tested prior to final paving.

**Submittals:** Submit the following:

ITEM #1403001A, 1403002A, 1403010A,  
1403011A, 1403012A, 1403094A, 1403501A

Material Certificates and Product Data for precast structures, frames and covers, and miscellaneous system products and connection appurtenances.

Shop Drawings: Include plans, elevations, details, and attachments for the following for precast concrete manholes, including frames and covers.

Two (2) copies of the CCTV sewer inspection DVD in color on high quality format for playback on a standard DVD player.

The Contractor shall furnish to the Owner notarized test reports from manhole and casting manufacturers including methods of tests by an approved independent testing laboratory to show compliance of all materials furnished under this section of the specifications with all specification requirements. A copy of each test report is to be attached to the shipping list of each shipment

The Contractor shall furnish, at no additional expense to the Owner, the services of structure manufacturer's representatives for such lengths of time as may be necessary to properly instruct the Contractor's personnel in the proper handling, installation structures in accordance with the printed recommendations of the manufacturer .

The Contractor shall furnish to the Owner a certified statement indicating all on-site testing procedures have been completed and met the specification requirements.

### **Project Conditions**

Coordinate with other project work, including other subcontractors, occurring within the project area.

### **Manhole Installation:**

Install manholes, complete with appurtenances and accessories indicated. Set manhole base level on 8 inch minimum bedding material. Align manhole steps. Assemble manhole sections before connecting pipe to manhole. Point inside and outside joints with mortar. Close lifting holes with plastic plugs and mortar. Prior to assembly, clean joint surfaces of precast concrete sections and butyl rubber joint sealant. Form continuous channels and benches with concrete, brick and mortar, between inlets and outlet. Install precast concrete manhole sections with gaskets according to ASTM C 891. Fill annular space between sewer pipe and manhole on inner side of flexible pipe to manhole joint with flexible annular space filler.

Inverts and watertables shall be built of brick. Inverts shall, in general, have a uniform grade between the inverts of the inlet and outlet pipes. Joints in brick inverts shall be tooled to be slightly concave and polished. Only clean bricks shall be used. Bricks shall be moistened by suitable means, until they are neither so dry as to absorb water from the

mortar nor so wet as to be slippery when laid. Each brick shall be laid in a full bed and joint of mortar without requiring subsequent grouting, flushing or filling, and shall be thoroughly bonded. Outside faces of masonry walls shall be plastered with mortar ½-inch thick.

Each Manhole shall be tested immediately after assembly and prior to backfilling as defined by ASTM C1244 Standard Test Method for Concrete Sewer Manholes by the Negative Air Pressure (Vacuum) Test. A successful second test will also be conducted after the backfill has been placed to ensure the integrity of the manhole.

Special consideration shall be given to the manhole at Station 24+60. The Contractor shall take into account the new pipe alignment with the existing pipe. The doghouse portion of the base shall be wide enough to accommodate the proposed installation. The remaining portion of the manhole shall be constructed in place and flow shall be maintained during the time that both upstream pipes are needed. After the original existing upstream pipe is no longer needed, the pipe shall be removed from the manhole. The manhole base, sidewall and invert construction shall be completed.

**Manhole Frames and Covers:**

Set frame in full bed of mortar. Cover bottom flange of frame with a thick, smooth-surfaced ring of mortar that extends to outside edge of masonry. Slope mortar ring to shed water away from frame. Set tops of frames and covers flush with finished surface of manholes that occur in pavements and lawns. Set tops 2 inches above finished grade of turf, unless otherwise indicated. At unpaved locations (except for lawns), surround manhole frame and masonry with concrete anchor ring as indicated. Adjust frames with collars, masonry units or bricks. Maximum adjustment height shall be 12 inches. For adjustments greater than 12 inches, install riser section for structure.

**Reset Manholes:**

The Contractor shall carefully excavate the manhole frame and cover and add or delete brick masonry as necessary to reset the frame and cover to the final grade. The existing cover slab or cone section may be reused if it is not damaged. If the cover slab or cone section is damaged, it shall be replaced by the Contractor at his expense. The distance between the proposed elevation of the manhole cover and the first manhole step shall be a minimum of 12 inches and a maximum of 16 inches. Prevent covers rocking or rattling under traffic and insure proper fit and interchangeability between different frames and covers.

**Concrete Placement:**

Place cast-in-place concrete according to ACI 318 and ACI 350R.

**Removing Manholes:**

Removing Manholes: The work shall comply with Section 2.05 – Trench Excavation

**Bedding Material:** Work under these items shall conform to the requirements of Section 6.51 as supplemented here in and as detailed

**Field Quality Control:**

General: Clear interior of newly installed piping and structures of dirt and superfluous material as work progresses.

Inspection: Inspect interior of gravity sewer structures to determine whether line displacement or other damage has occurred. Inspect after completion of backfill and compaction.

1. Submit reports for each system inspection.

Testing: Test new structures, and parts of existing systems that have been altered, extended, or repaired, for leaks and defects. The contractor shall evaluate the construction sequence and in some cases be prepared to use packers in order segmentally test new pipes

- A. Manholes: Perform vacuum test according to ASTM C1244.
  - 1) Test each manhole prior to backfilling.
  - 2) Plug lift holes with a non-shrink grout.
  - 3) Temporarily plug pipes entering manhole. Secure and brace pipes and plugs to prevent them from being drawn into the manhole during testing.
  - 4) Place test head at inside top of cone section and inflate seal in accordance with manufacturer’s recommendations.
  - 5) Draw a vacuum of 10 inches of mercury. Shut off pump.
  - 6) With valves closed, measure elapsed time for vacuum to drop from 10 inches to 9 inches. Manhole shall pass if time meets or exceeds values indicated in Table 1.

Table1 - Minimum Test Times

Manhole Diameter		
(48 inches)	(60 inches)	(72 inches)
Time to Drop Vacuum from 10 Inches to 9 Inches		
60 seconds	75 seconds	90 seconds

7. Repeat test for each manhole after backfilling.

- B. Leaks and loss in test pressure constitute defects that must be repaired.

- C. Replace leaking structures using new materials, and repeat testing until leakage is within allowances specified.

**14.01.04 - Method of Measurement:** Manholes will be measured on a per each basis regardless of type (standard precast, flat-top, or doghouse) by the appropriate diameter and depth. Manhole Frames and Covers will not be measured under this item and will be measured for separate payment.

Manhole Frames and Covers: Measured on a per each basis by the appropriate type and size, adjusted to finish grade and accepted.

Reset Sanitary Manhole: Measured on a per each basis by the appropriate type and size of existing frame and cover that is adjusted to finish grade and accepted.

Manhole Collar Wraps: Will not be measured for separate payment and will be considered incidental to the work of the associated items.

Excavation for Trench: Measured for payment in accordance with Article 2.05.04.

Bedding Material: No separate payment will be made for Bedding Material. The cost of the bedding material shall be included in the associated cost of the item it is incorporated with.

Removed Manholes: Measured for payment in accordance with Article 2.05.04.

**14.01.05 - Basis of Payment:** Manholes will be paid for at the Contract Unit Price per each, regardless of type (standard, flat-top, or doghouse) for the diameter and depth specified, complete in place, including temporary excavation support system, dewatering, bedding, filter fabric, inverts, connection to sewer mains and services, collar wraps, cleaning, testing and all materials, equipment, tools and labor incidental thereto. For doghouse manholes this includes the construction of the portion of the manhole that is not shipped as part of the doghouse base section, the removal of piping that is no longer needed and subsequent sidewall, base and interior manhole construction aligned to provide a smooth flowing channel into existing outlet pipe. No additional payment will be made for shoring, bracing, pumping, or bailing.

Manhole Frames and Covers: Paid for at the Contract Unit Price per each of the appropriate diameter and type, and including materials, labor, tools, and equipment incidental to the Work  
Reset Sanitary Manhole: Paid for at the Contract Unit Price per each existing manhole frame and cover that is adjusted to grade including materials, labor, tools, and equipment incidental to the Work.

Manhole "coring" and connections to existing stubs or pipes shall not be paid as separate items but shall be included in the prices bid for other items of work.

Trench Excavation: Paid for in accordance with Article 2.05.05 at the contract unit price per cubic yard for "Trench Excavation" of the applying depth.

Removed Manhole: Paid for in accordance with Article 2.05.05 at the contract unit price per cubic yard for "Trench Excavation" of the applying depth.

<u>Pay Item</u>	<u>Pay Unit</u>
Manhole (Sanitary Sewer)	Each
Manhole over 10 ft. Deep (Sanitary Sewer)	Each
Manhole Frame and Cover (Sanitary Sewer)	Each
Drop Manhole (Sanitary Sewer)	Each
Drop Manhole over 10 ft. Deep (Sanitary Sewer)	Each
60" ID Manhole (Sanitary Sewer)	Each
Reset Sanitary Manhole (Sanitary Sewer)	Each

**ITEM #1405006A - CLASS "A" CONCRETE (SANITARY SEWER)**

**14.05.01 – Description:** The work shall comply with Section 2.05 – Trench Excavation and Section 6.01 – Concrete for Structures and as supplemented and amended as follows:

**14.05.03 – Construction Methods:** Close open ends of abandoned underground piping indicated to remain in place. Include closures strong enough to withstand hydrostatic and earth pressures that may result after ends of abandoned piping have been closed. Close open ends of piping with at least 8 inch thick, cast-in-place concrete bulkheads; or close open ends of piping with threaded metal caps, plastic plugs, or other acceptable methods suitable for size and type of material being closed. Do not use wood plugs.

Class A Concrete shall replace bedding material and utilized for pipe encasement as shown on the plans or directed by the Engineer.

Pay Item

Pay Unit

Class "A" Concrete (Sanitary Sewer)

Cubic Yard

**ITEM #1408455A - TEMPORARY SANITARY SEWER BY-PASS**  
**(SANITARY SEWER)**

**14.08.01 – Description:** The work shall comply with the approved Sanitary Sewer Construction Plan or as modified with the approval of the owner.

**14.08.03 – Construction Methods:** Operate approved Sanitary Sewer By-pass to facilitate the construction of the sanitary sewer. Materials shall be furnished as part of item “Handling Sanitary Sewage (Sanitary Sewer)”

**14.08.04 – Method of Measurement:** Measurement is not required for this Lump Sum item. The value of this item will be earned in proportion to temporary mainline sewage pumping by-pass that is constructed and operated. Mainline flows that are rerouted or by-passed without pumping shall not be measured for payment. Any temporary piping or by-pass pumping for lateral construction shall not be measured for separate payment.

**14.08.05 – Basis of Payment:** Paid for at the contract lump sum that is earned and accepted to construct and operate a temporary mainline sewage pumping by-pass. No separate payment will be made for mainline flows that are rerouted or by-passed without pumping or for any temporary piping or by-pass pumping for lateral construction.

Pay Item

Pay Unit

Temporary Sanitary Sewer By-pass (Sanitary Sewer)

Lump Sum

## **PERMITS AND/OR PERMIT APPLICATIONS**

- CT DEEP Inland Wetlands and Watercourses Permit
- CT DEEP Flood Management Certification
- CT DEEP 401 Water Quality Certification
- General Permit for the Discharge of Stormwater and Dewatering Activities Associated with Construction Activities (with associated SWPCP document)
- U.S. Army Corps of Engineers Section 404 Connecticut General Permit Category 2

RECONSTRUCTION OF ROUTE 31  
COVENTRY, CT  
STATE PROJECT NO. 32-130  
IWRD PERMIT APPLICATION

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PERMIT APPLICATION TRANSMITTAL FORM

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RESOURCES DIVISION (FORM DEP-IWRD-APP-100)

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ATTACHMENT C	Documentation Form for Inland Wetlands and Watercourses Permit (Form DEP-IWRD-APP-101) Includes Supplements: Description of Regulated Activities Abutters List Construction Sequencing Plans - Impact Area 'B'
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ATTACHMENT J	Soil Scientist Report  1.0 Narrative 2.0 NRCS Soil Mapping and Supporting Documentation
ATTACHMENT K	Environmental Report  1.0 Narrative 2.0 Wetland Impact Area Photos and Sketches

- 3.0 Wetland Function-Value Evaluation Forms
- 4.0 Overview Graphic of Impact Areas in Relation to NDDB Habitat

ATTACHMENT L Mitigation Report

ATTACHMENT M Alternatives Analysis

ATTACHMENT Q Additional Information: Correspondence with Other Agencies



**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: <b>Connecticut Department of Transportation</b>			
Mailing Address: <b>2800 Berlin Turnpike</b>			
City/Town: <b>Newington</b>	State: <b>CT</b>	Zip Code: <b>06131</b>	
Business Phone: <b>860-594-2931</b>	ext.:	Fax: <b>860 594-3028</b>	
Contact Person: <b>Mark W. Alexander</b>	Phone:	ext.	
E-Mail: <b>Mark.W.Alexander@ct.gov</b>			
Applicant (check one): <input type="checkbox"/> individual <input type="checkbox"/> *business entity <input type="checkbox"/> federal agency <input checked="" type="checkbox"/> state agency <input type="checkbox"/> municipality <input type="checkbox"/> tribal			
*If a business entity, list type (e.g., corporation, limited partnership, etc.):			
<input type="checkbox"/> 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 <i>billing purposes only</i> , if different:			
Company/Individual Name:			
Mailing Address:			
City/Town:	State:	Zip Code:	
Contact Person:	Phone:	ext.	

## Part II: Project Information

Brief Description of Project: <i>(Example: Development of a 50 slip marina on Long Island Sound)</i>					
<b>Reconstruction of less than one half mile of Rt. 31. Includes replacement of several culverts and creation of step-pools. (State Project No. 32-130)</b>					
Location (City/Town): <b>Coventry</b>					
Other Project Related Permits <i>(not included with this form)</i> :					
Permit Description	Issuing Authority	Submittal Date	Issuance Date	Denial Date	Permit #
<b>Section 404 &amp; 10 GP Cat. II</b>	<b>US ACOE</b>	<b>May 2013 (est)</b>	<b>TBD</b>		<b>TBD</b>

### 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	\$940.00			1 + 0
	Title V Operating Permits	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 + 2
	<b>INLAND WATER RESOURCES-multiple permits 1 + 6 total copies</b>				
	Dam Construction	none			1 + 2
N	Flood Management Certification	none	1	\$0	1 + 1
N	Inland 401 Water Quality Certification	none	1	\$0	1 + 5
N	Inland Wetlands and Watercourses	none	1	\$0	
	Stream Channel Encroachment Lines	★			
	Water Diversion	★			1 + 5
	<b>OFFICE OF LONG ISLAND SOUND PROGRAMS</b>				
	Certificate of Permission	\$375.00			1 + 3
	Coastal 401 Water Quality Certification	none			1 + 3
	Structures and Dredging/Tidal Wetlands	\$660.00			1 + 3
	<b>WASTE MANAGEMENT</b>				
	Aerial Pesticide Application	★			1 + 2
	Aquatic Pesticide Application	\$200.00			1 + 0
	CGS Section 22a-454 Waste Facilities	★			1 + 1
	Hazardous Waste Treatment, Storage and Disposal Facilities	★			1 + 1
	Marine Terminal License	\$125.00			1 + 0
	Stewardship	\$4000.00			1 + 1
	Solid Waste Facilities	★			1 + 1
	Waste Transportation	★			1 + 0
		Subtotal ➡	3	\$0	
		GENERAL PERMITS and AUTHORIZATIONS Subtotals Page 3 ➡	0	\$0	
		Enter subtotals from Part IV, pages 3 & 4 & 5 of this form Subtotals Page 4 ➡	0	\$0	
		Subtotals Page 5 ➡	0	\$0	
		<b>TOTAL ➡</b>	<b>3</b>	<b>\$0</b>	
		<input checked="" type="checkbox"/> Indicate whether municipal discount or state waiver applies. Less Applicable Discount ➡		<b>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.

### Application and Fee Information III

<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"/> Ionizing Radiation Registration	\$200.00			1 + 0
<input type="checkbox"/> Emergency/Temporary Authorization	★★			★★
<input type="checkbox"/> Other, (please specify):				
<b>WATER DISCHARGES</b>				
<input type="checkbox"/> Domestic Sewage	\$500.00			1 + 0
<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 DEP	\$1250.00			
<input type="checkbox"/> Hydrostatic Pressure Testing Wastewater Registration Only	\$625.00			1 + 0
<input type="checkbox"/> Approval of Registration by DEP (natural gas pipelines)	\$1250.00			
<input type="checkbox"/> Miscellaneous Discharges of Sewer Compatible Wastewater Flow < 5,000 gpd and fire sprinkler system testwater	\$625.00			1 + 1
<input type="checkbox"/> Flow > 5,000 gpd	\$1250.00			
<input type="checkbox"/> Non-Contact Cooling and Heat Pump Water (Minor)	\$625.00			1 + 1
<input type="checkbox"/> Photographic Processing Wastewater (Minor)	\$100.00			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	\$500.00			1 + 0
<input type="checkbox"/> Stormwater Associated with Industrial Activities <500 employees—see general permit for additional requirements >500 employees—see general permit for additional requirements	\$500.00 \$1000.00			1 + 0
<input type="checkbox"/> Stormwater & Dewatering Wastewaters-Construction Activities 5 – 10 acres	\$625.00			1 + 0
<input type="checkbox"/> > 10 acres	\$1250.00			
<input type="checkbox"/> Stormwater from Small Municipal Separate Storm Sewer Systems (MS4)	\$250.00			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)	\$1000.00			1 + 1
<input type="checkbox"/> Vehicle Maintenance Wastewater Registration Only	\$625.00			1 + 0
<input type="checkbox"/> Approval of Registration by DEP	\$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

★★ 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)**

✓ 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"/> Dam Safety Repair and Alteration	\$1000.00			1 + 2
<input type="checkbox"/> Diversion of Water for Consumptive Use: Reauthorization Categories	\$1000.00			1 + 2
<input type="checkbox"/> Diversion of Water for Consumptive Use: Authorization Required	\$2500.00			1 + 5
<input type="checkbox"/> Diversion of Water for Consumptive Use: Filing Only	\$1500.00			1 + 4
<input type="checkbox"/> Habitat Conservation	\$1000.00			1 + 2
<input type="checkbox"/> Lake, Pond and Basin Dredging	\$1000.00			1 + 2
<input type="checkbox"/> Minor Grading	\$1000.00			1 + 2
<input type="checkbox"/> Minor Structures	\$1000.00			1 + 2
<input type="checkbox"/> Utilities and Drainage	\$1000.00			1 + 2
<input type="checkbox"/> Emergency/Temporary Authorization	★★			★★
<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"/> Coastal Remedial Activities Required by Order	\$700.00			1 + 1
<input type="checkbox"/> Dock Reconstruction	\$300.00			1 + 1
<input type="checkbox"/> Marina and Mooring Field Reconfiguration	\$700.00			1 + 1
<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"/> 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):				
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.

**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"/> Asbestos Disposal Authorization	\$300.00			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
Contaminated Soil and/or Staging Management (Staging/Transfer)				
<input type="checkbox"/> Registration Only	\$250.00			1 + 0
<input type="checkbox"/> Approval of Registration by DEP	\$1500.00			1 + 0
<input type="checkbox"/> Connecticut Solid Waste Demonstration Project	\$1000.00			1 + 0
<input type="checkbox"/> Disassembling Used Electronics	\$400.00			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"/> Special Waste Authorization	\$660.00			1 + 0
<input type="checkbox"/> Storage and Distribution of Two (2) Inch Nominal Tire Chip Aggregate	\$500.00			1 + 0
<input type="checkbox"/> Storage and Processing of Asphalt Roofing Shingle Waste and/or Storage and Distribution of Ground Asphalt Aggregate	★			1 + 0
<input type="checkbox"/> Storage and Processing of Scrap Tires for Beneficial Use	\$1000.00			1 + 0
<input type="checkbox"/> Emergency/Temporary Authorization	★★			★★
<input type="checkbox"/> Other, (please specify):				
<b>REMEDATION</b>				
<input type="checkbox"/> In Situ Groundwater Remediation: Enhance Aerobic Biodegradation	★			1 + 2
<b>Note: Carry subtotals over to Part III, page 2 of this form.</b>		<b>Subtotal</b> ➔	<b>0</b>	<b>0</b>

★ See fee schedule on registration/application.

★★ Contact the specific permit program for this information.

The Department of Energy and Environmental Protection is an affirmative action/equal opportunity employer and service provider. In conformance with the Americans with Disabilities Act, DEEP makes every effort to provide equally effective services for persons with disabilities. Individuals with disabilities who need this information in an alternative format, to allow them to benefit and/or participate in the agency's programs and services, should call 860-424-3035 or e-mail the ADA Coordinator at [DEP.aoffice@ct.gov](mailto:DEP.aoffice@ct.gov). Persons who are hearing impaired should call the State of Connecticut relay number 711.



# Permit Application for Programs Administered by the Inland Water Resources Division

Please complete this application form in accordance with the instructions (DEP-IWRD-INST-100) in order to ensure the proper handling of your application. Print or type unless otherwise noted. You must submit the *Permit Application Transmittal Form* (DEP-APP-001) and the initial fee along with this form.

DEP USE ONLY

## Part I: Application Type

Check the appropriate box identifying the application type.

<p>This application is for (check one):</p> <p><input checked="" type="checkbox"/> A <i>new</i> application</p> <p><input type="checkbox"/> A <i>renewal</i> of an existing permit</p> <p><input type="checkbox"/> A <i>modification</i> of an existing permit</p>	<p>Please identify any previous or existing permit/authorization/registration number in the space provided.</p> <p>Existing permit/authorization/registration number:</p> <p>Expiration Date:</p>
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## Part II: Permit Type and Fee Information

Please note: effective August 21, 2003, the application fees for the programs administered by the Inland Water Resources Division have increased as listed in the following table. The fee for municipalities is 50% of the listed rates.

Type of Permit (check <i>all</i> that apply):	Fee to submit with application:
<input checked="" type="checkbox"/> <b>Inland Wetlands &amp; Watercourses</b> CGS Sec. 22a-36 et seq.	none
<input type="checkbox"/> <b>Dam Construction</b> CGS Sec. 22a-403	none
<input checked="" type="checkbox"/> <b>401 Water Quality Certificate</b> 33 U.S.C. 1341	none
<input checked="" type="checkbox"/> <b>Flood Management Certification</b> CGS Sec. 25-68(b) - (h)	none
<b>Stream Channel Encroachment</b> CGS Sec. 22a-342	
<input type="checkbox"/> No change in grade and no construction of above-ground structures	\$470.00
<input type="checkbox"/> A change in grade and no construction of above-ground structures	\$940.00
<input type="checkbox"/> A change in grade and above-ground structures or buildings	\$4,000.00
<b>Water Diversion: Consumptive Use</b> CGS Sec. 22a-372(e)	
<input type="checkbox"/> Withdrawal > 0.05 and < 0.5 mgd	\$2,050.00
<input type="checkbox"/> Withdrawal ≥ 0.5 and < 2.0 mgd	\$4,000.00
<input type="checkbox"/> Withdrawal ≥ 2.0 mgd	\$6,250.00
<b>Water Diversion: Nonconsumptive Use</b> CGS Sec. 22a-372(e)	
<input type="checkbox"/> Watershed < 0.5 sq mi	\$2,050.00
<input type="checkbox"/> Watershed ≥ 0.5 sq mi and < 2.0 sq mi	\$4,000.00
<input type="checkbox"/> Watershed ≥ 2.0 sq mi	\$6,250.00

### Part III: Applicant Information

1. Fill in the name of the applicant(s) as indicated on the *Permit Application Transmittal Form* (DEP-APP-001):  
Applicant: **Connecticut Department of Transportation**  
Phone: **860-594-2931** ext. Fax:  
 Check here if there are co-applicants. If so, label and attach additional sheet(s) with the required information to this sheet.

2. Applicant's interest in property at which the proposed activity is to be located:  
 site owner       option holder       lessee  
 easement holder       operator       other (specify):

3. List primary contact for departmental correspondence and inquiries, if different than the applicant.  
Name:  
Mailing Address: **2800 Berlin Turnpike**  
City/Town: **Newington** State: **CT** Zip Code: **06131**  
Business Phone: **860-594-2931** ext. Fax: **860-594-3028**  
Contact Person: **Mark W. Alexander** Title: **Trans. Assist. Planning Director**

4. List attorney or other representative, if applicable:  
Firm Name:  
Mailing Address:  
City/Town: State: Zip Code:  
Business Phone: ext. Fax:  
Attorney:

5. Facility or Property Owner, if different than the applicant:  
Name:  
Mailing Address:  
City/Town: State: Zip Code:  
Business Phone: ext. Fax:  
Contact Person: Title:  
  
Home address of owner (for Inland Wetlands applications only):  
Mailing Address:  
City/Town: State: Zip Code:  
Home Phone:

### Part III: Applicant Information (continued)

6. List any engineer(s) or other consultant(s) employed or retained to assist in preparing the application or in designing or constructing the activity.  Check here if additional sheets are necessary, and label and attach them to this sheet.

Name: **BSC Group, Inc.**

Mailing Address: **180 Glastonbury Blvd. Suite 103**

City/Town: **Glastonbury**

State: **CT**

Zip Code: **06033**

Business Phone: **617-896-4300**

ext. **4331**

Fax: **617-896-4301**

Contact Person: **Peter Briere, P.E.**

Title: **Project Manager**

Service Provided: **Engineering: Traffic, Drainage, Hydraulic, Env. Permitting**

### Part IV: Site Information

#### 1. Site Location:

- a. Name of facility, if applicable: **Route 31 Reconstruction**

Street Address or Description of Location: **Route 31 (Main Street), from 300 feet north of the intersection with Route 275 to approximately 1000 ft east of Monument Hill Rd.**

City/Town: **Coventry**

State: **CT**

Zip Code: **06238**

Project No., if applicable: **State Project No. 32-130**

- b. Tax Assessor's Reference: Map **Agency of CT** Block Lot

(Assessor's reference is not required if requester is an agency of the State of Connecticut.)

- c. Latitude and Longitude of the approximate "center of the site" in *degrees, minutes, and seconds*:

Latitude: **41° 46' 04" N**

Longitude: **72° 17' 55" W**

Method of determination (check one):

GPS  USGS Map  Other (please specify): **TopoZone.com**

If a USGS Map was used, provide the quadrangle name:

- d. Drainage Basin number(s) wherein the proposed activity will take place: **3105**

- e. Flood Insurance Rate Map Panel Number: **090:110-0015C**

Date of the map referenced: **06/04/1980**

- f. If applying for a SCEL permit, identify the property wherein the proposed activity will take place by indicating the following:

SCEL Map number(s):

Property Identifier:

Date of the map referenced:

2. **COASTAL BOUNDARY:** Is the activity which is the subject of this application located within the coastal boundary as delineated on DEP approved coastal boundary maps?  Yes  No

If yes, and this application is for a new permit or for a modification of an existing permit, you must submit a *Coastal Consistency Review Form* (DEP-APP-004) with your application as Attachment P.

Information on the coastal boundary is available at the local town hall or on the "Coastal Boundary Map" available at DEP Maps and Publications (860-424-3555).

RECONSTRUCTION OF ROUTE 31  
COVENTRY, CT  
STATE PROJECT NO. 32-130

DEP-IWRD-APP-100 SUPPLEMENTAL SHEETS  
IWRD PERMIT APPLICATION

**Part III Applicant Information - #6 Engineers/Consultants**

**Page 1 of 1**

**GM2 Associates**

730 Hebron Avenue  
Glastonbury, CT 06033

**Contact:** Madan Gupta

**Email:** [madan.gupta@gm2inc.com](mailto:madan.gupta@gm2inc.com)

**Phone:** (860) 659-1416

**Fax:** (860) 657-2926

**Service Provided:** Hydrologic Modeling/Report

### Part IV: Site Information (continued)

- 3. ENDANGERED OR THREATENED SPECIES:** Is the project site located within an area identified as a habitat for endangered, threatened or special concern species as identified on the "State and Federal Listed Species and Natural Communities Map"?  Yes  No Date of Map: **December 2012**

If yes, complete and submit a *Connecticut Natural Diversity Data Base (CT NDDB) Review Request Form* (DEP-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 applicant. DEP strongly recommends that applicants complete this process before submitting the subject application.**

When submitting this application form, include copies of any correspondence to and from the NDDB, including copies of the completed *CT NDDB Review Request Form*, as Attachment K (Environmental Report) or in Attachment Q if no environmental report is required.

For more information visit the DEP website at [www.ct.gov/dep/endorangeredspecies](http://www.ct.gov/dep/endorangeredspecies) (Review/Data Requests) or call the NDDB at 860-424-3011.

- 4. AQUIFER PROTECTION AREAS:** Is the site located within a town required to establish Aquifer Protection Areas, as defined in section 22a-354a through 354bb of the General Statutes (CGS)?

Yes  No

If yes, is the site within an area identified on a Level A or Level B map?  Yes  No

To view the applicable list of towns and maps visit the DEP website at [www.ct.gov/dep/aquiferprotection](http://www.ct.gov/dep/aquiferprotection)

To speak with someone about the Aquifer Protection Areas, call 860-424-3020.

- 5. CONSERVATION OR PRESERVATION RESTRICTION:** Is the property subject to a conservation or preservation restriction?  Yes  No

If Yes, proof of written notice of this application to the holder of such restriction or a letter from the holder of such restriction verifying that this application is in compliance with the terms of the restriction, must be submitted as Attachment Q.

- 6. Other Permits:** List any previous federal, state or local permits or certificates that have already been issued for the site or for the proposed activity:

<u>Type or Nature of Permit</u>	<u>Permit No.</u>	<u>Issuing Authority</u>	<u>Date Issued</u>	<u>Expiration Date</u>	<u>Permittee Name</u>
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### Part V: Supporting Documents

Please check the attachments submitted as verification that *all* applicable attachments have been submitted with this application form. 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 applicant's name as indicated on the *Permit Application Transmittal Form*. The specific information required in each attachment is described in the *Instructions for Completing A Permit Application for Inland Water Resources Division Activities* (DEP-IWRD-INST-100).

- Attachment A: Executive Summary
- Attachment B: An 8 1/2" x 11" copy of a United States Geological Survey (USGS) Topographic Quadrangle Map (scale: 1:24,000) with the regulated activity or project site outlined or pinpointed, as appropriate.
- Attachment C: *Documentation Form for: Inland Wetlands and Watercourses Permit, Stream Channel Encroachment Line Permit, and 401 Water Quality Certification* (DEP-IWRD-APP-101)

## Part V: Supporting Documents (continued)

- Attachment D: *Documentation Form for Water Diversion Permit* (DEP-IWRD-APP-102)
- Attachment E: *Documentation Form for a Dam Construction Permit* (DEP-IWRD-APP-103)
- Attachment F: *Documentation Form for Flood Management Certification* (DEP-IWRD-APP-104) (State Agencies Only)
- Attachment G: Plan Sheets and Drawings
- Attachment H: Engineering Documentation
  - Part 1: *Engineering Report Checklist* (DEP-IWRD-APP-105A) and an Engineering Report
  - Part 2: *Hydrologic and Hydraulic Consistency Worksheet* (DEP-IWRD-APP-105B)
    - Section I: Floodplain Management
    - Section II: Stormwater Management
    - For state agencies only:*
    - Section III: State Grants and Loans
    - Section IV: Disposal of State Land
- Attachment I: Flood Contingency Plan
- Attachment J: Soil Scientist Report (not required for Flood Management Certification)
- Attachment K: Environmental Report (not required for Flood Management Certification)
- Attachment L: Mitigation Report - wetlands and watercourses, fish and wildlife (not required for Flood Management Certification)
- Attachment M: Alternatives Assessment (not required for Flood Management Certification)
- Attachment N: *Applicant Compliance Information Form* (DEP-APP-002) (not required for Flood Management Certification or 401 Water Quality Certification Approvals)
- Attachment O: *Applicant Background Information Form* (DEP-APP-008) (not required for Flood Management Certification)
- Attachment P: *Coastal Consistency Review Form* (DEP-APP-004) (if applicable)
- Attachment Q: Other Information: any other information the applicant deems relevant or is required by DEP.

### *Number of Copies of Application:*

Submit one original of all application forms, certifications, reports and supporting documents and the number of photocopies of all such materials as noted on the *Permit Application Transmittal Form*. When applying for more than one permit, you should submit the original and no more than six copies.

**Part VI: Application Certification**

The applicant *and all* individuals responsible for actually preparing the application or supporting documentation must sign this part. An application will be considered insufficient unless **all** required signatures are provided. You must include signatures of any person preparing any report or parts thereof filed in support of this application (i.e., professional engineers, surveyors, soil scientists, biologists, environmental and other consultants, etc.).

<p>"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.</p> <p>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.</p> <p>I certify that this application is on complete and accurate forms as prescribed by the commissioner without alteration of the text.</p> <p>I certify that I will comply with all notice requirements as listed in Section 22a-6g of the General Statutes."</p>	
<p>Signature of Applicant</p>	<p>Date</p>
<p><b>Thomas J. Maziarz</b></p>	<p><b>Bureau Chief, Policy &amp; Planning</b></p>
<p>Name of Applicant (print or type)</p>	<p>Title (if applicable)</p>
	<p>4/29/2013</p>
<p>Signature of Preparer (if different than above)</p>	<p>Date</p>
<p><b>Peter J. Briere, P.E.</b></p>	<p><b>Project Manager</b></p>
<p>Name of Preparer (print or type)</p>	<p>Title (if applicable)</p>
<p><input type="checkbox"/> Check here if additional signatures are required. If so, please reproduce this sheet and attach signed copies to this sheet.</p>	

Reminder: After submitting this application to DEP, except in the case of a Flood Management Certification, you must publish a notice of the application immediately and submit a certified copy of this published notice to DEP. See "Notice of Permit Application" section in the instructions (DEP-IWRD-INST-100).

List the name of the newspaper the Notice of Permit Application will be published in:

Note: Please submit the *Permit Application Transmittal Form*, Application Form, Fee, and all Supporting Documents to:

CENTRAL PERMIT PROCESSING UNIT  
DEPARTMENT OF ENVIRONMENTAL PROTECTION  
79 ELM STREET  
HARTFORD, CT 06106-5127

**ATTACHMENT A – EXECUTIVE SUMMARY**

**Project Description**

The Connecticut Department of Transportation (ConnDOT) proposes to reconstruct Route 31 (Main Street) through the town of Coventry, from about 300 feet north of the intersection of Route 275 (Stonehouse Road) to about 1000 feet east of Monument Hill Road, a total distance of approximately 2,000 feet. The project's primary objective is to improve safety by eliminating a very sharp curve and steep grade on Route 31 just south of its intersection with Route 275 in Coventry. The roadway topography and drainage downgradient from the curve also leads to some pooling water and icing. Existing conditions at this curve have been responsible for numerous accidents, including several fatalities. The reconstruction project will include full depth reconstruction, milling and overlay, horizontal and vertical realignment, a five-foot sidewalk separated from the travel way by a three-foot snow shelf/utility strip on one or both sides of the roadway, and drainage improvements. The proposed roadway width of Route 31 will be 28 feet wide with granite curb on both sides. Intersecting approaches (Stonehouse Road/Lake Street, and Monument Hill Road) will be reconstructed for lengths that vary from stubs to 175 feet and will include drainage improvements.

The project's secondary objectives are to enhance the aesthetics of the Village of South Coventry and encourage business development by providing/reconfiguring additional off- street parking, pedestrian access, and landscape and streetscape amenities. This is in accordance with the Federal Highway Administration's policy on "Context Sensitive Solutions" which recognizes the surroundings through which the roadway travels, and includes input from the Town. In this case, the roadway travels through a historic village and project design took this into consideration.

The reconstruction of the road also requires the replacement of culverts and drainage systems. Therefore, the infrastructure has to be retrofitted to meet recent regulations and standards to the extent feasible. An open section of Mill Brook will include development of step pools for maintaining fish habitat and also serve to improve aesthetics and interest in the Village. The total impacts proposed to inland wetlands and watercourses is 0.12 acres / 5,182 square feet (0.03 acres / 1,420 sqft of which is permanent impacts to wetlands). This total includes the temporary and permanent work occurring along 453 linear feet of intermittent and perennial stream channels. Some of the activities will also occur within the 100-year floodplain as designated by the appropriate Federal Emergency Management Agency (FEMA) Flood Insurance Rate Map. A total of 2,883.5 cubic yards (cuyd) will be excavated in the 100-year floodplain with 844 cuyd of subsequent fill, resulting in a net gain of 2039.5 cuyd of storage in the project area. Overall wetland and stream function will be retained.

Realignment/reconstruction of Route 31 in this location will eliminate vertical sight distance issues, provide a consistent roadway width, consolidate vehicle access to abutting commercial properties, provide sidewalks, reduce problems with icing, and reduce vehicular speed.

**Engineering Report Synopsis (Attachment H)**

In addition to the required forms and checklists for Part I and II of the Engineering Report, the information provided consists of three separate studies/reports completed for this project. This includes the Drainage Report, the Hydrologic Report, and the Hydraulic Report.

## ATTACHMENT A – EXECUTIVE SUMMARY

The Drainage Report describes the existing conditions of the project route along Route 31. The area has four (4) separate stormwater conveyance systems, consisting of catch basins and leak-offs. All of the existing drainage outfalls within the project area have inadequate outlet protection. The ultimate receiving water body is Mill Brook. The proposed drainage system will consist of three (3) state maintained storm collection, conveyance and discharge systems. Outlet protection will be provided at each outfall. All design criteria adhered to **ConnDOT Drainage Manual requirements** and considered the **2004 Connecticut Stormwater Quality Manual**. Due to inadequate space and the restrictions inherent in redevelopment/reconstruction, the project could not meet primary treatment options in all locations based on our **water quality flow and water quality volume calculations**. Water quality and drainage improvements were provided to the extent feasible and do include the addition of deep sump catch basins for the state maintained systems.

The Study Area for the Hydraulic and Hydrologic Reports consists of the Mill Brook (perennial stream) from its headwater at the outlet of Lake Wangumbaug to its crossing of Mason Street. Included in this area is an unnamed, northern tributary to Mill Brook (locally known as Manning Brook) that crosses Route 31 at the major cross culvert and enters Mill Pond (also known as the Fire Pond).

The Hydrologic Report produced peak flows for storm events of 2-year, 5-year, 10-year, 25-year, 50-year, and 100-year frequency. In addition, separate calculations were performed to provide flows for a 3-year and 500-year storm event. Calculations were performed using **TR-20 (version 2001.06)** and all design criteria adhered to **ConnDOT Drainage Manual requirements**. Since the watershed for the Mill Brook culverts is greater than one square mile, and less than 10 square miles, and due to the fact that this drainage sub basin is the most upstream area of the study basin, the hydraulic analysis was based upon a 100-year and a 500-year design storm events for those culverts and the stone channel. The North tributary/Manning Brook drainage area to the Route 31 cross culvert is less than 1.0 square mile (about 0.15 sq.mi.), so the hydraulic analysis was based upon a 50-year and a 100-year design storm events.

In the Hydraulic Report, cross sectional data on Mill Brook and the North Tributary, and site observations and measurements from the Hydrologic Report were used to perform **HEC-RAS modeling runs** for the various storm events for Mill Brook from a point upstream of the Monument Hill Road crossing to a point downstream of the Mason Street Bridge, and a few hundred feet north of the North Tributary/Mill Brook confluence. The modeling was performed for the existing and proposed conditions as well as the natural condition and the temporary conditions during construction. The proposed conditions model was based upon the approved Preliminary Hydraulic Report for ConnDOT. Twin 48" culverts box culverts for the culverts exiting Mill Pond and a stone channel were modeled.

- All modeling was based upon the **ConnDOT Drainage Manual requirements**.
- In addition, the **applicable sections of the DEP Hydraulic Analysis Guidance Document** were utilized in the modeling and in the preparation of this Report.
- A main consideration was to maintain the new culverts in close proximity to the existing to maintain or increase cover and to develop a construction sequencing plan that provides for existing stream flows while the new culverts are constructed.

**ATTACHMENT A – EXECUTIVE SUMMARY**

- Another consideration was that a stone channel (or concrete form liner) with step pools would be installed to convey Mill Brook through the area now occupied by Mill Pond.
- The channel must be located a sufficient distance from the proposed roadway/sidewalk and not present a danger to pedestrians/vehicles.

A 9' wide stone channel will convey flow from Mill Brook and the North Tributary to downstream reaches of Mill Brook. A natural bottom with step pools is proposed within the stone channel.

The results of the analyses clearly show that the existing culverts are undersized and contribute to minor flooding in the Mill Pond area (particularly the building adjacent to Mill Pond, #1265 Main Street). In addition, the proposed water surface elevations during the 100-year storm event within the Mill Pond area have been reduced from the existing levels such that under proposed conditions, floodwaters from the stone channel do not overtop the structure.

**Soil Report and Environmental Report Synopses (Attachments J and K)**

Wetlands were evaluated and assessed using the federal method in accordance with the U.S. Army Corps of Engineers (ACOE) **Wetlands Delineation Manual (1987 Manual)** (and later with the Regional Supplement) as well as the state method in accordance with **General Statutes of Connecticut, Title 22a, Chapter 440, Sec. 22a-38**. In addition to field reconnaissance, soil information was also gathered from the **Natural Resources Conservation Service (NRCS) National Cooperative Soil Survey**. An assessment of wetland functions and values was also conducted in accordance with the **ACOE New England Division Highway Methodology Workbook Supplement**. Data sheets describing the dominant wetland vegetation, soil information, functions and values, and photographs of the representative sites are included in the Army Corps of Engineers Section 404 General Permit application.

Wetlands along the project route are associated with the perennial stream Mill Brook, as well as in Manning Brook, an intermittent tributary. Direct impact will also occur to previously altered areas of both streams. All of the wetland impact areas are fairly localized and immediately adjacent to disturbed/developed areas. This was evident by refusal and the presence of Human Transported Materials (HTM) in many of the soil evaluation plots and a number of invasive plant species in the vegetation plots. In some areas plots could not be performed adequately because of surrounding impervious or maintained surfaces. For these reasons, many of the wetland impact areas had limited capacity for functions and values while the larger associated wetland systems would be more valuable.

Wetland impacts could not be avoided but they were minimized wherever feasible and we do not anticipate loss of existing functions and values. Attachments L and M describe the measures taken to reduce overall impacts at each location. Improvements in water quality and stormwater conveyance are also anticipated with the proposed upgrades to the existing drainage and culvert systems.

The project is not located immediately within state-listed species habitat mapped by the CT DEP Natural Diversity Database (NDDB), but is within the **previously** regulated ½ mile upstream or downstream of mapped areas. A Review Request was submitted previously, and the NDDB

**ATTACHMENT A – EXECUTIVE SUMMARY**

responded with information that past records for wood turtles (*Glyptemus insculpta*) were located in the mapped habitat. While the NDDDB concurred that adverse impacts to state-listed species are unlikely due to the nature of the proposed activities, they no longer review projects located outside of mapped habitat. Further consultation or an updated review is therefore not required.

**Correspondence with Other Agencies (Attachment Q)**

The CT DEP Inland Fisheries Division has been consulted at varying stages of this project. They have determined the stone channel and concrete floor step-pool design at the Fire Pond is appropriate in this situation due to the limited fish habitat in this portion of Mill Brook. They have also provided guidance on which culverts do and do not need to be embedded with natural substrate. Correspondence is included in Attachment Q. Although fish passage/habitat connectivity is not a concern in this area due to adjacent alteration, work will be conducted during low flow conditions (June 1<sup>st</sup> and September 30<sup>th</sup>) to the extent possible as a general BMP.

Although the work will occur in the South Coventry National Register Historic District, the project is being performed in compliance with a no adverse effect decision from the State Historic Preservation Office (SHPO). A final section 4(f) evaluation (under the Department of Transportation Act of 1966) was performed. Correspondence with SHPO is provided in Attachment Q.

The project is also applying for coverage under the ACOE Connecticut General Permit as a Category II screening.

**Anticipated Timeframe**

It is anticipated that the construction of this project will commence in the spring of 2014 and will continue for the following two years.



**SITE LOCUS**

RECONSTRUCTION OF ROUTE 31  
 COVENTRY, CONNECTICUT, STATE  
 PROJECT NO. 32-130  
 UNITED STATES GEOLOGICAL SURVEY  
 (USGS) TOPOGRAPHIC QUADRANGLE MAP



Source: UCONN MAGIC  
 USGS Quadrangle Map:  
 Coventry

## Attachment C: Documentation Form for the Following Permits:

- **Inland Wetlands and Watercourses Permit (CGS Section 22a-39)**
- **Stream Channel Encroachment Line Permit (CGS Section 22a-342 through 22a-349)**
- **401 Water Quality Certification Inland Waters (33 U.S.C. 1341)**

All applicants should review the application instructions (DEP-IWRD-INST-100). Applicants for an Inland Wetlands and Watercourses Permit should review CGS Sections 22a-36 through 22a-45 and RCSA Sections 22a-39-1 through 22a-39-15. Applicants for a Stream Channel Encroachment Line Permit should review CGS Section 22a-342. Applicants for 401 Water Quality Certification should review Section 401 of the Federal Water Pollution Control Act (33 U.S.C. 1341) and Connecticut's Water Quality Standards.

If more space is needed for your response, duplicate the form and attach additional pages to the form. If additional pages are attached, they should be numbered and titled to correspond to the specific number and title of the request for information on the application form.

1. Applicant Name: **Connecticut Department of Transportation**  
(as indicated on the *Permit Application Transmittal Form*)
2. Check the permit(s) being requested in this application (check all that apply):
  - Inland Wetlands & Watercourses
  - Stream Channel Encroachment Lines
  - Water Quality Certification
3. If applying for a SCEL permit, indicate the SCEL Map number(s) wherein the proposed activity will take place, the property identifier and the date of the map referenced:  
SCEL Map number(s) **Not applying**  
Property Identifier:  
Date of the map referenced:
4. Name of wetland(s) and watercourse(s) involved:  
**Mill Brook and associated wetlands, Manning Brook (tributary intermittent watercourse)**

## Attachment C: Documentation Form (continued)

5. Describe the purpose and need for the proposed project.

**The project's primary objective is to improve safety by eliminating a very sharp curve (Radius = 250') and steep grade (-12%) on Route 31 just south of its intersection with Route 275 in Coventry. The roadway topography and drainage downgradient from the curve also leads to some pooling water and icing. Existing conditions at this curve have been responsible for numerous accidents, including several fatalities. In addition to the curve realignment, less than a 1/2 mile of Route 31 is proposed for full depth reconstruction, milling and overlay, and drainage improvements. Realignment/reconstruction of the roadway in this location will eliminate vertical sight distance issues, provide a consistent roadway width, consolidate vehicle access to abutting commercial properties, provide sidewalks, reduce problems with icing, and reduce vehicular speed.**

**The project's secondary objectives are to enhance the aesthetics of the Village of South Coventry and encourage business development by providing additional off street parking, pedestrian access, and landscape and streetscape amenities. This is in accordance with the Federal Highway Administration's policy on "Context Sensitive Solutions" which recognizes the surroundings through which the roadway travels, and includes input from the Town.**

**The reconstruction of the road also requires the replacement of culverts and drainage systems. Therefore, the infrastructure has to be retrofitted to the extent feasible to meet recent regulations and standards. Some culverts are being replaced due to the fact they are undersized and prone to flooding. The step pool creation efforts in the open section of Mill Brook (Fire Pond) were recommended by the Connecticut DEP Inland Fisheries Division for maintaining fish habitat and also serve to improve aesthetics and interest in the Village.**

Check here if additional sheets are necessary, and label and attach them to this sheet.

## Attachment C: Documentation Form (continued)

6. *Description of the Regulated Activity:*

6a. Indicate the area, in acres and volume in cubic yards, of any fill, excavation, or other alterations of wetlands, watercourses and floodplains.

**\*see supp.sheet** acres

**\*see sheet** cubic yards

6b. Describe all proposed regulated activities in and affecting wetlands, watercourses and floodplains. Include all discharges of dredged or fill material and storm waters incidental to the construction and/or operation of the proposed project.

**A total of 0.12 acres (5,182 square feet) of impacts to inland wetlands and watercourses are proposed as a result of the project. This includes areas that will be altered to meet existing grades but will be restored with vegetation to a natural state. Temporary construction impacts will be largely avoided through the use of adjacent upland access points and use of permanently disturbed footprints. However, 0.01 acres (435 sqft) of the total wetland impacts are considered temporary for the extra space needed during construction. A total of 0.02 ac (867 sqft) of temporary watercourse impacts are also proposed for culvert replacement. Four separate impact areas have been identified along the project route. Work is proposed within previously altered areas of Mill Brook, as well as in Manning Brook, an intermittent tributary. A total of 358 linear feet of impacts (perm. and temp.) are proposed in the perennial Mill Brook with 95 linear feet of alteration in Manning Brook. A total of 482 cubic yards will be excavated in wetlands or watercourses to accommodate grading and the installation of pipes, scour protection, endwalls etc. Most areas will be filled with approximately equal volume of these materials.**

**A total of 1.69 acres of disturbance is proposed in the 100-year floodplain (designated by the appropriate FEMA Federal Insurance Rate Map). Approximately 2,883.5 cubic yards will be excavated and 844 cubic yards will be filled within the floodplain. This includes areas of roadway and parking that will be reconstructed as part of the project.**

The summary of the work is as follows, separated into regulated impact areas for ease of review.

### **Regulated Area A (Trolleyway)**

**Due to the realignment of the dangerous curve on Route 31, encroachment will be necessary within an existing wetland and drainage channel in this location. The channel is largely formed and fed by an existing catch basin outlet that conveys stormwater from the roadway. With the realignment of the roadway, an additional drainage outlet pipe will be installed adjacent to the existing, and a riprap scour pad is proposed. The scour pad will be sized according to ConnDOT's Hydraulic and Drainage Manual. A total of 0.01 acres (390 sq ft) of permanent inland wetland impacts are proposed, with 22 cubic yards (cy) of excavation (and 15 cy of subsequent fill). This includes portions of the wetland that will be revegetated or will resume function but will be permanently altered. Following installation of the pipe and scour pad, grades will match adjacent contours and areas will be replanted or reseeded. Additional temporary, construction-related impacts will be avoided to the extent feasible as equipment can access most of this area from the roadway shoulder. However, 85 sq ft of temporary impacts are proposed for the extra space needed during construction. Contractors will install the outlet protection scour pad first and work their way out along the footprint of the permanent impacts. Regulated Area A is not located within the 100-year floodplain.**

Check here if additional sheets are necessary, and label and attach them to this sheet.

ATTACHMENT C – SUPPLEMENTAL SHEETS  
IWRD PERMIT APPLICATION

**Question 6a Description of Regulated Activity**

**Wetlands/Watercourses**

**Acres**

0.12 total (of which 0.09 acres are permanent and 0.03 acres are temporary)

**Cubic Yards**

482 (Excavation) 585 (Fill)

**Floodplain (includes a partial overlap of the impacts calculated in wetlands)**

**Acres**

1.69

**Cubic Yards**

2,883.5 (Excavation) 844.0 (Fill)

**Question 6b Description of the Regulated Activity**  
**Page 1 of 4**

**Regulated Area A continued**

Deep sumps will be installed in the contributing catch basins, improving stormwater quality from existing conditions. The available space does not allow for the installation of appropriately sized sediment basins or water quality swales.

**Regulated Area B1 (Fire Pond North)**

With the reconstruction of Route 31, and reconfiguration of parking lots with the goal of access management for adjacent businesses, the existing culvert that conveys Manning Brook under the roadway to Mill Brook will need to be replaced and extended. The existing culvert is an oval, corrugated 36"x 54" pipe at a concrete headwall. It will be replaced by twin concrete culverts, and extended for a total of 28 feet within the Manning Brook channel. A wing type endwall and 30 linear feet of inlet scour protection will be installed in the channel prior to the culvert. A total of 0.01 acres (430 sq ft), occurring over 58 linear feet of inland watercourse impacts are proposed with 15 cubic yards of excavation (and 75 cy of subsequent fill). This includes portions of the channel that will resume function following construction, but will be considered permanently altered. The scour protection will have a base layer of riprap overlain with rounded riprap and any natural rocky stream substrate that can be salvaged from the impact area. Following installation of the scour protection, grades will match the profile of the adjacent stream channel. Adjacent areas will be replanted or reseeded following construction. Additional temporary, construction-related impacts will be avoided as equipment can access this entire narrow channel from either upland bank.

CTDEP Inland Fisheries Division was consulted and they determined that the replacement culverts under Route 31 did not have to be embedded or filled with natural substrate due to negligible fish habitat upstream in Manning Brook. The openness ratio could not be met due to lack of cover in the roadway. Where the Manning Brook culvert passes under Route 31 (Main Street), there would be only 2.5 feet of cover over the proposed 4-foot diameter twin culverts. The maximum height of any type of culvert at this location is four feet in order to retain the 2.5-foot cover at the northerly gutter. Given the length of the culvert and the maximum height of four feet, a box culvert would need to be 18 feet wide to provide the required openness ratio.

Currently, stormwater flows untreated into the stream from the existing parking lots. The project proposes drainage and water quality improvements that include the installation of several rain gardens and a vegetated swale. The available space does not accommodate appropriately sized treatment swales or basins but the rain gardens and stormwater collection do improve the existing conditions.

The culverts are also being replaced so they appropriately convey larger storm events.

**Question 6b Description of the Regulated Activity**  
**Page 2 of 4**

**Regulated Area B2 (Fire Pond)**

Mill Brook daylight at a small pit with several retaining walls, surrounded by paved parking areas and adjacent to Route 31. This is known locally as the Fire Pond. Mill Brook enters the Fire Pond from a 1.5' x 9' concrete box culvert that conveys the flow under several parking lots and buildings upgradient. Mill Brook leaves the Fire Pond through two 27-inch circular concrete pipes and is conveyed under existing parking areas for approximately 130 feet. The Fire Pond also receives drainage from roadway leak-offs and the tributary Manning Brook. The Fire Pond is located within the clear zone of Route 31 where there is a potential safety hazard of vehicles falling in. In order to correct this issue and add a sidewalk for increased pedestrian safety, the pit will be reconfigured and narrowed into a 9-foot wide stone lined channel with form liner walls.

CTDEP Inland Fisheries Division was consulted and they recommended step-pool creation within the channel to maintain fish habitat in this section of stream. Although fish passage/habitat connectivity is not a concern in this area due to adjacent alteration, work will be conducted during low flow conditions (June 1<sup>st</sup> and September 30<sup>th</sup>) to the extent possible as a general BMP. A total of three steps were designed and proposed, requiring excavation and an elevation change of almost 3 feet from the outlet to the double inlet. Hydraulic modeling has determined that a concrete slab will have to be installed with the rocks and features set into place immediately following the pouring process, in order for the area to remain stable in the high velocities calculated for the 25-yr storm. PVC pipes will be placed for groundwater interaction. (Please see Attachment M, Supplement for additional information on the construction of the channel.)

The work will result in alteration of 70 linear feet of the Mill Brook channel. This includes the daylighting of approximately 22 linear feet as a section of the existing 1.5' x 9' culvert will be removed. A total of 0.037 acres (1,615 sq ft) of inland watercourse impacts are proposed (all work was determined to be within the stream channel based on the modeled location of the 2-yr storm event). Approximately 150 cy of excavation (and 315 cy of subsequent fill) are proposed. Additional temporary, construction-related impacts will not be incurred in this location as the entire area is surrounded by pavement. Portions of the channel will resume enhanced stream function following construction, but will be permanently altered.

The twin 27" circular concrete pipes will also be replaced with a set of concrete box culverts. One of the culverts will be set two feet lower than the other to maintain continuous low flow. Natural substrate will be installed to a depth of one foot in the low flow culvert as recommended by Inland Fisheries. The other culvert will help convey larger storm events.

Existing conditions allow stormwater to run directly from the private parking lots and state roadway to the stream. The available space does not allow for the installation of appropriately sized sediment basins or water quality swales. To improve existing conditions,

**Question 6b Description of the Regulated Activity**  
**Page 3 of 4**

grading was altered in the existing private parking lot so run-off will reach a catch basin prior to flowing into the channel. Curbing and catch basins along the road will also capture stormwater.

**Regulated Area B3 (Fire Pond South)**

Mill Brook outlets from the existing twin 27" culverts to a natural stream channel located to the southeast of the Fire Pond. A scour/erosion problem is present at this outlet. As previously stated, the culverts will be replaced and will include a low flow culvert with natural substrate. The new culverts will outlet approximately 5 feet upgradient and to the west of the existing culverts, resulting in the daylighting of a small additional portion of the stream. Approximately 40 linear feet of scour protection is proposed within the channel in accordance with ConnDOT's Hydraulic and Drainage Manual. A total of 0.03 acres (1,445 sq ft) of inland wetland/watercourse impacts are proposed with 295 cy of excavation (and 180 cy of subsequent fill). The scour protection will have a base layer of riprap overlain with rounded riprap and any natural rocky substrate that can be salvaged from the impact area. Following installation of the scour protection, grades will match the profile of the adjacent stream channel. Adjacent areas will be replanted or reseeded following construction. Additional temporary, construction-related impacts were estimated at 350 square feet. Temporary impacts will be minimized to the extent feasible as equipment can access most of this area from upland banks and existing parking areas. Contractors will install the inner wetland portion of the outlet protection scour pad first and work their way out along the footprint of permanent impacts. Portions of the channel will resume stream function following construction, but will be considered permanently altered.

**100-year Floodplain**

All of the work proposed in Regulated Area B, as well as a portion of the reconstruction of Route 31, some parking area reconfiguration, and work along Monument Hill Road, is located within the 100-year floodplain. A total of 1.69 acres of impact to the floodplain is proposed (portions overlapping with the wetland impacts). Approximately 2,883.3 cubic yards of excavation and 844.0 cubic yards of subsequent fill are proposed. This results in a net increase of 2,039.5 cubic yards of storage in the floodplain.

Floodwaters have previously backed up in the Fire Pond and resulted in sheet flow in the adjacent parking lots and businesses. The downstream culverts are undersized and deteriorating and are being replaced so they convey the appropriate storm events. Calculations indicate that the surface elevation of proposed 100-year flood will not exceed the existing FEMA elevation.

**Question 6b Description of the Regulated Activity**  
**Page 4 of 4**

Impact Area	Type of Impact	Total Wetland/Waters Impact in Acres (Square Feet)	-Subset- Wetland Impact in Acres (Square Feet)		-Subset- Watercourse Impact Acres (Square Feet)		Linear Watercourse Impact <sup>1</sup>		Wetland/Watercourse Impact in Cubic Yards	
			Permanent	Temporary	Permanent	Temporary	Permanent	Temporary	Excavation	Fill
Area A	Replace endwall and outlet; scour protection.	0.01 (475)	0.009 (390)	0.002 (85)	0	0	0	0	22	15
Area B1	Replace/extend culvert and endwall; scour protection.	0.012 (541)	0	0	0.01 (430)	0.003(111)	58	37	15	75
Area B2	Stone liner channel and step pool creation.	0.04 (1813)	0	0	0.037(1615)	0.005 (198)	48	22	150	315
Area B3	Replace culverts and endwall, scour protection	0.054 (2353)	0.02 (1030)	0.008 (350)	0.01 (415)	0.013 (558)	40	248	295	180
<b>Totals</b>		<b>0.12 (5,182)<sup>2</sup></b>	<b>0.03 (1,420)</b>	<b>0.01 (435)</b>	<b>0.057 (2,460)</b>	<b>0.02 (867)</b>	<b>146</b>	<b>307</b>	<b>482</b>	<b>585</b>

<sup>1</sup>The identified watercourse impacts are taking place over the course of the linear footages listed. The length of each culvert was also counted.

<sup>2</sup>When temporary wetland and all watercourse impacts are removed from the total, 1420 sf of permanent wetland impacts are proposed

**STAGE CONSTRUCTION & WATER HANDLING NOTES**

**STAGE 1:**

1. INSTALL TEMPORARY WATER HANDLING STRUCTURE #1 AT OUTLET OF TWIN 27" CULVERTS.
2. BUILD LOW FLOW OUTLET WINGWALL (WW1D) AND CONSTRUCT WEST HALF OF SCOUR HOLE USING STANDARD RIPRAP.
3. BUILD LOW FLOW CULVERT (4' X 5' ) AND DOWNSTREAM HEADWALL/CUTOFF WALL. BACKFILL AND REPAVE AREA ABOVE LOW FLOW CULVERT.
4. EXCAVATE IN PARKING LOT TO EXPOSE TOP OF EXISTING 9' X 1.5' CULVERT. SAW CUT AND REMOVE TOP SLAB OF CULVERT TO ENABLE PLACEMENT OF TEMPORARY WATER HANDLING STRUCTURE #2 WITHIN UPSTREAM PORTION OF CULVERT AS SHOWN. INSTALL TEMPORARY WATER HANDLING STRUCTURE #3 ALONG FLOOR OF EXISTING 9' X 1.5' CULVERT AND FORCE ENTIRE FLOW ON NORTH SIDE OF CULVERT.
5. INSTALL TEMPORARY WATER HANDLING STRUCTURE #4 AROUND NORTHWEST SIDE OF POND.
6. SAW CUT FLOOR OF EXISTING 9' X 1.5' CULVERT AND REMOVE SOUTH PORTION OF FLOOR AND SOUTH CULVERT WALL. RETAIN CULVERT FLOOR AND NORTH WALL ON NORTH SIDE OF TEMPORARY WATER HANDLING STRUCTURE #3.
7. INSTALL TEMPORARY WATER HANDLING STRUCTURES #5A AND #5B SOUTH OF POND.
8. INSTALL TEMPORARY EARTH RETAINING SYSTEMS #1 AND #2 ALONG SOUTH SIDE OF POND.
9. REMOVE TEMPORARY WATER HANDLING STRUCTURE #3 ALONG FLOOR OF CULVERT AND PLACE SANDBAGS AT INTERFACE OF TEMPORARY EARTH RETAINING SYSTEM AND FLOOR OF CULVERT AS REQUIRED TO FILL ANY VOIDS AT INTERFACE.
10. BUILD UPSTREAM HEADWALL/CUTOFF WALL OF LOW FLOW CULVERT, SOUTH STONE CHANNEL WALL (WW1C) AND PORTION OF 12" RCP.
11. BUILD SOUTH HALF OF 9' X 1.5' CULVERT CUTOFF WALL AND SOUTH HALF OF CONCRETE FLOOR OF STONE CHANNEL.

**STAGE 2:**

1. REMOVE TEMPORARY EARTH RETENTION SYSTEM #1 SOUTH OF STONE CHANNEL.
2. COMPLETE DRAINAGE SYSTEM SOUTH OF STONE CHANNEL.
3. MODIFY TEMPORARY WATER HANDLING STRUCTURE #1 TO ACCOMODATE FLOW IN THE LOW FLOW CULVERT.
4. REMOVE A PORTION OF TEMPORARY EARTH RETAINING SYSTEM #2 INSTALLED IN STAGE 1. INSTALL TEMPORARY EARTH RETAINING SYSTEM #3 TOWARD ROUTE 31 AS SHOWN, SHIFTING FLOW INTO LOW FLOW CULVERT. COMPLETE REALIGNMENT OF TEMPORARY WATER HANDLING STRUCTURE #1 AS SHOWN. MODIFY TEMPORARY WATER HANDLING STRUCTURE #1 TO ALLOW SHEET FLOW FROM ROUTE 31 INTO POND.
5. BACKFILL SWALE CONSTRUCTED IN STAGE 1, AND REMOVE TEMPORARY WATER HANDLING STRUCTURES #5A AND #5B.
6. REMOVE TWIN 27" CULVERTS.
7. INSTALL HIGH FLOW CULVERT (5' X 3' ), HEADWALL/CUTOFF WALL ON UPSTREAM AND DOWNSTREAM SIDES, WINGWALL (WW2C) AND EAST HALF OF SCOUR HOLE.
8. BUILD EAST END OF STONE CHANNEL (WW2B) AND PORTION OF 12" RCP.
9. BUILD TWIN 48" CULVERTS (TWO EIGHT FOOT LONG SECTIONS ONLY) AND HEADWALL/CUTOFF WALL.
10. BUILD CONCRETE FLOOR OF STONE CHANNEL AT OUTLET OF TWIN 48" CULVERTS.

**STAGE 3:**

1. REMOVE EXISTING PEDESTRIAN BRIDGE.
2. INSTALL TEMPORARY EARTH RETAINING SYSTEM #4 AND TEMPORARY WATER HANDLING ALONG NORTH TRIBUTARY CHANNEL AS SHOWN. MODIFY 15" ACCM TO DISCHARGE THROUGH TEMPORARY EARTH RETAINING SYSTEM #4 INTO CHANNEL NORTH OF ROUTE 31.
3. BUILD PORTION OF WATER LINE IN ROUTE 31.
4. COMPLETE EASTERN 48" CULVERT AND BUILD HEADWALL/CUTOFF WALL, WINGWALL (WW2A), 15" RCP AND STORM MANHOLE. SHIFT FLOW FROM 15" ACCM INTO 48" CULVERT AND REMOVE TEMPORARY WATER HANDLING STRUCTURE #1.
5. PLACE EAST HALF OF INTERMEDIATE RIPRAP.

**STAGE 4:**

1. PLACE TEMPORARY WATER HANDLING STRUCTURE #7 AT OUTLET OF WEST 48" CULVERT AND DOWNSTREAM OF ROUTE 31 CULVERT DEMOLITION.
2. COMPLETE DRAINAGE SYSTEM EAST OF STONE CHANNEL.
3. REMOVE A PORTION OF TEMPORARY EARTH RETAINING SYSTEMS #1 AND #3 SOUTH OF ROUTE 31 AND FILL VOID TO COMPLETE CONCRETE FLOOR.
4. ADJUST AND EXTEND TEMPORARY WATER HANDLING STRUCTURE #6 TO DIVERT FLOW TO EAST SIDE OF CHANNEL AND INTO EAST 48" CULVERT.
5. REMOVE SOUTH PORTION OF TEMPORARY EARTH RETAINING SYSTEM #4.
6. REMOVE EXISTING ROUTE 31 CULVERT.
7. COMPLETE WESTERN 48" CULVERT, HEADWALL/CUTOFF WALL AND COMPLETE WATER LINE AND WINGWALL (WW1A).
8. PLACE WEST HALF OF INTERMEDIATE RIPRAP.
9. ALLOW FLOW INTO BOTH 48" CULVERTS.

**STAGE 5:**

1. SHIFT FLOW FROM 9' X 1.5' CULVERT TO SOUTH SIDE OF TEMPORARY EARTH RETAINING SYSTEM #2.
2. INSTALL TEMPORARY WATER HANDLING STRUCTURE #8.
3. BUILD NORTH WALL OF STONE CHANNEL (WW1B) AND DRAINAGE SYSTEM NORTH OF STONE CHANNEL.
4. BUILD NORTH HALF OF 9' X 1.5' CULVERT CUTOFF WALL AND NORTH HALF OF CONCRETE FLOOR OF STONE CHANNEL.
5. REMOVE REMAINDER OF TEMPORARY EARTH RETAINING SYSTEM #2 WITHIN STONE CHANNEL AND FILL VOID TO COMPLETE CONCRETE FLOOR OF STONE CHANNEL PREVIOUSLY OCCUPIED BY THE TEMPORARY EARTH RETAINING SYSTEM.



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 Glastonbury, Connecticut 06033  
 860 652 8227

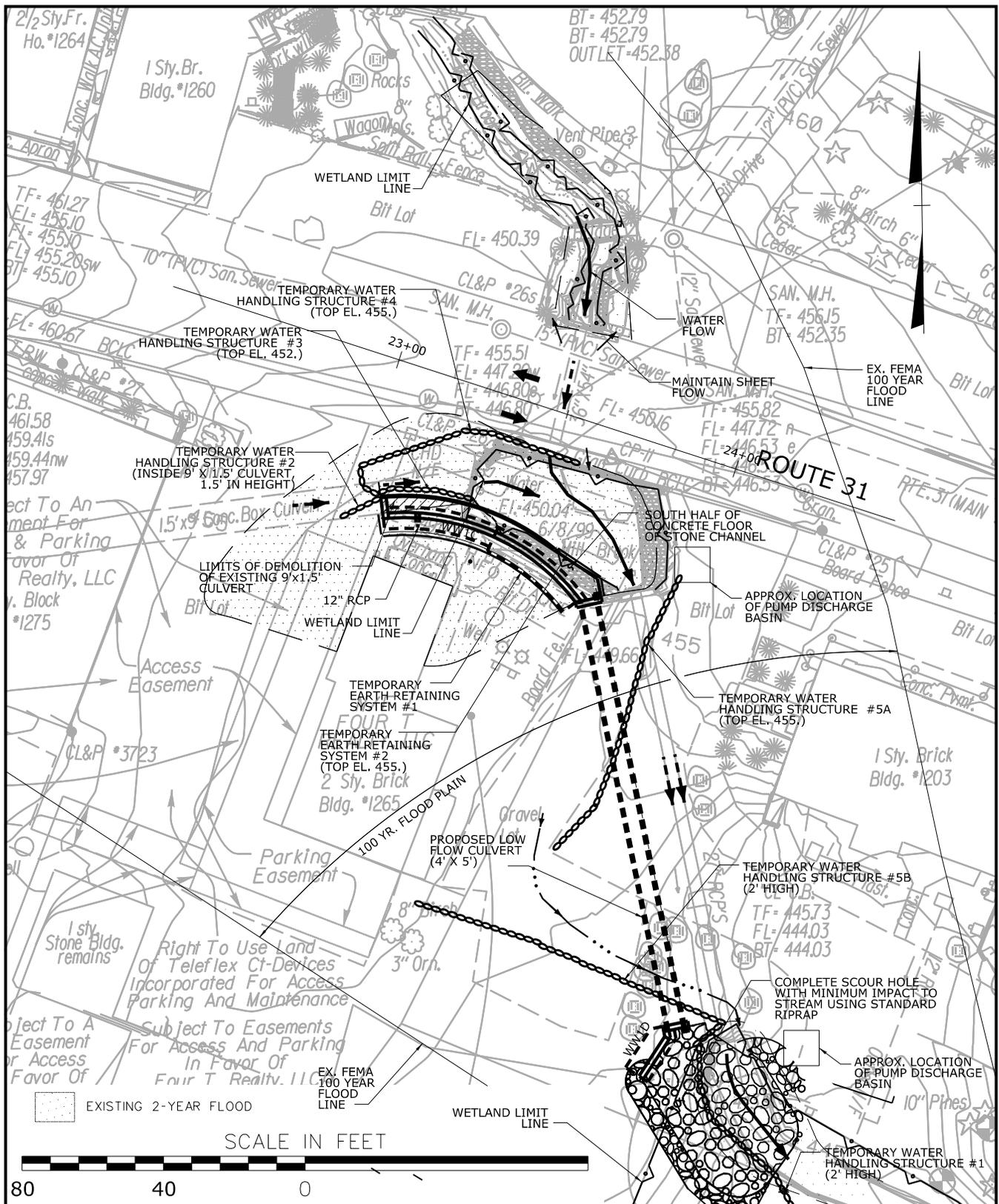
**RECONSTRUCTION OF ROUTE 31, COVENTRY,  
 CONNECTICUT, STATE PROJECT NO. 32-130  
 CONSTRUCTION SEQUENCING (NOTES) -  
 IMPACT AREA 'B'**

TOLLAND COUNTY  
 COVENTRY, CONNECTICUT

APPLICANT: CONNECTICUT  
 DEPARTMENT OF  
 TRANSPORTATION  
 2800 BERLIN TURNPIKE  
 NEWINGTON, CONNECTICUT

DATE: 05/13/13

SHEET 1 OF 6



SCALE IN FEET



# RECONSTRUCTION OF ROUTE 31, COVENTRY, CONNECTICUT, STATE PROJECT NO. 32-130 CONSTRUCTION SEQUENCING (STAGE 1) - IMPACT AREA 'B'

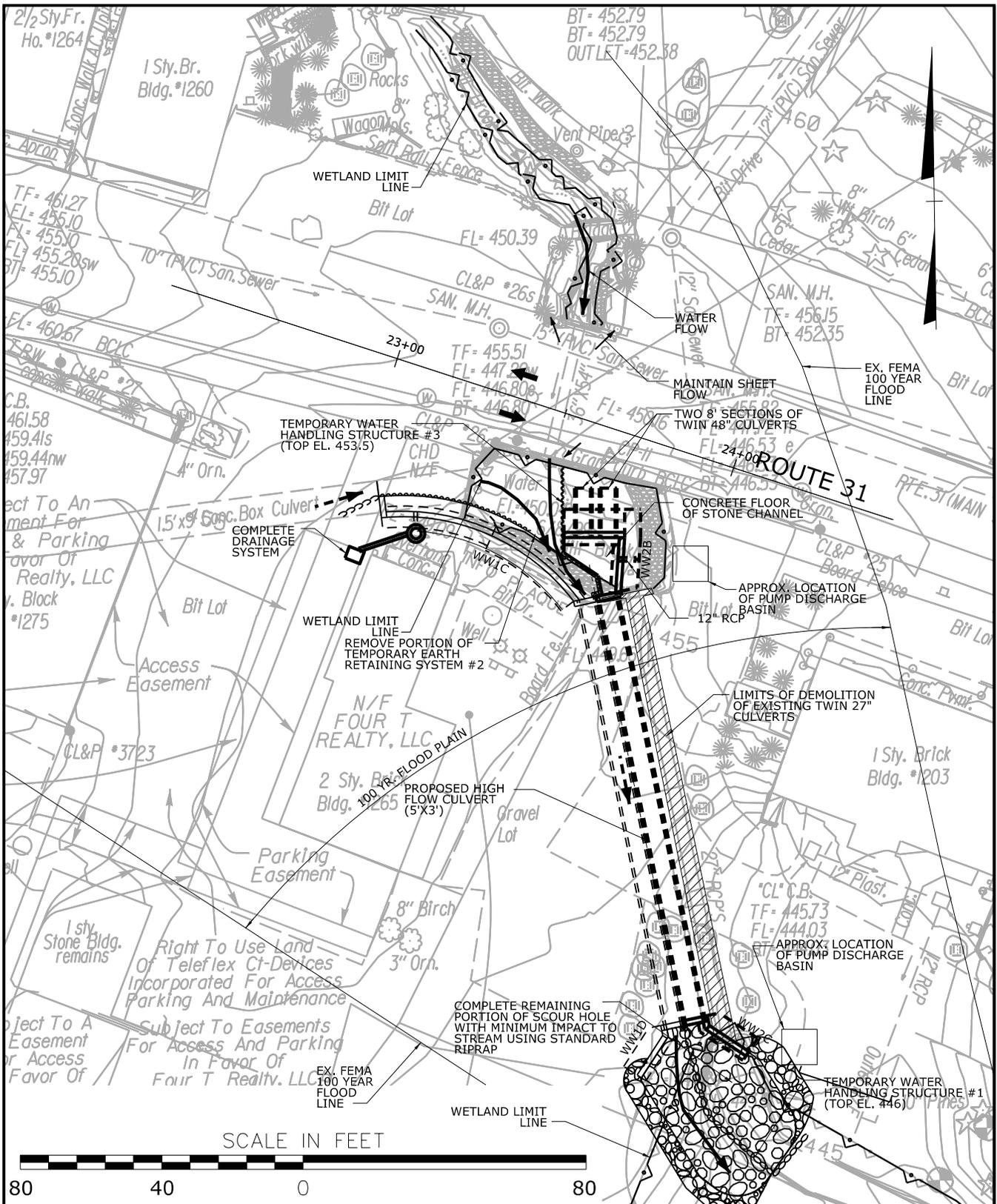
**BSC GROUP**  
180 Glastonbury Boulevard  
Suite 103  
Glastonbury, Connecticut 06033  
860 652 8227

TOLLAND COUNTY  
COVENTRY, CONNECTICUT

APPLICANT: CONNECTICUT  
DEPARTMENT OF  
TRANSPORTATION  
2800 BERLIN TURNPIKE  
NEWINGTON, CONNECTICUT

DATE: 05/13/13

SHEET 2 OF 6



SCALE IN FEET



**RECONSTRUCTION OF ROUTE 31, COVENTRY, CONNECTICUT, STATE PROJECT NO. 32-130  
CONSTRUCTION SEQUENCING (STAGE 2) -  
IMPACT AREA 'B'**

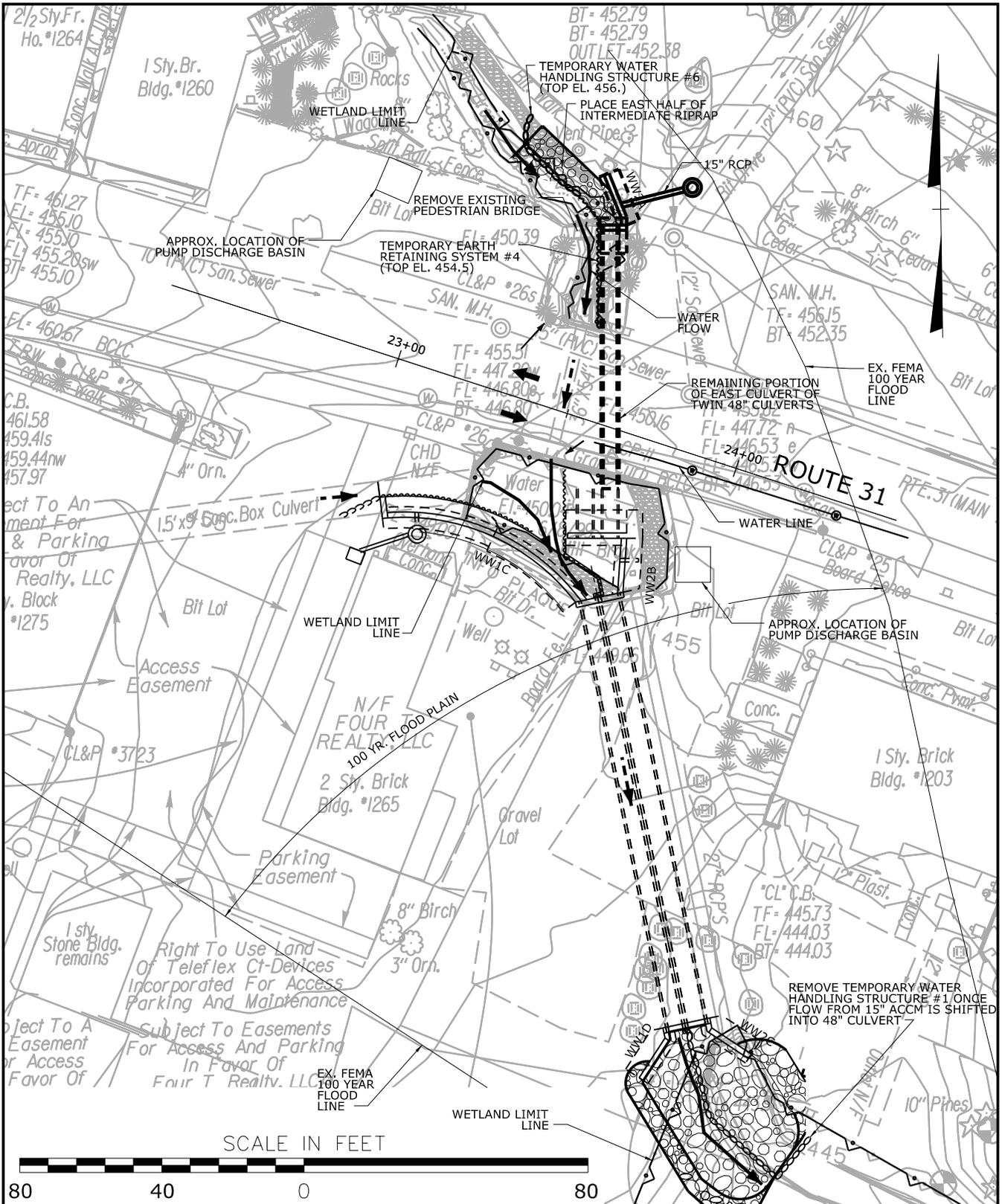
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860 652 8227

TOLLAND COUNTY  
COVENTRY, CONNECTICUT

APPLICANT: CONNECTICUT  
DEPARTMENT OF  
TRANSPORTATION  
2800 BERLIN TURNPIKE  
NEWINGTON, CONNECTICUT

DATE: 05/13/13

SHEET 3 OF 6



SCALE IN FEET



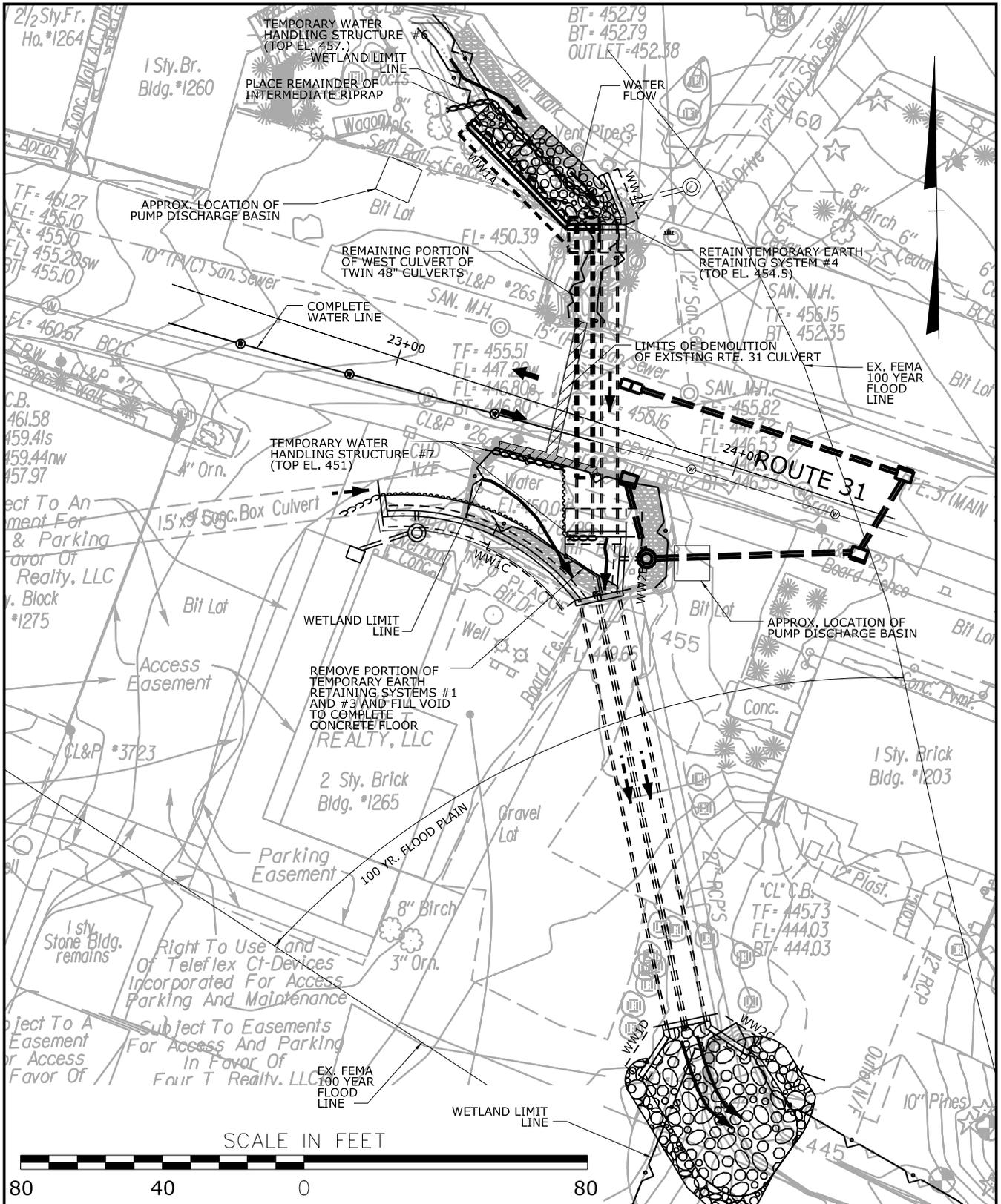
**RECONSTRUCTION OF ROUTE 31, COVENTRY, CONNECTICUT, STATE PROJECT NO. 32-130  
CONSTRUCTION SEQUENCING (STAGE 3) -  
IMPACT AREA 'B'**

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TOLLAND COUNTY  
COVENTRY, CONNECTICUT

APPLICANT: CONNECTICUT  
DEPARTMENT OF  
TRANSPORTATION  
2800 BERLIN TURNPIKE  
NEWINGTON, CONNECTICUT

DATE: 05/13/13  
SHEET 4 OF 6



SCALE IN FEET



**RECONSTRUCTION OF ROUTE 31, COVENTRY, CONNECTICUT, STATE PROJECT NO. 32-130  
CONSTRUCTION SEQUENCING (STAGE 4) -  
IMPACT AREA 'B'**

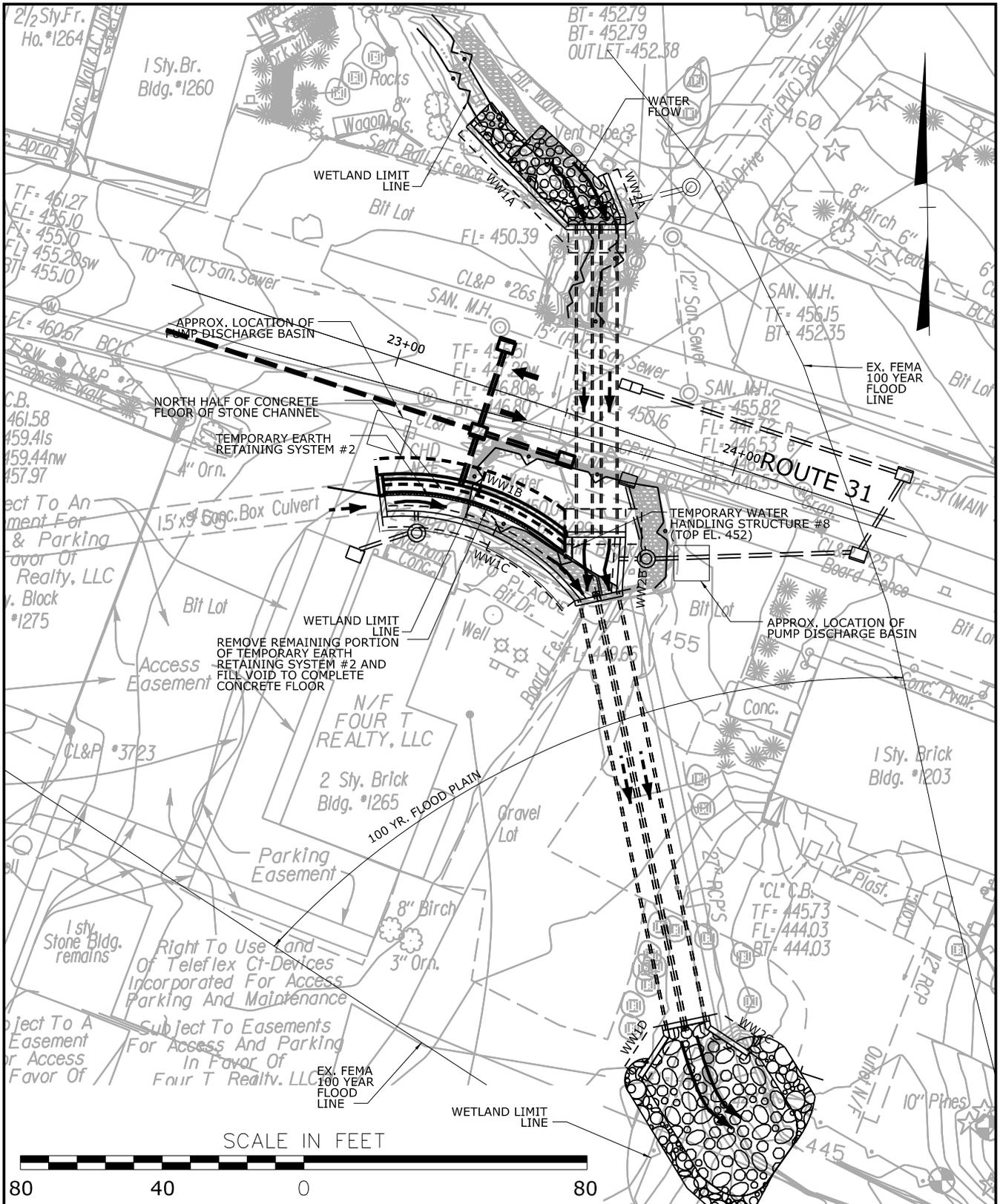
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COVENTRY, CONNECTICUT

APPLICANT: CONNECTICUT  
DEPARTMENT OF  
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DATE: 05/13/13

SHEET 5 OF 6



SCALE IN FEET



**RECONSTRUCTION OF ROUTE 31, COVENTRY, CONNECTICUT, STATE PROJECT NO. 32-130  
CONSTRUCTION SEQUENCING (STAGE 5) -  
IMPACT AREA 'B'**

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TOLLAND COUNTY  
COVENTRY, CONNECTICUT

APPLICANT: CONNECTICUT  
DEPARTMENT OF  
TRANSPORTATION  
2800 BERLIN TURNPIKE  
NEWINGTON, CONNECTICUT

DATE: 05/13/13

SHEET 6 OF 6

## Attachment C: Documentation Form (continued)

7. *Description of Site* - Describe all natural and man-made features at the property at which the regulated activity is proposed to be conducted.

**The project route is centered along an approximately 1/2-mile segment of Route 31 beginning just west of the intersection with Route 275 and ending approx. 1000 feet east of the intersection with Monument Hill Rd. Land uses adjacent to the roadway are typically residential and commercial, interspersed with some natural forested or vegetated areas. Two roadway intersections and adjacent parking areas are also part of the project footprint. Most of the wetland impact areas have been previously altered and are located immediately adjacent to roadways or parking lots. Mill Brook in particular has been previously altered and impacted and was historically used to power the mills in this Village. A large section of the stream remains underground and under buildings in culverts in the vicinity of the project.**

**Please see Attachment K Environmental Report for a detailed description of the features of each of the four wetland impact areas along the project.**

Check here if additional sheets are necessary, and label and attach them to this sheet.

8. *Disposal of Excess Material* - State the type and quantity of excess material anticipated from the project and where such material will be disposed.

**Blasting will be necessary in the realignment of Route 31. We anticipate the removal of 5,000 cubic yards of rock/ledge and 9,000 cubic yards of earth and pavement for a total of 14,000 cubic yards of excess material generated during the reconstruction of the roadway.**

**Excavation will be necessary within the wetland impact areas, including the channel of Mill Brook in the creation of the step pool features and the installation of the form liner walls. We anticipate the excavation of a total of 482 cubic yards of material in wetlands and watercourses prior to the installation of scour protection and new culvert materials. Any useable rocky substrate from the stream channels will be preserved and used to supplement the instream scour protection with a more natural material layer.**

**All material will be disposed of in accordance with state and federal laws as well as ConnDOT's material disposal policies. This includes ConnDOT specification form #816 for fill material as needed.**

Check here if a disposal plan is included as Attachment C8.

**Attachment C: Documentation Form (continued)**

9. *Inland Wetlands and Watercourses Applications Only:*

- a. Is the project located in a public water supply watershed?  Yes  No

If Yes, the applicant must give written notice to the water company of the filing of this application in accordance with CGS Section 22a-42f.

If Yes, include a copy of that notice as Attachment C9a.

- b. Is any portion of an inland wetland or watercourse in which the regulated activity is proposed located within 500 feet of an another municipality?  Yes  No

If Yes, the applicant must give written notice to the inland wetlands agency of such municipality of the filing of this application in accordance with CGS Section 22a-42c.

If Yes, include a copy of that notice as Attachment C9b.

- c. Is the owner of the subject property different than the applicant?  Yes  No

If Yes, the owner must give written consent to the proposed activity in accordance with RCSA Section 22a-39-5.2.

If Yes, include a copy of that consent as Attachment C9c.

10. *Inland Wetlands and Watercourses Applications Only:*

List the names and addresses of the current owners of record of land abutting the site of the proposed regulated activity.

Name:

Address:

City/Town: State: Zip Code:

Mailing address, if different than above:

Mailing Address:

City/Town: State: Zip Code:

Name:

Address:

City/Town: State: Zip Code:

Mailing address, if different than above:

Mailing Address:

City/Town: State: Zip Code:

Name:

Address:

City/Town: State: Zip Code:

Mailing address, if different than above:

Mailing Address:

City/Town: State: Zip Code:

Check here if additional sheets are necessary, and label and attach them to this sheet.

ATTACHMENT C – SUPPLEMENTAL SHEETS  
 IWRD PERMIT APPLICATION

**Question 10 Abutters List**  
**Page 1 of 1**

<u>NAME</u>	<u>STREET</u>	<u>TOWN</u>	<u>ZIP CODE</u>	<u>PARCEL</u>	<u>AREA</u>
Teleflex-CT Devices Inc.	P.O. Box 219	Coventry, CT	06238	L61 2	A
State of Connecticut	2800 Berlin Turnpike P.O. Box 317546	Newington, CT	06131	L61 3	A
State of Connecticut	2800 Berlin Turnpike P.O. Box 317546	Newington, CT	06131	L61 4	A
SJB Properties LCC	1260 Main Street	Coventry, CT	06238	L61 8	B1
Laura A. Etchells	1250 Main Street P.O. Box 204	Coventry, CT	06238	L61 6	B1
Bidwell Apartments Asscoiates c/o Pelkey Roger	2931 South Street	Coventry, CT	06238	L61 10	B1
Teleflex-CT Devices Inc.	P.O. Box 219	Coventry, CT	06238	L62 1	B2
Four T Realty LLC	P.O. Box 406	Coventry, CT	06238	L62 1A	B2, B3
Town of Coventry	1712 Main Street	Coventry, CT	06238	L62 1B	B2, B3
Country Village LCC	91 Satari Drive	Coventry, CT	06238	L62 2	B3
Town of Coventry	1712 Main Street	Coventry, CT	06238	L62 20	B3

\* Highlighted entries indicate a repeat abutter.

## Attachment C: Documentation Form (continued)

### 11. Section 401 Water Quality Certification Applications Only:

In order to obtain a Section 401 Water Quality Certification from the DEP, you must have applied for a federal license or permit for an activity which may result in a discharge into the waters of the United States, including wetlands.

- a. Has an application for a federal license or permit been submitted to the Army Corps of Engineers or other federal agency?  Yes  No

If Yes, include a complete copy of the application form and plans as Attachment C11a.

- b. If the Section 401 Water Quality Certification application is for an activity authorized by an individual or programmatic general permit issued by the Army Corps of Engineers under section 404 of the federal Clean Water Act, identify such permit by name and application or file number.

Permit Name: **Dept of the Army General Permit State of CT**

Application or File Number: **TBD**

### 12. Summary of Documents submitted with Attachment C: Check each document being submitted under Attachment C as verification that all applicable documents have been submitted.

Attachment C8: Disposal Plan

Attachment C9a: If the project is located in a public water supply watershed, provide a copy of the written notice sent to the water company of the filing of this application in accordance with CGS Section 22a-42f.

Attachment C9b: If any portion of an inland wetland or watercourse in which the regulated activity is proposed to be located is within 500 feet of an another municipality, provide a copy of the written notice sent to the inland wetlands agency of such municipality of the filing of this application in accordance with CGS Section 22a-42c.

Attachment C9c: If the owner of the subject property is different than the applicant, provide a copy of the owner's written consent to the proposed activity in accordance with RCSA Section 22a-39-5.2.

Attachment C11a: *Section 401 Water Quality Certification Applications Only*: a complete copy of the application form and plans submitted to a federal agency for a federal license or permit.

Other, please specify:

# Attachment F: Documentation Form for Flood Management Certification

<p>1. Applicant Name: <b>Connecticut Department of Transportation</b> (as indicated on the <i>Permit Application Transmittal Form</i>)</p> <p>2. Name of Subject Facility or Project/Project Number: <b>Route 31 Reconstruction - Project #32-130</b></p> <p>3. Name of floodplain and watercourse: <b>Mill Brook</b></p> <p>4. This Certification is submitted for the Commissioner's approval pursuant to Section 25-68d of the General Statutes. I hereby certify that based on my reasonable investigation, including my inquiry of those individuals responsible for obtaining the information, the proposed activity described in this application is consistent with all applicable standards and criteria established in Sections 25-68d(b) of the General Statutes and Sections 25-68h-1 through 25-68h-3, inclusive, of the Regulations of Connecticut State Agencies.</p>	
Signature of the head of the certifying State agency or his/her designated agent	Date
<b>Thomas J. Maziarz</b>	<b>Bureau Chief, Policy &amp; Plannin</b>
Name of the head of the certifying State agency or his/her designated agent (print or type)	Title (if applicable)

**RECONSTRUCTION OF ROUTE 31, COVENTRY,  
CONNECTICUT STATE PROJECT NO. 32-130**

**INDEX OF PLATES**

DESCRIPTION	SHEET NUMBER
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OVERALL LAYOUT	2
IMPACT AREA 'A' – TROLLEYWAY	3
ROADWAY CROSS SECTION 'A-A'	4
IMPACT AREA 'B' – FIRE POND NORTH (B1), CENTRAL (B2), AND SOUTH (B3)	5
IMPACT AREA 'B1' - FIRE POND NORTH ROADWAY CROSS SECTION 'A-A'	6
IMPACT AREA 'B2' – FIRE POND CENTRAL STONE CHANNEL PLAN	7
IMPACT AREA 'B2' – FIRE POND CENTRAL STONE CHANNEL PROFILE	8
IMPACT AREA 'B2' – FIRE POND CENTRAL SECTION 'B-B'	9
IMPACT AREA 'B2' – FIRE POND CENTRAL SECTION 'C-C'	10
IMPACT AREA 'B2' – FIRE POND CENTRAL DETAIL 'A'	11
IMPACT AREA 'B2' – FIRE POND CENTRAL SECTION 'D-D'	12
IMPACT AREA 'B3' – FIRE POND SOUTH ROADWAY CROSS SECTION 'E-E'	13
PREFORMED SCOUR HOLE – TYPE 1 (ENDWALL) DETAIL	14
RIPRAP APRON – TYPE C (ENDWALL) DETAIL	15
PLANTING PLAN - IMPACT AREA 'A'	16
PLANTING PLAN – IMPACT AREA 'B'	17
PLANT SCHEDULE	18

**WETLAND AND WATERCOURSE IMPACT SUMMARY**

**LEGEND**

- FLOW DIRECTION
- ▨ WETLAND IMPACT

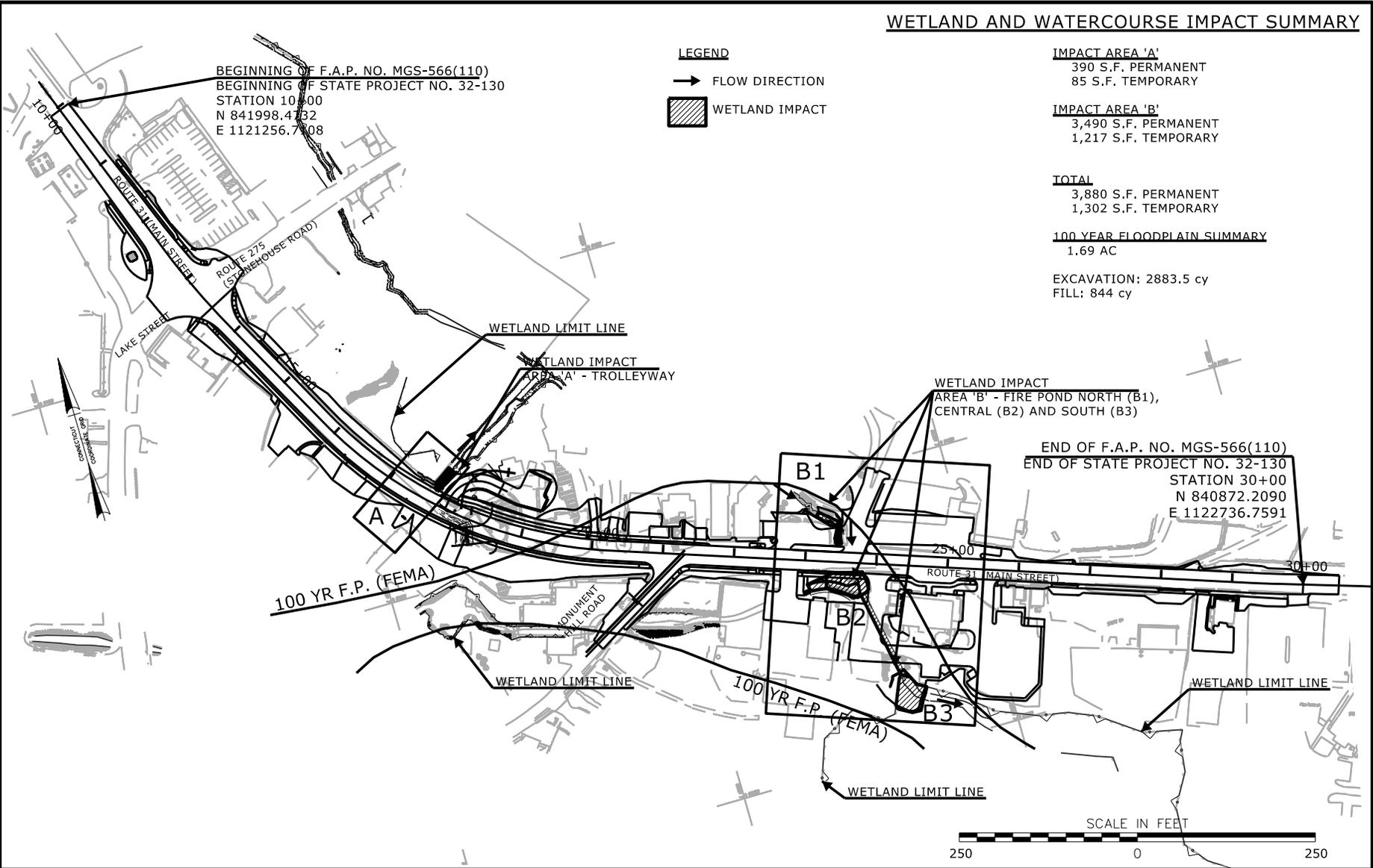
**IMPACT AREA 'A'**  
 390 S.F. PERMANENT  
 85 S.F. TEMPORARY

**IMPACT AREA 'B'**  
 3,490 S.F. PERMANENT  
 1,217 S.F. TEMPORARY

**TOTAL**  
 3,880 S.F. PERMANENT  
 1,302 S.F. TEMPORARY

**100 YEAR FLOODPLAIN SUMMARY**  
 1.69 AC

EXCAVATION: 2883.5 cy  
 FILL: 844 cy



**BSC GROUP**  
 180 Glastonbury Boulevard  
 Suite 103  
 Glastonbury, Connecticut 06033  
 860 652 8227

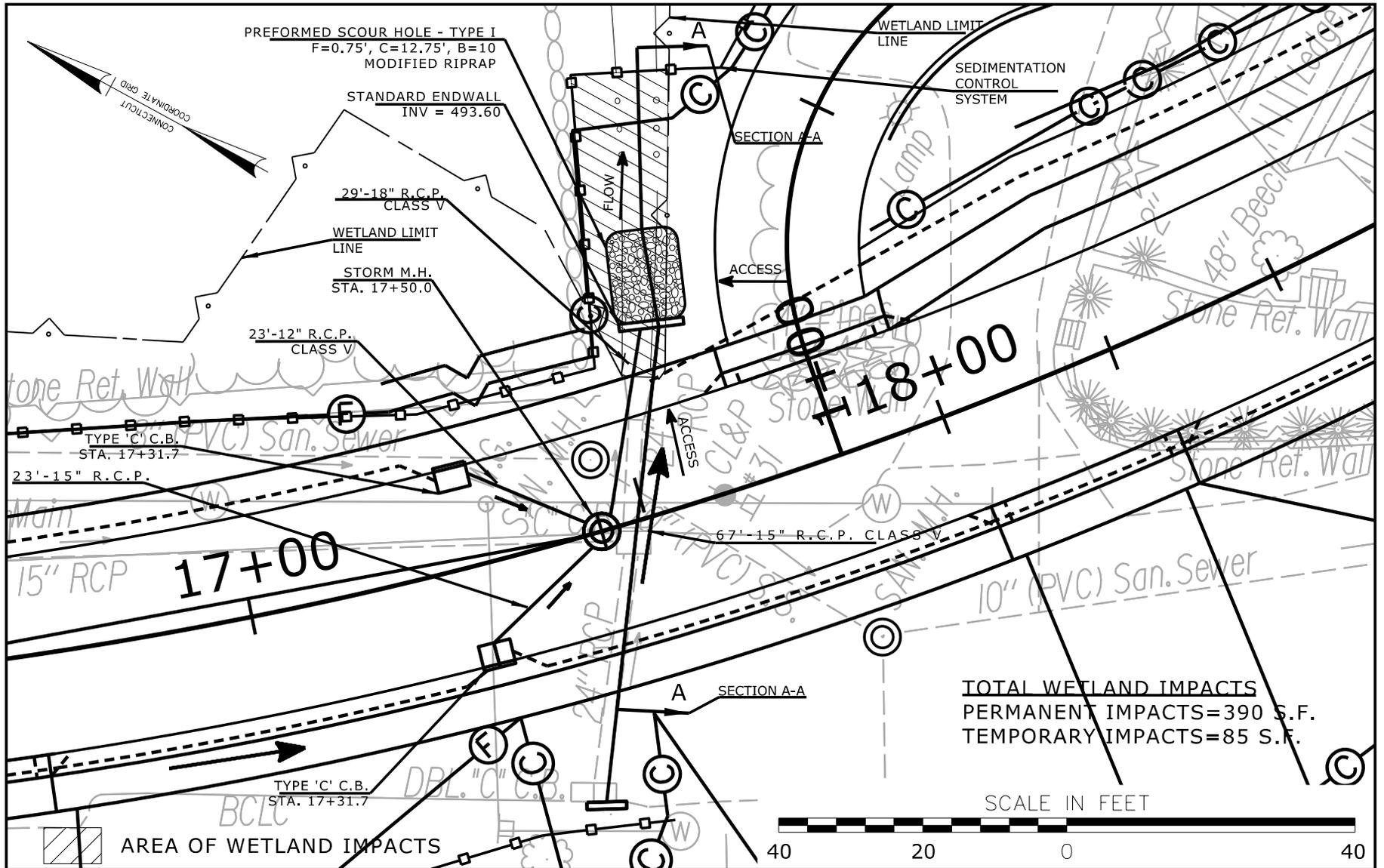
**RECONSTRUCTION OF ROUTE 31, COVENTRY,  
 CONNECTICUT STATE PROJECT NO. 32-130  
 OVERALL LAYOUT**

DATE: 05/13/13

TOLLAND COUNTY  
 COVENTRY, CONNECTICUT

APPLICANT: CONNECTICUT DEPARTMENT OF  
 TRANSPORTATION  
 2800 BERLIN TURNPIKE  
 NEWINGTON, CONNECTICUT

SHEET 2 OF 18



**BSC GROUP**  
 180 Glastonbury Boulevard  
 Suite 103  
 Glastonbury, Connecticut 06033  
 860 652 8227

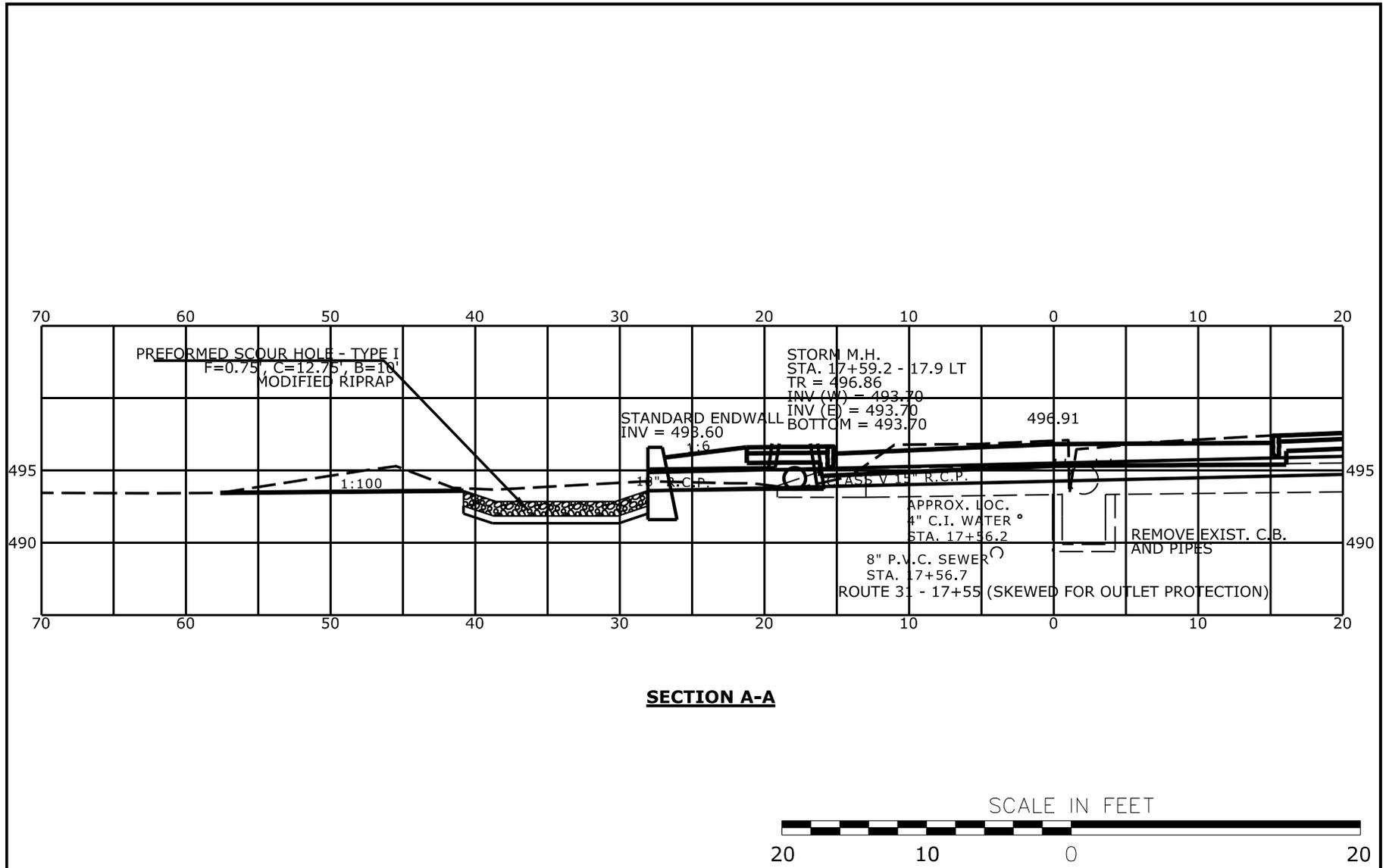
**RECONSTRUCTION OF ROUTE 31, COVENTRY,  
 CONNECTICUT, STATE PROJECT NO. 32-130  
 IMPACT AREA 'A'-TROLLEYWAY**

DATE: 05/13/13

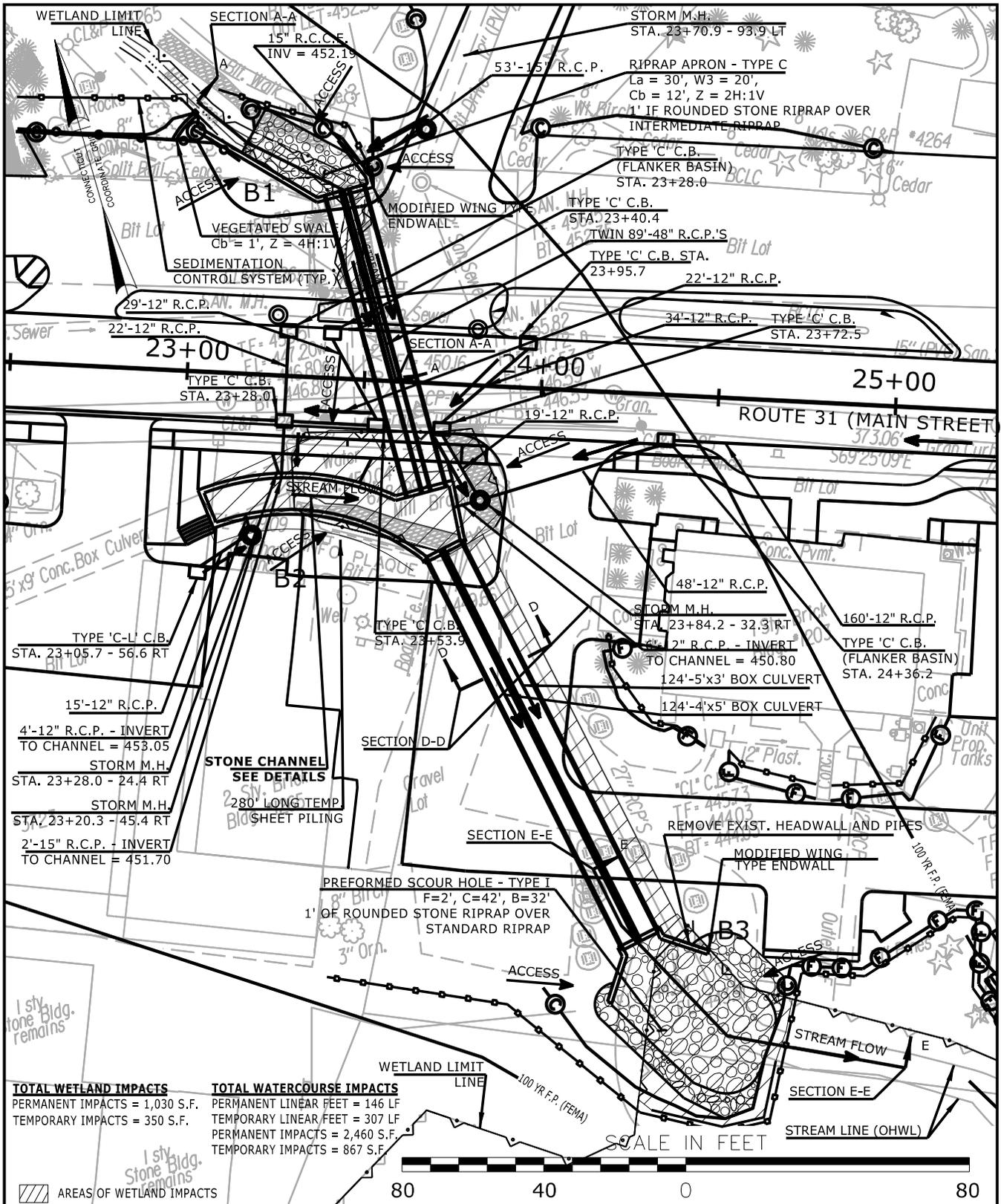
TOLLAND COUNTY  
 COVENTRY, CONNECTICUT

APPLICANT: CONNECTICUT DEPARTMENT OF  
 TRANSPORTATION  
 2800 BERLIN TURNPIKE  
 NEWINGTON, CONNECTICUT

SHEET 3 OF 18



 <p>180 Glastonbury Boulevard Suite 103 Glastonbury, Connecticut 06033 860 652 8227</p>	<p><b>RECONSTRUCTION OF ROUTE 31, COVENTRY, CONNECTICUT, STATE PROJECT NO. 32-130 IMPACT AREA 'A' - TROLLEYWAY - SECTION 'A-A'</b></p>		<p>DATE: 05/13/13</p>
	<p>TOLLAND COUNTY COVENTRY, CONNECTICUT</p>	<p>APPLICANT: CONNECTICUT DEPARTMENT OF TRANSPORTATION 2800 BERLIN TURNPIKE NEWINGTON, CONNECTICUT</p>	<p>SHEET 4 OF 18</p>



**TOTAL WETLAND IMPACTS**  
 PERMANENT IMPACTS = 1,030 S.F.  
 TEMPORARY IMPACTS = 350 S.F.

**TOTAL WATERCOURSE IMPACTS**  
 PERMANENT LINEAR FEET = 146 LF  
 TEMPORARY LINEAR FEET = 307 LF  
 PERMANENT IMPACTS = 2,460 S.F.  
 TEMPORARY IMPACTS = 867 S.F.

▨ AREAS OF WETLAND IMPACTS

## RECONSTRUCTION OF ROUTE 31, COVENTRY, CONNECTICUT, STATE PROJECT NO. 32-130 IMPACT AREA 'B' - FIRE POND NORTH (B1), CENTRAL (B2) AND SOUTH (B3)

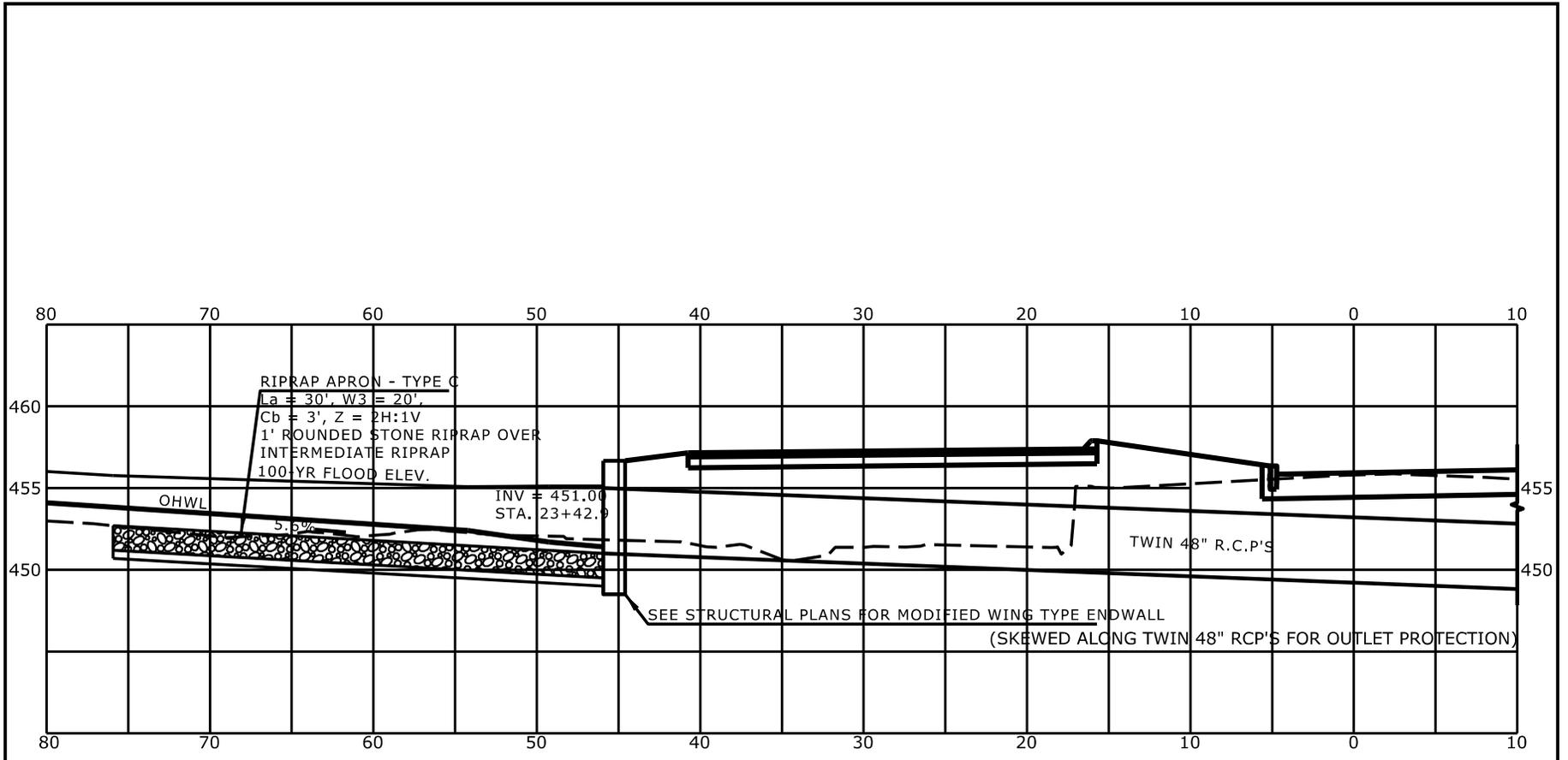
**BSC GROUP**  
 180 Glastonbury Boulevard  
 Suite 103  
 Glastonbury, Connecticut 06033  
 860 652 8227

TOLLAND COUNTY  
 COVENTRY, CONNECTICUT

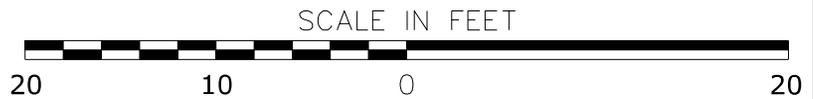
APPLICANT: CONNECTICUT  
 DEPARTMENT OF  
 TRANSPORTATION  
 2800 BERLIN TURNPIKE  
 NEWINGTON, CONNECTICUT

DATE: 05/13/13

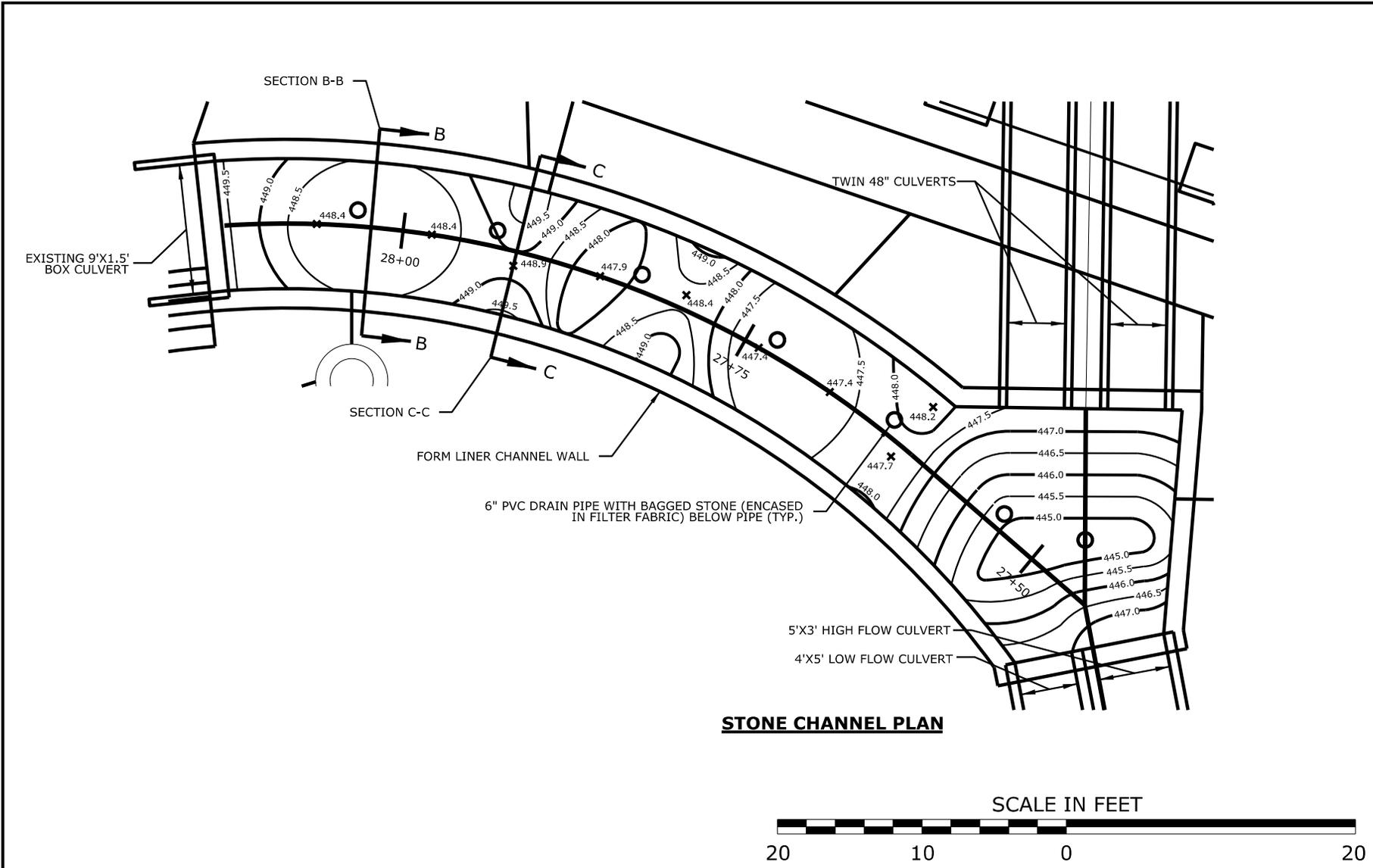
SHEET 5 OF 18



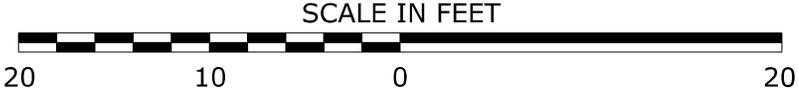
**SECTION A-A**



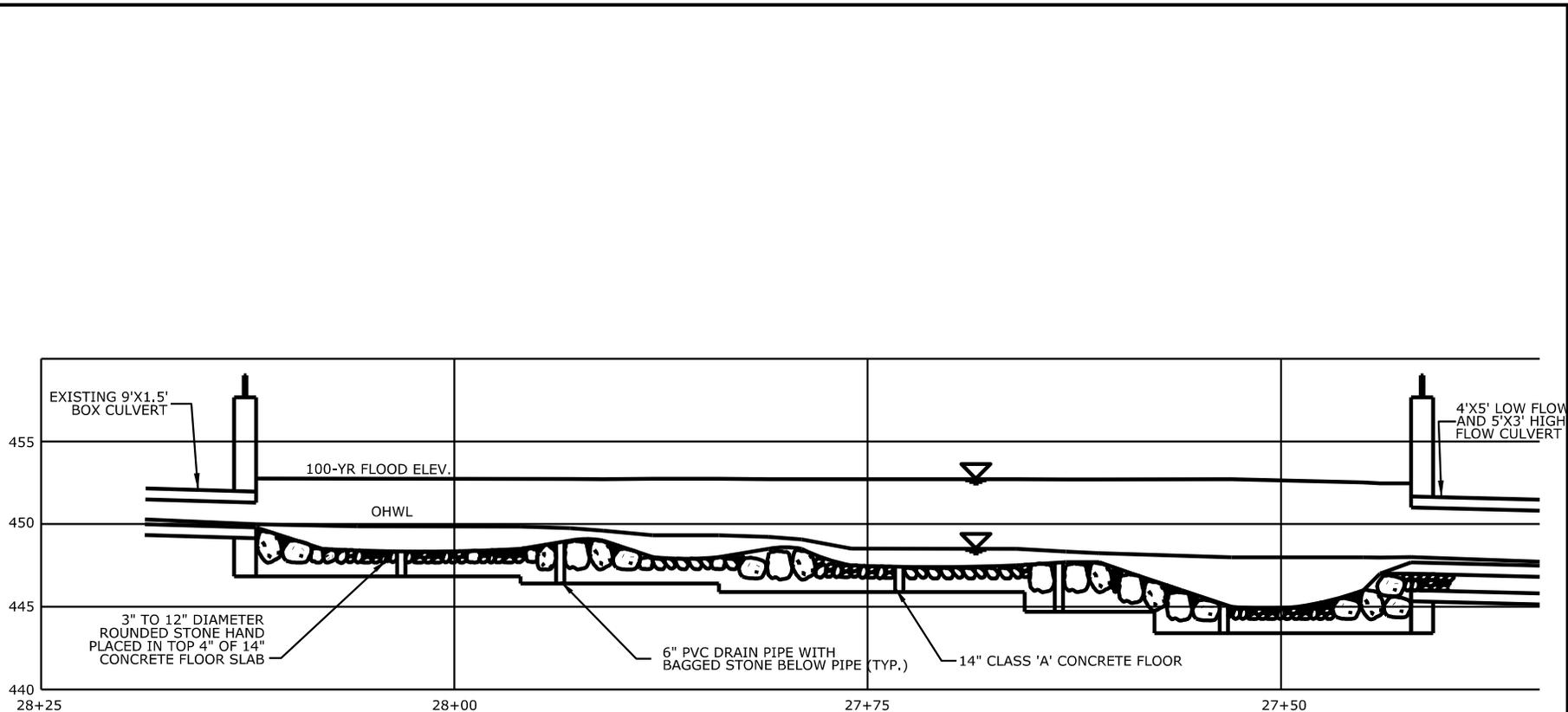
 <p>180 Glastonbury Boulevard Suite 103 Glastonbury, Connecticut 06033 860 652 8227</p>	<p><b>RECONSTRUCTION OF ROUTE 31, COVENTRY, CONNECTICUT, STATE PROJECT NO. 32-130 IMPACT AREA 'B1' - FIRE POND NORTH - SECTION 'A-A'</b></p>		<p>DATE: 05/13/13</p>
	<p>TOLLAND COUNTY COVENTRY, CONNECTICUT</p>	<p>APPLICANT: CONNECTICUT DEPARTMENT OF TRANSPORTATION 2800 BERLIN TURNPIKE NEWINGTON, CONNECTICUT</p>	<p>SHEET 6 OF 18</p>



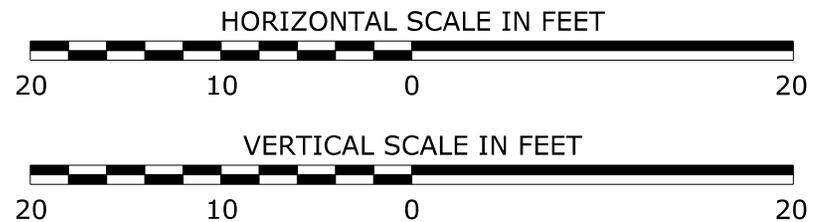
**STONE CHANNEL PLAN**



 <p>180 Glastonbury Boulevard Suite 103 Glastonbury, Connecticut 06033 860 652 8227</p>	<p><b>RECONSTRUCTION OF ROUTE 31, COVENTRY, CONNECTICUT, STATE PROJECT NO. 32-130 IMPACT AREA 'B2' - FIRE POND CENTRAL - STONE CHANNEL PLAN</b></p>		<p>DATE: 05/13/13</p>
	<p>TOLLAND COUNTY COVENTRY, CONNECTICUT</p>	<p>APPLICANT: CONNECTICUT DEPARTMENT OF TRANSPORTATION 2800 BERLIN TURNPIKE NEWINGTON, CONNECTICUT</p>	<p>SHEET 7 OF 18</p>



**STONE CHANNEL PROFILE**



**BSC GROUP**  
 180 Glastonbury Boulevard  
 Suite 103  
 Glastonbury, Connecticut 06033  
 860 652 8227

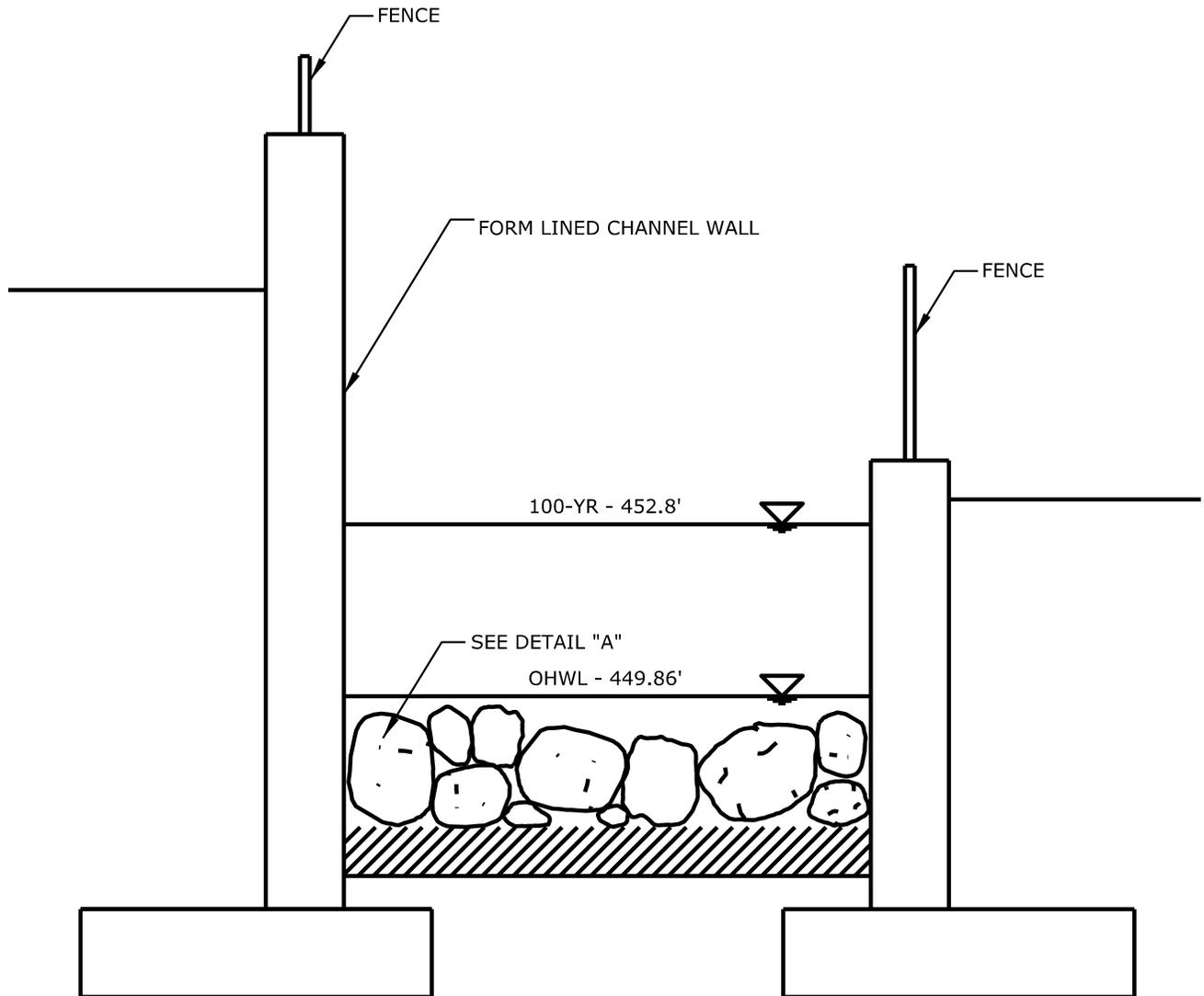
**RECONSTRUCTION OF ROUTE 31, COVENTRY,  
 CONNECTICUT, STATE PROJECT NO. 32-130  
 IMPACT AREA 'B2' - FIRE POND CENTRAL - STONE  
 CHANNEL PROFILE**

DATE: 05/13/13

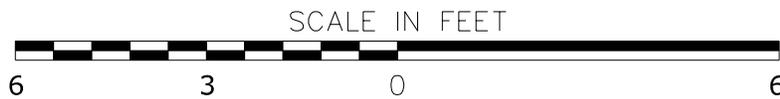
TOLLAND COUNTY  
 COVENTRY, CONNECTICUT

APPLICANT: CONNECTICUT DEPARTMENT OF  
 TRANSPORTATION  
 2800 BERLIN TURNPIKE  
 NEWINGTON, CONNECTICUT

SHEET 8 OF 18



**SECTION B-B**



**BSC GROUP**  
 180 Glastonbury Boulevard  
 Suite 103  
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 860 652 8227

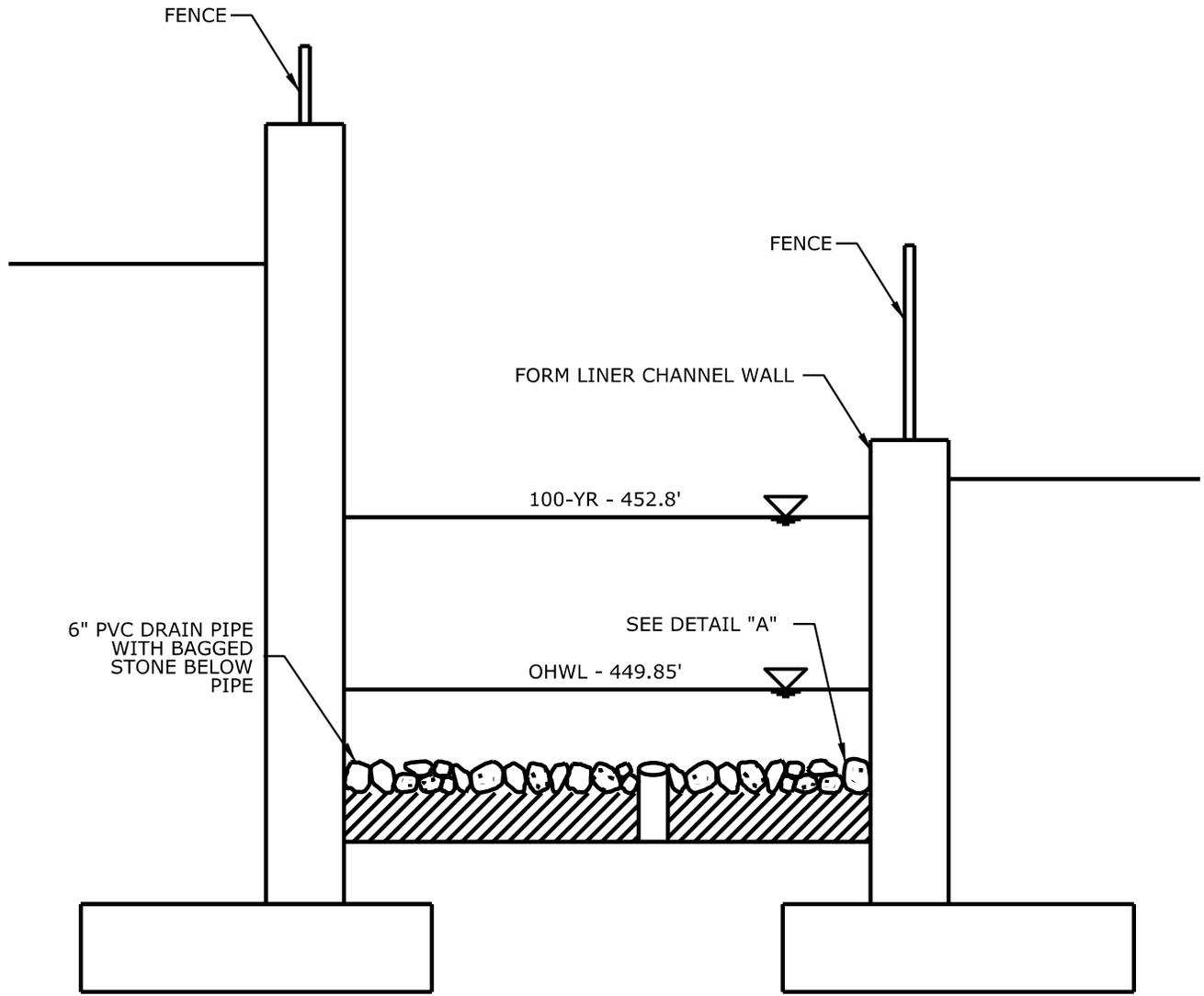
**RECONSTRUCTION OF ROUTE 31,  
 COVENTRY, CONNECTICUT, STATE PROJECT NO.  
 32-30 IMPACT AREA 'B2' - FIRE POND CENTRAL -  
 SECTION 'B-B'**

TOLLAND COUNTY  
 COVENTRY, CONNECTICUT

APPLICANT: CONNECTICUT  
 DEPARTMENT OF  
 TRANSPORTATION  
 2800 BERLIN TURNPIKE  
 NEWINGTON, CONNECTICUT

DATE: 05/13/13

SHEET 9 OF 18



**SECTION C-C**



**BSC GROUP**  
 180 Glastonbury Boulevard  
 Suite 103  
 Glastonbury, Connecticut 06033  
 860 652 8227

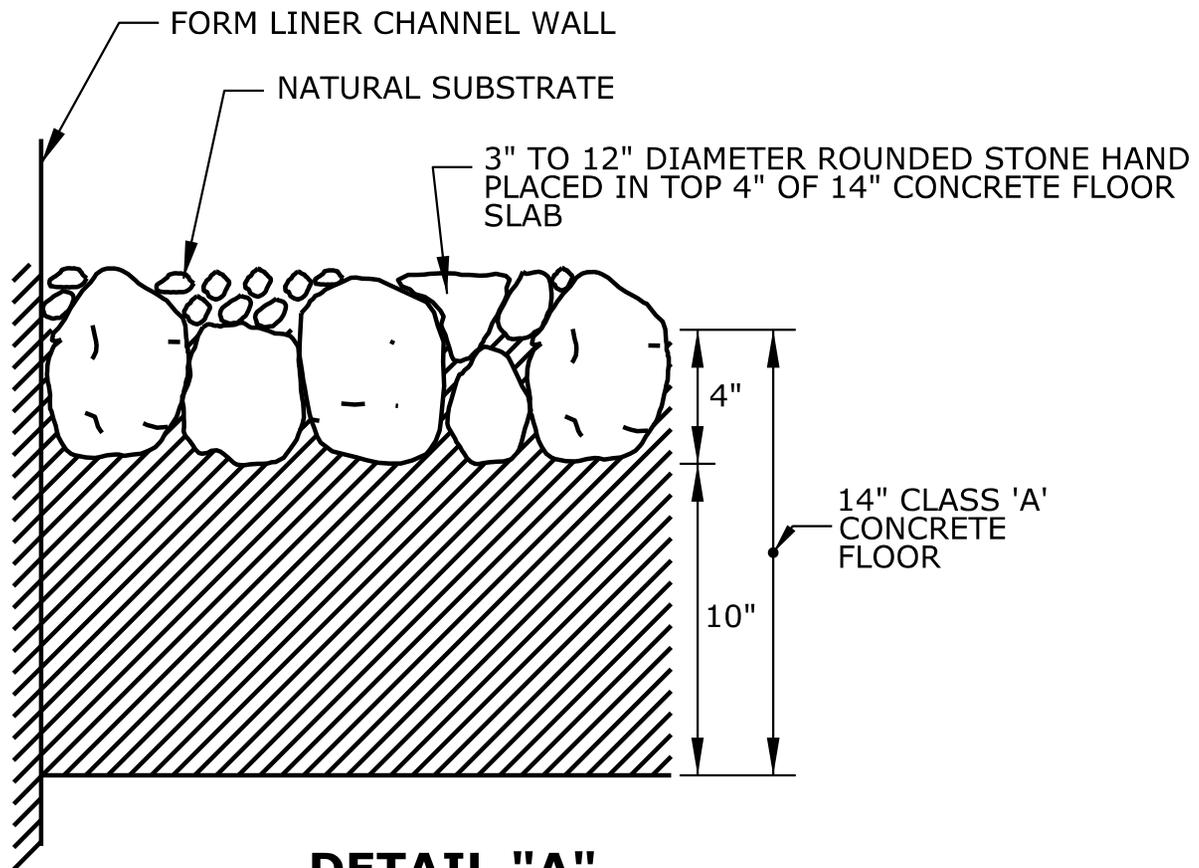
**RECONSTRUCTION OF ROUTE 31, COVENTRY,  
 CONNECTICUT STATE PROJECT NO. 32-130  
 IMPACT AREA 'B2' - FIRE POND CENTRAL -  
 SECTION 'C-C'**

TOLLAND COUNTY  
 COVENTRY, CONNECTICUT

APPLICANT: CONNECTICUT  
 DEPARTMENT OF  
 TRANSPORTATION  
 2800 BERLIN TURNPIKE  
 NEWINGTON, CONNECTICUT

DATE: 05/13/13

SHEET 10 OF 18

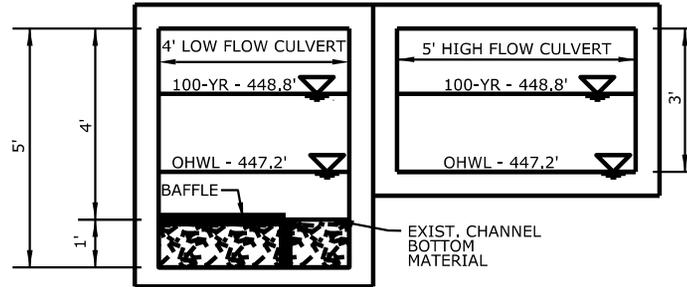


**DETAIL "A"**



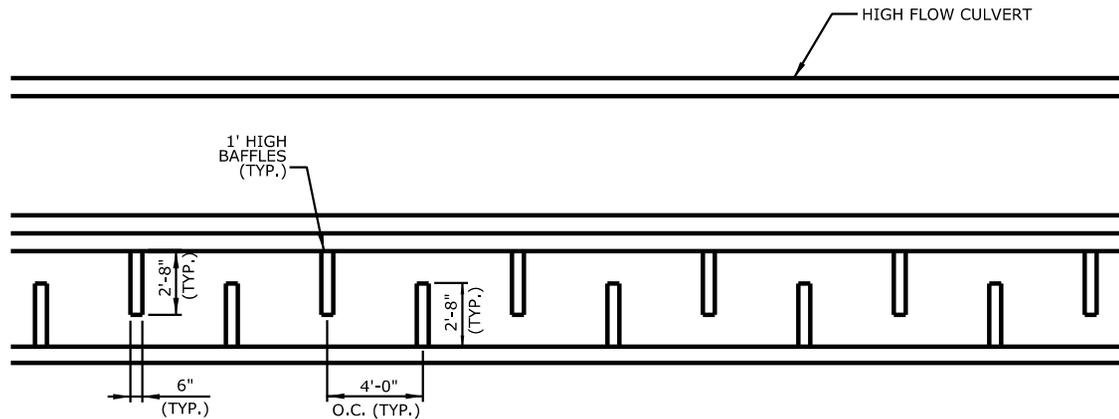
 180 Glastonbury Boulevard Suite 103 Glastonbury, Connecticut 06033 860 652 8227	<b>RECONSTRUCTION OF ROUTE 31, COVENTRY,          CONNECTICUT, STATE PROJECT NO. 32-130          IMPACT AREA 'B2' - FIRE POND CENTRAL - DETAIL 'A'</b>		DATE: 05/13/13
	TOLLAND COUNTY COVENTRY, CONNECTICUT	APPLICANT: CONNECTICUT DEPARTMENT OF TRANSPORTATION 2800 BERLIN TURNPIKE NEWINGTON, CONNECTICUT	SHEET 11 OF 18

PROPOSED GRADE VARIES



**SECTION D-D**

SCALE: 1"=4'



**BAFFLE LAYOUT PLAN**

SCALE: 1"=8'



180 Glastonbury Boulevard  
Suite 103  
Glastonbury, Connecticut 06033  
860 652 8227

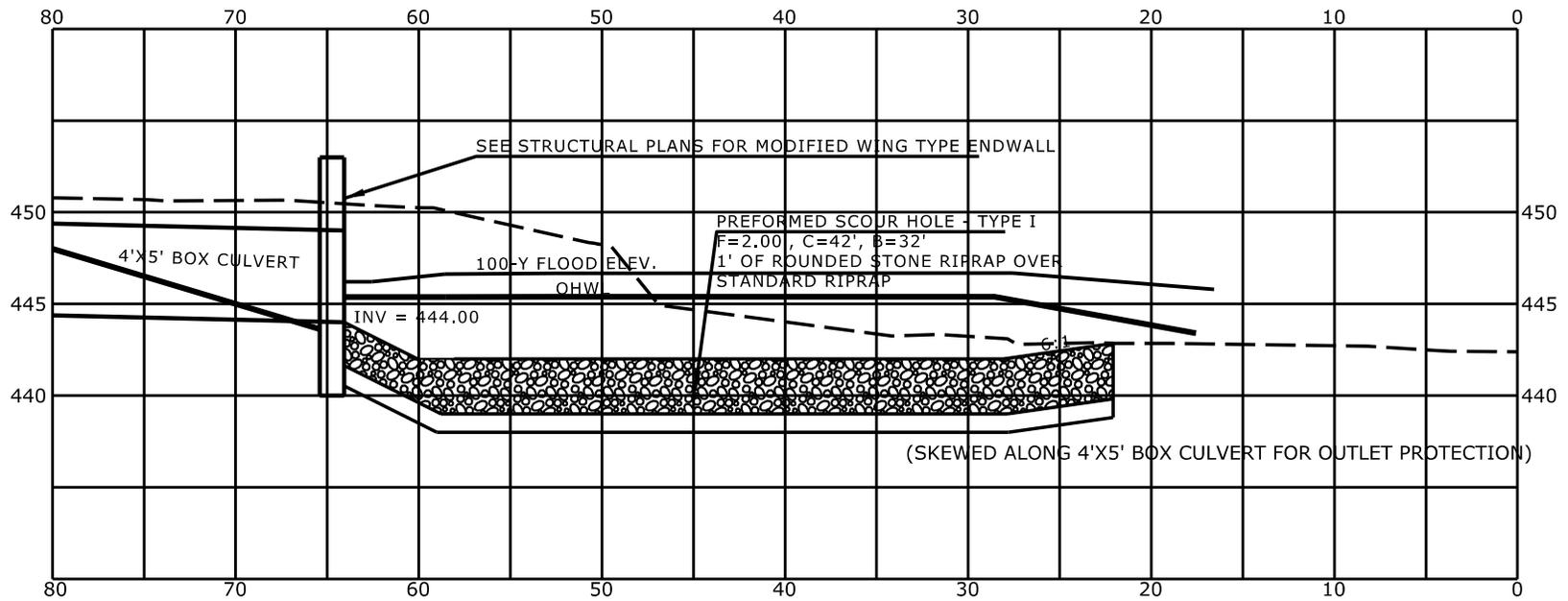
RECONSTRUCTION OF ROUTE 31, COVENTRY,  
CONNECTICUT, STATE PROJECT NO. 32-130  
IMPACT AREA 'B2' - FIRE POND CENTRAL - SECTION 'D-D'

DATE: 05/13/13

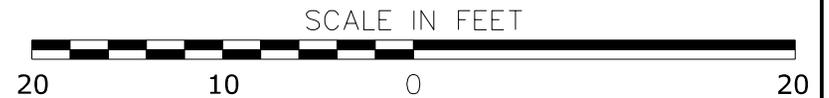
TOLLAND COUNTY  
COVENTRY, CONNECTICUT

APPLICANT: CONNECTICUT DEPARTMENT OF  
TRANSPORTATION  
2800 BERLIN TURNPIKE  
NEWINGTON, CONNECTICUT

SHEET 12 OF 18



**SECTION E-E**



**BSC GROUP**  
 180 Glastonbury Boulevard  
 Suite 103  
 Glastonbury, Connecticut 06033  
 860 652 8227

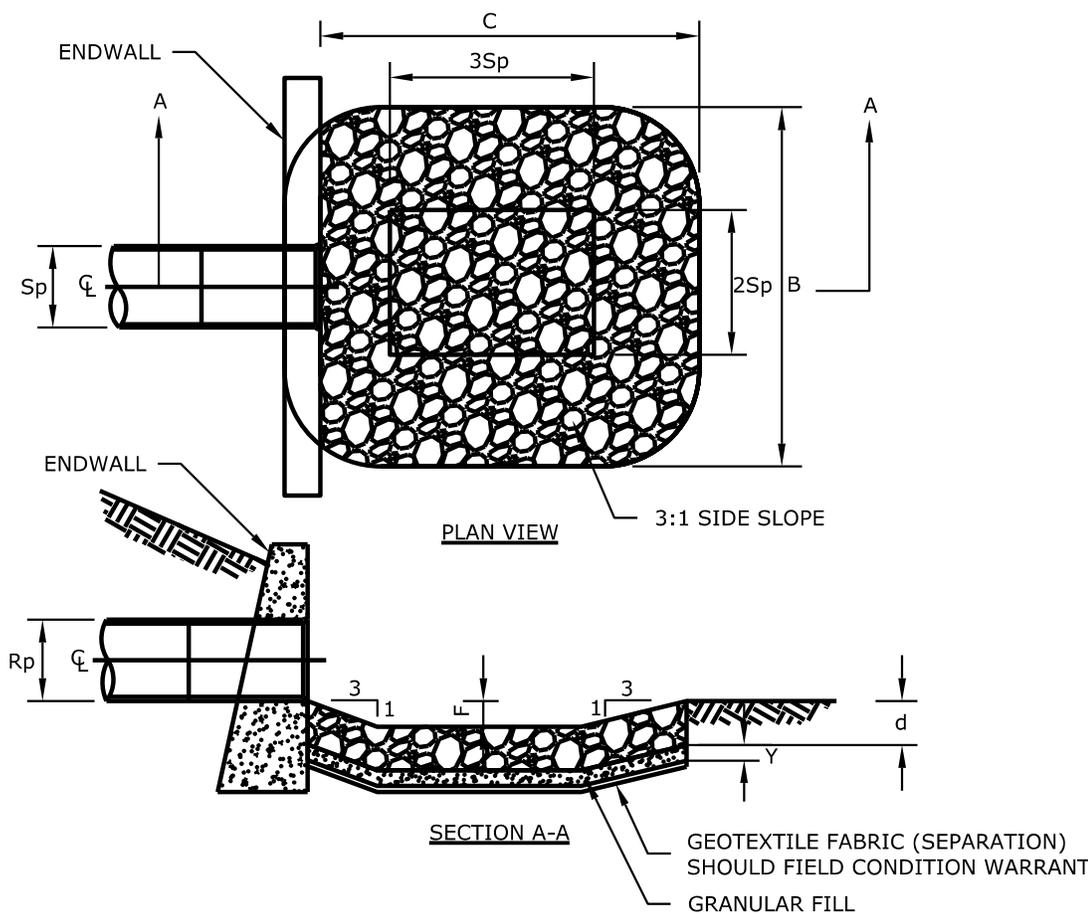
**RECONSTRUCTION OF ROUTE 31, COVENTRY,  
 CONNECTICUT, STATE PROJECT NO. 32-130  
 IMPACT AREA 'B3' - FIRE POND SOUTH - SECTION 'E-E'**

DATE: 05/13/13

TOLLAND COUNTY  
 COVENTRY, CONNECTICUT

APPLICANT: CONNECTICUT DEPARTMENT OF  
 TRANSPORTATION  
 2800 BERLIN TURNPIKE  
 NEWINGTON, CONNECTICUT

SHEET 13 OF 18



PREFORMED SCOUR HOLE - TYPE I						
LOCATION	d	F	C	B	Y	RIPRAP TYPE
ROUTE 31 STA. 17+65LT.	12"	0.75'	12.75'	10'	6"	MODIFIED
ROUTE 31 STA. 24+35RT.	36"	2.00'	42'	*32'	12"	STANDARD

\*RIPRAP WILL EXTEND TO THE EAST SIDE OF THE SCOUR HOLE AN ADDITIONAL 5' AT A 1:2 SLOPE TO ELEVATION 446.5, AND TO THE WEST SIDE AN ADDITIONAL 7.5' AT A 1:3 SLOPE TO ELEVATION 446.5, OR TO WHERE THE SLOPE FLATTENS OUT.

**NOTES:**

1. THE TYPE C RIPRAP APRON ROUTE 31 STA. 23+41LT. AND THE PREFORMED SCOUR HOLES - TYPE I AT ROUTE 31 STA. 24+35RT. SHALL PROVIDE A 1' TOP LAYER OF ROUNDED STONE RIPRAP TO BE PAID UNDER ITEM 0703029A "ROUNDED STONE RIPRAP".
2. FOR ENDWALLS WITH TWO PIPES Sp IS THE DISTANCE BETWEEN THE OUTSIDE WALLS OF THE TWO PIPES.

**PREFORMED SCOUR HOLE - TYPE 1 (ENDWALL)**

**BSC GROUP**  
 180 Glastonbury Boulevard  
 Suite 103  
 Glastonbury, Connecticut 06033  
 860 652 8227

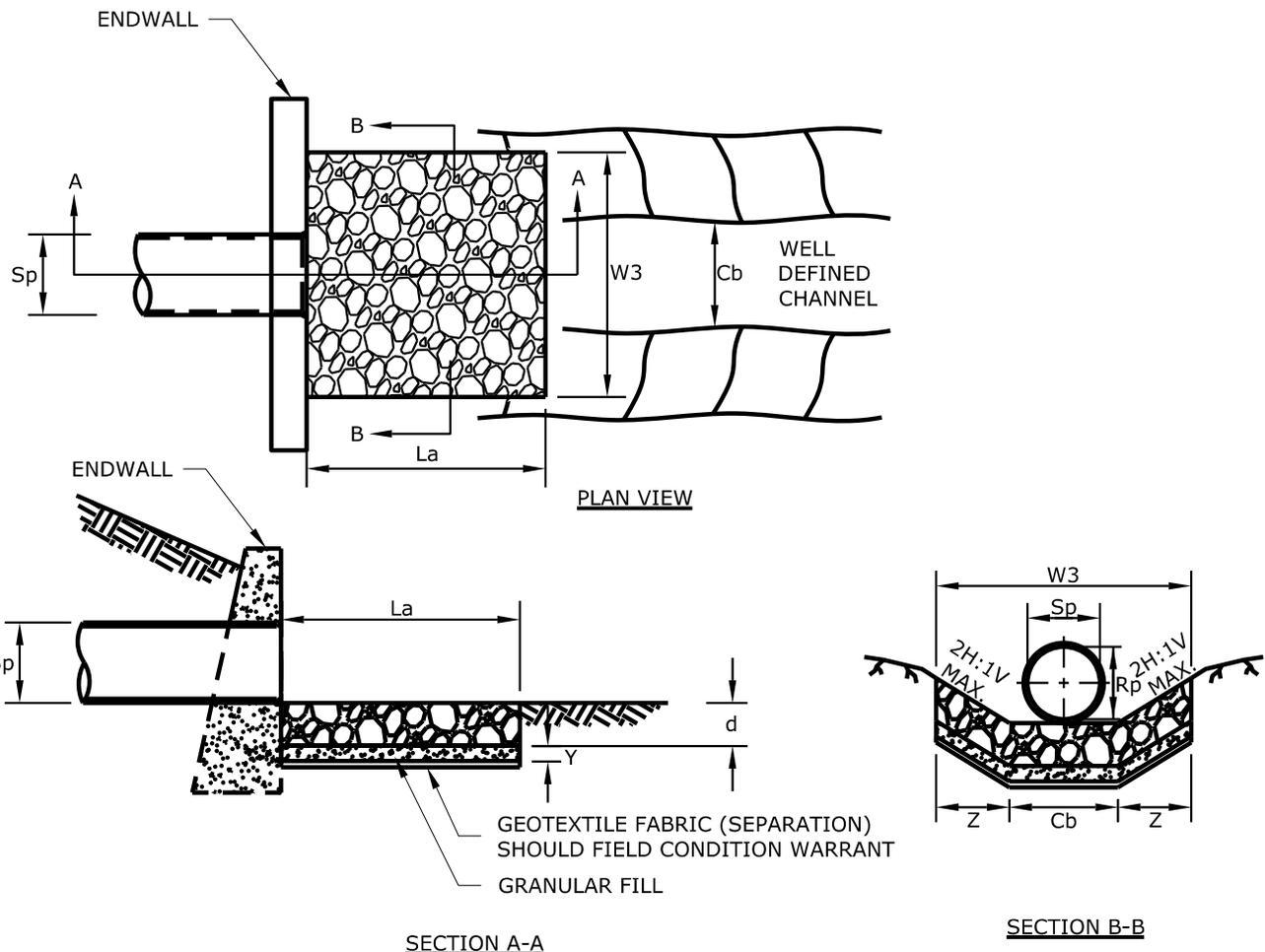
**RECONSTRUCTION OF ROUTE 31, COVENTRY, CONNECTICUT, STATE PROJECT NO. 32-130  
 PREFORMED SCOUR HOLE - TYPE 1 (ENDWALL)  
 DETAIL**

TOLLAND COUNTY  
 COVENTRY, CONNECTICUT

APPLICANT: CONNECTICUT  
 DEPARTMENT OF  
 TRANSPORTATION  
 2800 BERLIN TURNPIKE  
 NEWINGTON, CONNECTICUT

DATE: 05/13/13

SHEET 14 OF 18



12" - MODIFIED RIPRAP  
 $d = \begin{cases} 18" & \text{- INTERMEDIATE RIPRAP} \\ 36" & \text{- STANDARD RIPRAP} \end{cases}$

TYPE C RIPRAP APRON								
	Sp	La	W3	Z	Cb	d	Y	RIPRAP TYPE
ROUTE 31 STA. 23+41LT.	12'	30'	20'	4'	12'	18"	6"	INTERMEDIATE

**NOTES:**

1. THE TYPE C RIPRAP APRON ROUTE 31 STA. 23+41LT. AND THE PREFORMED SCOUR HOLES - TYPE I AT ROUTE 31 STA. 24+35RT. SHALL PROVIDE A 1' TOP LAYER OF ROUNDED STONE RIPRAP TO BE PAID UNDER ITEM 0703029A "ROUNDED STONE RIPRAP".
2. FOR ENDWALLS WITH TWO PIPES Sp IS THE DISTANCE BETWEEN THE OUTSIDE WALLS OF THE TWO PIPES.

**RIPRAP APRON - TYPE C (ENDWALL)**

**BSC GROUP**  
 180 Glastonbury Boulevard  
 Suite 103  
 Glastonbury, Connecticut 06033  
 860 652 8227

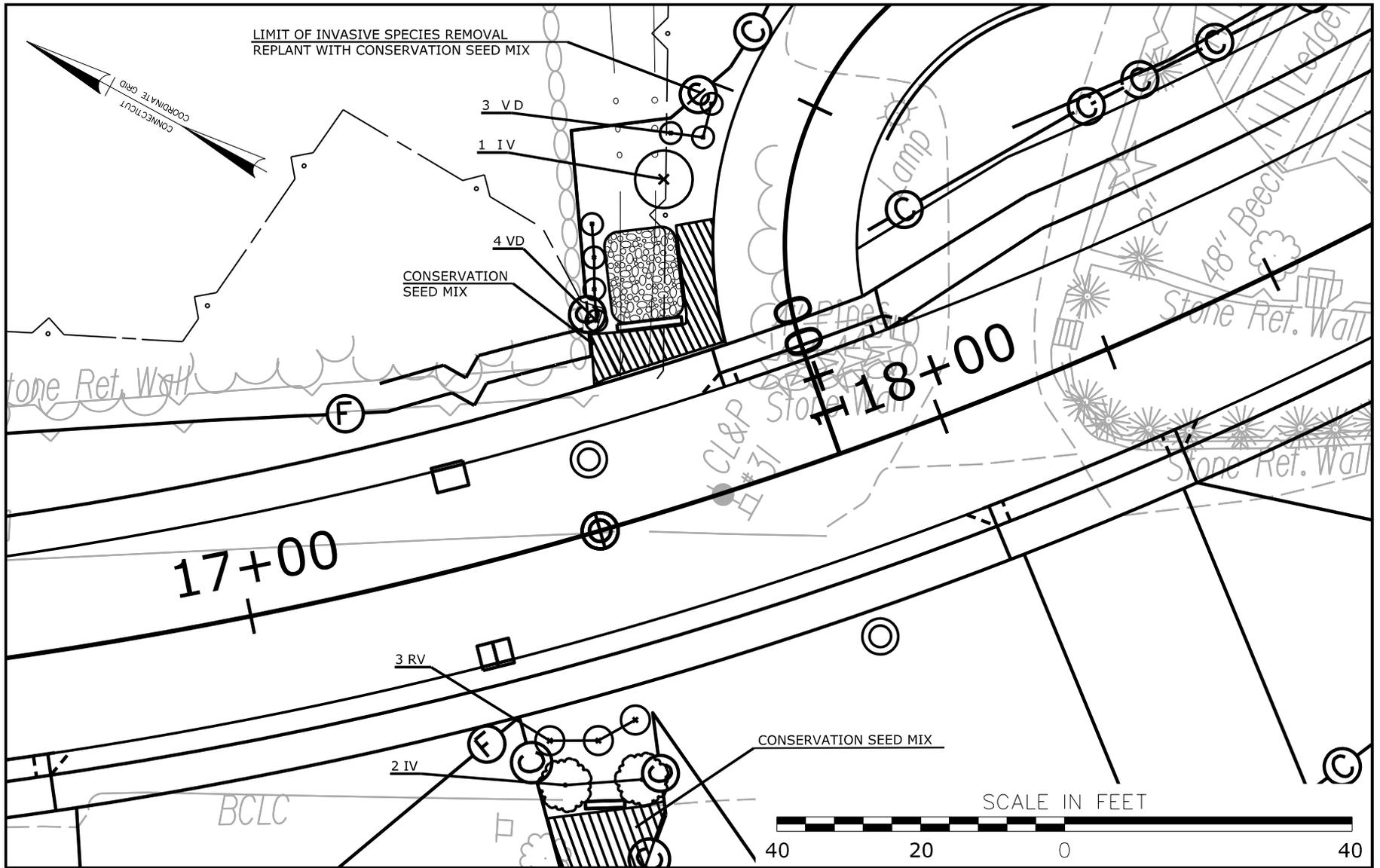
**RECONSTRUCTION OF ROUTE 31, COVENTRY, CONNECTICUT, STATE PROJECT NO. 32-130  
 RIPRAP APRON - TYPE C (ENDWALL) DETAIL**

TOLLAND COUNTY  
 COVENTRY, CONNECTICUT

APPLICANT: CONNECTICUT  
 DEPARTMENT OF  
 TRANSPORTATION  
 2800 BERLIN TURNPIKE  
 NEWINGTON, CONNECTICUT

DATE: 05/13/13

SHEET 15 OF 18



**BSC GROUP**  
 180 Glastonbury Boulevard  
 Suite 103  
 Glastonbury, Connecticut 06033  
 860 652 8227

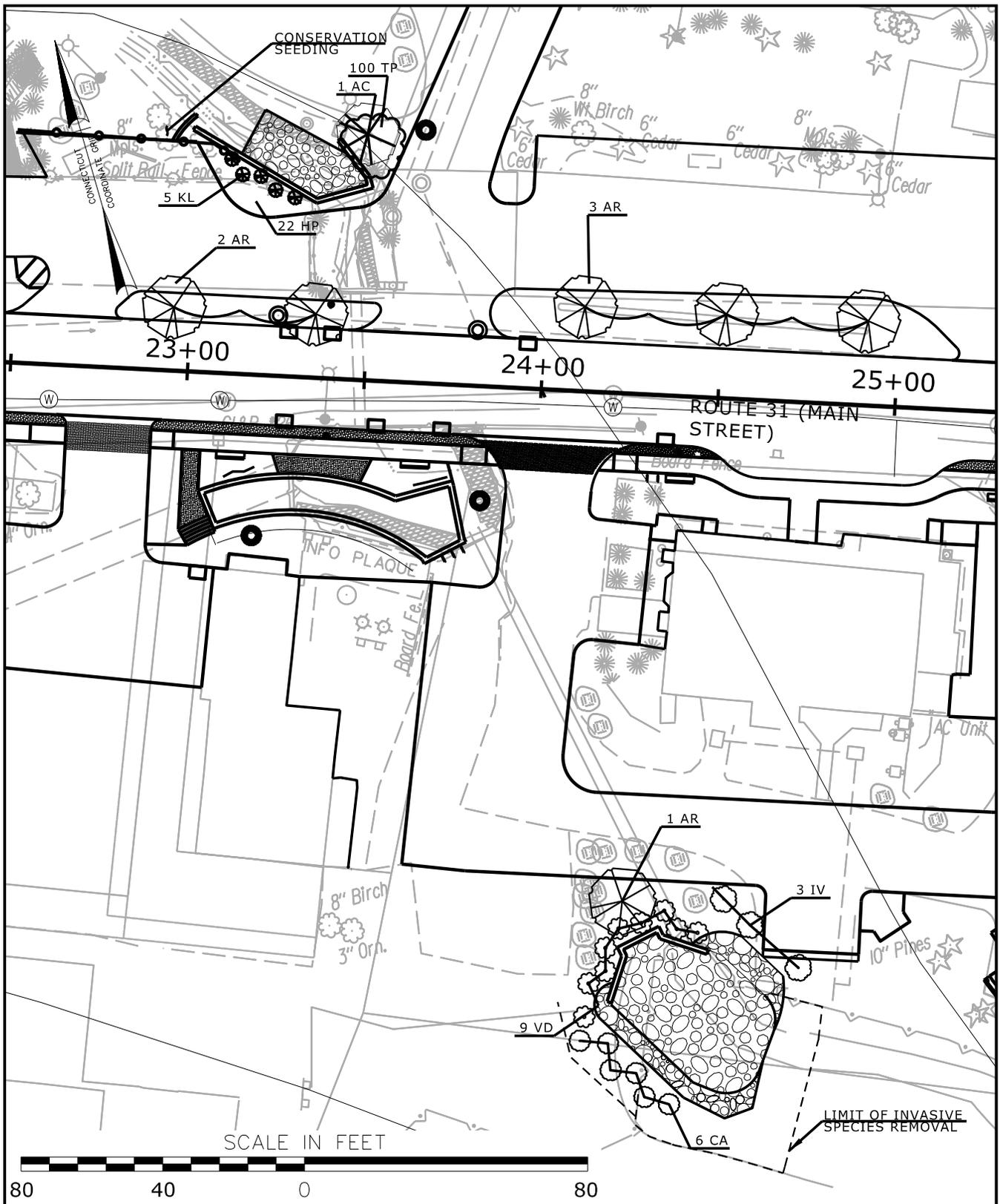
**RECONSTRUCTION OF ROUTE 31, COVENTRY,  
 CONNECTICUT, STATE PROJECT NO. 32-130  
 PLANTING PLAN - IMPACT AREA 'A' - TROLLEYWAY**

DATE: 05/13/13

TOLLAND COUNTY  
 COVENTRY, CONNECTICUT

APPLICANT: CONNECTICUT DEPARTMENT OF  
 TRANSPORTATION  
 2800 BERLIN TURNPIKE  
 NEWINGTON, CONNECTICUT

SHEET 16 OF 18



SCALE IN FEET



**RECONSTRUCTION OF ROUTE 31, COVENTRY,  
CONNECTICUT, STATE PROJECT NO. 32-130  
PLANTING PLAN - IMPACT AREA 'B'**

**BSC GROUP**  
180 Glastonbury Boulevard  
Suite 103  
Glastonbury, Connecticut 06033  
860 652 8227

TOLLAND COUNTY  
COVENTRY, CONNECTICUT

APPLICANT: CONNECTICUT  
DEPARTMENT OF  
TRANSPORTATION  
2800 BERLIN TURNPIKE  
NEWINGTON, CONNECTICUT

DATE: 05/13/13

SHEET 17 OF 18

PLANT SCHEDULE				
KEY	BOTANICAL NAME	SIZE	QUANTITY	SPACING
AC	Amelanchier canadensis	8'-10' Ht. Multi-Stem	1	SEE PLAN
AR	Acer rubrum	2"-2 ½" Cal. B&B	6	SEE PLAN
CA	Clethra alnifolia	18"-24" HT. 2 GALLON CONT.	6	7' O.C.
KL	Kalmia latifolia	18"-24" HT. 2 GAL. CONT.	5	5' O.C.
HP	Hemerocallis	1 GALLON CONT. 3 FAN MIN.	22	3' O.C.
IV	Ilex verticillata	2'-3' HT. B&B	6	SEE PLAN
RV	Viburnum dentatum	2'-3' HT. B&B	6	4' O.C.
TP	Thelypteris palustris	1 GALLON	100	12" O.C.
VD	Viburnum dentatum	2'-3' HT. B&B	16	5' O.C.



180 Glastonbury Boulevard  
 Suite 103  
 Glastonbury, Connecticut 06033  
 860 652 8227

RECONSTRUCTION OF ROUTE 31, COVENTRY,  
 CONNECTICUT, STATE PROJECT NO. 32-130  
 PLANT SCHEDULE

DATE: 05/13/13

TOLLAND COUNTY  
 COVENTRY, CONNECTICUT

APPLICANT: CONNECTICUT DEPARTMENT OF  
 TRANSPORTATION  
 2800 BERLIN TURNPIKE  
 NEWINGTON, CONNECTICUT

SHEET 18 OF 18

## ATTACHMENT H – ENGINEERING DOCUMENTATION

### Engineering Documentation

BSC, and their subconsultant GM2, performed a detailed engineering analysis of the proposed stormwater and conveyance design, and the effect the project would have on receiving waters and adjacent resource areas. Included (under separate cover) with this Attachment are the following three (3) engineering reports:

- **Report #1 – Final Design Drainage Report:** The Drainage Report consists of an analysis of the proposed Route 31 conveyance system, including both Town and State facilities. It includes a hydraulic analysis of the drainage system, culvert design, and outlet protection design. It does not cover the hydraulic or drainage analysis of the Mill Brook culverts or Fire Pond Channel.
- **Report #2 - Final Hydraulic Design Report:** This Hydraulic Report consists of an analysis of the culverts located at the Fire Pond adjacent to Route 31. It includes a hydraulic analysis of the existing and proposed culverts, the proposed stone channel, and outlet protection.
- **Report #3 - Hydrologic Report, Mill Brook along CT Rte. 31, Outlet of Lake Wangumbaug to Mason Street Crossing: July 2004:** The report consists of hydrologic analysis of the watershed from Lake Wangumbaug to the Mason Street Crossing including the fire pond and the North Tributary that crosses under Route 31 at the fire pond.

The following two versions of the (2) engineering report checklists (**Attachment H, Part 1**) are being provided with this attachment. Two separate checklists were determined to be necessary to reflect the varying activities proposed:

- **Stormwater Management (Roadway Drainage) Checklist** – this checklist references appropriate sections of the Drainage Report (Rep. 1) and plans.
- **Stormwater Management (Stream Analysis) Checklist** – this checklist references appropriate sections of the Hydraulic (Rep.2) and Hydrologic (Rep.3) reports.

Also provided is one copy of **Attachment H, Part 2, the Hydraulic and Hydrologic Consistency Worksheet**.

## Attachment H: Engineering Documentation

### Part 1: Engineering Report Checklist

The following is a checklist of requirements that need to be completed, included and submitted as part of the Engineering Report. Please complete this checklist by identifying where each requirement listed is addressed in the Engineering Report (report title and page numbers). If an item is not applicable, place "NA" in the box. Attach the completed checklist as the cover sheet to engineering reports, as applicable, which fully describe the design of the proposed facilities or other actions and the hydraulic and hydrologic effects thereof. The application instructions (DEP-IWRD-INST-100) should be consulted for a complete description of each item listed. This checklist is required to be signed and sealed by a professional engineer licensed in the State of Connecticut.

#### Stormwater Management (Roadway Drainage)

Location of Item	Item Description
Rep #1, Ch. 3.1/3.2, p. 6-7	Description of the design storm frequency intensity, volume and duration
Rep. #1, App. B	Watershed maps, existing and proposed
Rep. #1, App. C	Computations for Tc
Rep. #1, Table 1, p. 7	Imperviousness calculations
Rep. #1, Table 1, p. 7	NRCS runoff curve numbers, volumetric runoff coefficients
Conveyance Protection – Rep. #1, App. E	<p>Computations used to determine peak runoff rates, and velocities for each watershed area (24-hour storm):</p> <ul style="list-style-type: none"> <li>• Stream Channel Protection: 2-year frequency (“over-control” of 2-year storm)</li> <li>• Conveyance Protection: 10-year frequency</li> <li>• Peak Runoff Attenuation: 2-year, 10-year, and 100-year frequency</li> <li>• Emergency Outlet Sizing: safely pass the 100-year frequency or larger storm</li> </ul>
Rep. #1, App. E	Hydrograph routing calculations
Rep. #1, Ch. 3.3, p. 7-12 and Ch. 4.0, p. 12-13	Description, schematics, and calculations for drainage and stormwater management systems, bridges and culverts
NA	Infiltration rates
Rep. #1, Ch. 3.1/3.2, p. 6-7	Documentation of sources
Attached	Computer disk containing input and output data and the associated program for all computer models used in the analyses
Rep. #1, App. E	Hard copy of input and output data including input/output tables
NA	Detention basin analysis including timing and duration of expected outflow, stream stability analysis and hydrograph summation

## Flood Plain Assessment

Location of Item	Item Description
NA	Description or simulation of existing and proposed conditions upstream and downstream of the proposed activity
NA	(For SCEL applications only) A determination of the effect of the proposed activity on flooding and flood hazards together with an equivalent encroachment on the opposite bank for the flood event establishing the encroachment lines
NA	For any bridge or culvert placement or replacement with a drainage area of 100 acres or more, plan sheets showing the existing and proposed inundation area for the 2, 10, 25, 50, and 100 year discharges, carried to convergence
NA	A description and analysis of the floodplain modifications required to restore any flood conveyance and flood storage capacity
NA	Demonstration that backwater from the proposed activity will not impact an existing dam, dike, or similar structure
NA	Backup data and complete hydraulic analysis for proposed modifications to the floodplain including location plan and plot for sections, profile sheet, summary sheet

## Dams, Dikes, Diversion Channels, Similar Structures

Location of Item	Item Description
NA	Primary and emergency spillway and outlet structure erosion protection
NA	Dam breach analysis
NA	Geotechnical evaluation
NA	Construction Specifications for foundation preparation, embankment material, outlet structure, and construction inspection

## Soil Erosion and Sediment Control Plan

Location of Item	Item Description
Statement attached	Narrative
Att. G Plates, Att C Water	Drawings
Att. G Plates, Att C Water	Details
NA	Calculations for Engineered Measures

## Attachment H: Engineering Documentation

### Part 1: Engineering Report Checklist

The following is a checklist of requirements that need to be completed, included and submitted as part of the Engineering Report. Please complete this checklist by identifying where each requirement listed is addressed in the Engineering Report (report title and page numbers). If an item is not applicable, place "NA" in the box. Attach the completed checklist as the cover sheet to engineering reports, as applicable, which fully describe the design of the proposed facilities or other actions and the hydraulic and hydrologic effects thereof. The application instructions (DEP-IWRD-INST-100) should be consulted for a complete description of each item listed. This checklist is required to be signed and sealed by a professional engineer licensed in the State of Connecticut.

#### Stormwater Management (Stream Analysis)

Location of Item	Item Description
Rep. 3, pg. 2	Description of the design storm frequency intensity, volume and duration
Rep. 3, pg. 11	Watershed maps, existing and proposed
Rep. 3, pg. 14	Computations for Tc
NA	Imperviousness calculations
Rep. 3, pg. 14	NRCS runoff curve numbers, volumetric runoff coefficients
Rep. 3, pg. 41 Rep. 2, Volume I, Table 4	Computations used to determine peak runoff rates, and velocities for each watershed area (24-hour storm): <ul style="list-style-type: none"> <li>• Stream Channel Protection: 2-year frequency ("over-control" of 2-year storm)</li> <li>• Conveyance Protection: 10-year frequency</li> <li>• Peak Runoff Attenuation: 2-year, 10-year, and 100-year frequency</li> <li>• Emergency Outlet Sizing: safely pass the 100-year frequency or larger storm</li> </ul>
Rep. 3, pg. 41	Hydrograph routing calculations
Rep. 2, Vol. I, Exec. Sum.; Rep.2, Vol II, Ap C,E,F,I, L	Description, schematics, and calculations for drainage and stormwater management systems, bridges and culverts
NA	Infiltration rates
Rep. 3, pg. 1	Documentation of sources
Rep. 3 (TR-20)Rep. 2, Vol. II, App. L (HEC-RAS)	Computer disk containing input and output data and the associated program for all computer models used in the analyses
Rep. 3, pg. 41 Rep. 2, VII, Appendix C, L	Hard copy of input and output data including input/output tables
NA	Detention basin analysis including timing and duration of expected outflow, stream stability analysis and hydrograph summation

## Flood Plain Assessment

Location of Item	Item Description
Rep. 2, Vol I, Sect. 2,3,5 Rep. 2, Vol II, App. G, H	Description or simulation of existing and proposed conditions upstream and downstream of the proposed activity
NA	(For SCEL applications only) A determination of the effect of the proposed activity on flooding and flood hazards together with an equivalent encroachment on the opposite bank for the flood event establishing the encroachment lines
Rep. 2, Appendix M	For any bridge or culvert placement or replacement with a drainage area of 100 acres or more, plan sheets showing the existing and proposed inundation area for the 2, 10, 25, 50, and 100 year discharges, carried to convergence
Rep. 2, Vol I, Executive Summary	A description and analysis of the floodplain modifications required to restore any flood conveyance and flood storage capacity
Rep. 2, Vol II, Appendix H	Demonstration that backwater from the proposed activity will not impact an existing dam, dike, or similar structure
Rep. 2, Vol II, Appendix C, D, F, G, H, L	Backup data and complete hydraulic analysis for proposed modifications to the floodplain including location plan and plot for sections, profile sheet, summary sheet

## Dams, Dikes, Diversion Channels, Similar Structures

Location of Item	Item Description
NA	Primary and emergency spillway and outlet structure erosion protection
NA	Dam breach analysis
NA	Geotechnical evaluation
NA	Construction Specifications for foundation preparation, embankment material, outlet structure, and construction inspection

## Soil Erosion and Sediment Control Plan

Location of Item	Item Description
Rep. 2, Vol. I, Section 7.0	Narrative
Rep. 2, Vol. II, App. K	Drawings
Rep. 2, Vol. II, App. K	Details
Rep. 2, Vol. II, App. L	Calculations for Engineered Measures

### Professional Certification

For any Engineering Report submitted as part of the IWRD permit application, the following certification must be signed and sealed by a professional engineer licensed to practice in Connecticut and submitted with the Engineering Report Checklist and Report.

"I certify that in my professional judgement, each requirement listed in the Engineering Report Checklist has been addressed in the Engineering Report submitted as part of the IWRD permit application as Attachment H, Part 1 and that the information is true, accurate and complete to the best of my knowledge and belief.

This certification is based on my review of the Engineering Report.

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

Signature of Applicant

Date

Name of Applicant (print or type)

Title (if applicable)

*[Handwritten Signature]*

4/29/13

Signature of Professional Engineer

Date

Peter J. Briere P.E.

21606

Name of Professional Engineer (print or type)

P.E. Number (if applicable)

Affix P.E. Stamp Here  
(if applicable)



# Attachment H: Engineering Documentation

## Part 2: Hydrologic and Hydraulic Consistency Worksheet

### *Inland Water Resources Division Permit Activities*

This worksheet has four sections; only complete the section(s) applicable to the proposed project. Where a question requires a "Yes" or "No" answer, select the appropriate response and explain your response, if required, in the space provided.

**Section I: Floodplain Management** *(if the proposed project involves a structure, obstruction, encroachment or work in a watercourse, floodplain, or coastal high hazard area)*

**Section II: Stormwater Management** *(if the proposed project involves stormwater drainage or stormwater runoff)*

**Sections III: State Grants and Loans** and **Section IV: Disposal of State Land** *(only if the applicant is a state agency seeking flood management certification approval for state grants and loans or disposal of state land)*

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Definitions of terms used in these worksheets are found in Section 25-68b of the Connecticut General Statutes and Section 25-68h-1 of the Regulations of Connecticut State Agencies and in the National Flood Insurance Program Regulations (44 CFR, Chapter 1, Subchapter B, Part 59.1).

**Section I: Floodplain Management**

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## Section I: Floodplain Management

Name of Applicant: **Connecticut Department of Transportation**

Name of Proposed Project: **Route 31 Reconstruction**

### 1. General Criteria

- a. *Critical Activity* - Does the proposed project involve the treatment, storage and disposal of hazardous waste or the siting of hospitals, housing for the elderly, schools or residences, in the 0.2 per cent [500 year] floodplain?  Yes  No

If yes, the base flood for the critical activity shall have a recurrence interval equal to the 500 year flood event; if no, the base flood for the activity shall have a recurrence interval equal to the 100 year flood event.

- b. *Nonintensive Floodplain Uses* - Will the proposed project promote development in floodplains or will utilities servicing the project be located so as to enable floodplain development?

Yes  No

Explain:

**The project mainly consists of reconstruction activities of existing structures. The majority of the affected areas in the existing floodplain are already developed.**

- c. *National Flood Insurance Program (NFIP)* - Will the proposed project be located within an area of special flood hazard designated by the Federal Emergency Management Agency (FEMA)?

Yes  No If yes, list the FEMA flood zone(s):

**FEMA Zone A**

Does the proposed project meet the NFIP minimum standards established in 44 CFR, Chapter 1, Subchapter B, Part 60.3, floodplain management criteria for flood-prone areas?

Yes  No

- d. *Municipal Regulations* - Has the municipality in which the proposed project is to be located adopted floodplain regulations containing requirements that are more restrictive than the NFIP floodplain management criteria for flood-prone areas?  Yes  No

If yes, describe the more restrictive requirements:

Does the proposed project comply with the more restrictive standards of the municipality?

Yes  No

## Section I: Floodplain Management (continued)

### 2. Flooding and Flood Hazards

- a. *Flooding* - Will the proposed project pose any hazard to human life, health or property in the event of a base flood?  Yes  No

If yes, explain:

- b. *Flood Velocities* - Will the proposed project cause an increase in flow velocity or depth during the base flood discharge?  Yes  No

If yes, the increase in velocity is: **2.39** fps  
and/or the increase in depth is: **0.25** ft.

Will such increase in velocity or depth cause channel erosion or pose any hazard to human life, health or property?  Yes  No

Explain:

**The proposed project will cause an increase in velocity at various locations, 2.39 fps being the maximum increase. The stone channel will be fitted with adequate erosion protection to accommodate the increase. Due to the undersize outlet culverts, floodwaters currently back up within the Fire Pond and sheet flow over the parking lots to the wetland system to the south. The proposed culverts will convey the floodwater to this area more efficiently and the proposed stone channel was sized to accommodate the 500-year flood. The increase in the 100-year flood water surface elevation is well below a 1 ft difference. This increase is the maximum that occurs, however an increase in velocity occurs at various locations. The channel will be fitted with adequate erosion protection at these locations to accommodate the increase.**

- c. *Flood Storage* - Will the proposed project affect the flood storage capacity or flood control value of the floodplain?  Yes  No

If yes, describe the effects:

**Increase in flood storage.**

- d. *Degrading or Aggrading Stream Beds* - Is the streambed currently degrading or aggrading?

Degrading  Aggrading  Neither

Has the project design addressed degrading or aggrading streambed conditions?

Yes  No

- e. *Ice Jams* - Is the watercourse prone to ice jams or floods due to ice?  Yes  No

Has the project design considered ice jams or floods due to ice?  Yes  No

**Section I: Floodplain Management (continued)**

- f. *Storage of Materials & Equipment* - Will the construction or use of the proposed project involve the storage of materials below the 500 year flood elevation that are buoyant, hazardous, flammable, explosive, soluble, expansive or radioactive, or the storage of any other materials which could be injurious to human, animal or plant life in the event of a flood?

Yes       No

If yes, describe the materials and how such materials will be protected from flood damage, secured or removed from the floodplain to prevent pollution and hazards to life and property.

Storage of materials that could be injurious to human health or the environment in the event of flooding is prohibited below the elevation of the 500 year flood. Other material or equipment may be stored below the 500 year flood elevation provided that such material or equipment is not subject to major damage by floods, and provided that such material or equipment is firmly anchored, restrained or enclosed to prevent it from floating away or that such material or equipment can be removed prior to flooding.

- g. *Floodwater Loads* - Will structures, facilities and stored materials be anchored or otherwise designed to prevent floatation, collapse, or lateral movement resulting from hydrodynamic and hydrostatic loads, including the effects of buoyancy?       Yes       No

**3. Standards for Structures in Floodplains or Coastal High Hazard Areas**

Does the proposed project involve a new or substantially improved structure or facility located within a floodplain or coastal high hazard area?       Yes       No

If yes, complete this subsection; if no, skip to subsection 4 (***Topography Changes within Floodplain***).

- a. *Structures in Coastal High Hazard Areas* - Will the structure or facility be located within an NFIP coastal high hazard area?       Yes       No

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

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

Yes       No

- 2. Will a new structure or facility be located on an undeveloped coastal barrier beach designated by FEMA?       Yes       No

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

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

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

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

## Section I: Floodplain Management (continued)

4. Will the space below the lowest floor be either free of obstruction or constructed with non-supporting breakaway walls?  Yes  No

5. Will fill be used for structural support of any buildings within coastal high hazard areas?  
 Yes  No

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

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

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

Yes  No

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

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

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

Yes  No

If yes, the structure will be:  Elevated  Floodproofed

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

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

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

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

e. *Utilities* - Will service facilities such as electrical, heating, ventilation, plumbing, and air conditioning equipment be constructed at or above the elevation of the base flood or floodproofed with a passive system?  Yes  No

f. *Water Supply Systems* - Does the proposed project include a new or replacement water supply system?  
 Yes  No

If yes, is the water supply system designed to prevent floodwaters from entering and contaminating the system during the base flood?  Yes  No

g. *Sanitary Sewage Systems* - Does the proposed project include a new or replacement sanitary sewage or collection system?  Yes  No

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

Yes  No

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

Yes  No  No foundation drains

## Section I: Floodplain Management (continued)

### 4. Activity within Floodplain

Does the proposed project involve activity in a floodplain including but not limited to filling, dumping, construction, excavating, or grading?

Yes     No    If no, skip to subsection 5 (**Alterations of Watercourses**).

If yes, does the proposed project include encroachments, including fill, new construction, substantial improvements, or other development within a NFIP adopted regulatory floodway?

Yes     No    If yes, skip to paragraph 4(b) below.

- a. *No Regulatory Floodway* - The NFIP requires that until a regulatory floodway is designated, that no new construction, substantial improvements, or other development (including fill) shall be permitted within Zones A1-30 and AE unless it is demonstrated that the cumulative effect of the proposed development, when combined with all other existing and anticipated development, will not increase the water surface elevation of the base flood more than one foot at any point. (If no regulatory floodway has been adopted, project impacts may be evaluated by considering an equivalent conveyance loss on the opposite side of the river from the proposed project.)

Is the proposed project consistent with this requirement?     Yes     No

- b. *Floodway Encroachments* - Will the proposed encroachment into the floodway result in any increase in flood levels during either the 100 year or 10 year discharges?

100 year:     Yes; the increase is:    (in 1/100ths of a foot)     No

If yes, has the applicant received approval of such increase in accordance with 44 CFR, Chapter 1, Subchapter B, Part 65.12?     Yes     No

10 year:     Yes; the increase is:    (in 1/100ths of a foot)     No

- c. *Coastal Areas* - Flood hazard potential in coastal areas shall be evaluated considering surface profiles of the combined occurrence of tides, storm surges, and peak runoff. The starting water surface elevation for the base flood in watersheds with time of concentrations of over 6 hours shall be the 10 year frequency tidal surge level.

If the proposed project is in a coastal area, have the hydraulic analyses incorporated these criteria?

Yes     No     Not in Coastal Area

### 5. Alterations of Watercourses

Does the proposed project include the construction or alteration to a natural perennial watercourse or man-made channel?

Yes     No    If no, skip to subsection 6 (**Culverts and Bridges**); if yes, complete the following subsection:

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

The channel capacity is designed for the: **500** year flood.

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

## Section I: Floodplain Management (continued)

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

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

Yes       No

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

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

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

**Consultation with CTDEP Inland Fisheries Division confirmed that fish habitat was present but minor in the Fire Pond, and limited to warmwater pond species washed from Wangumbaug Lake. While habitat connectivity for fish passage was not a main concern due to the existing alteration, they did request that the existing habitat be maintained for individuals who may become isolated in this stretch of river. The open stone channel was proposed with a step-pool design. Natural stream substrate material will be secured in place to create the stream bed and steps. Very little existing vegetation is present for preservation due to the area being surrounded by impervious surfaces. Some landscaping and plantings are proposed at the top of the channel.**

**The replacement culverts at the outlet of the stone channel were designed to maintain low flow. One of the culverts will be set at a lower grade and natural substrate will be installed.**

**Natural substrate will not be placed in the culverts conveying Manning Brook under Route 31 as Inland Fisheries determined that aquatic habitat was negligible upstream. All scour protection installed in the streams will consist of a base-layer of riprap, covered by at least 1 ft of rounded stone. However, natural substrate will be placed in the low flow culvert that conveys Mill Brook from the Fire Pond to the outlet.**

## Section I: Floodplain Management (continued)

### 6. Culverts and Bridges

Does the proposed project involve the repair or new construction of a culvert or bridge?

Yes     No    If no, go to subsection 7 (**Temporary Hydraulic Facilities**).

If yes, complete this subsection:

- a. *Fish Passage* - Does the culvert design allow for the passage of fish?     Yes     No

If yes, describe the specific design provisions for fish passage:

**Inland Fisheries acknowledged that the highly altered surrounding area and long existing culverts would prohibit most fish passage. However, the replacement twin outlet culverts conveying Mill Brook from the Fire Pond to the south were designed with maintaining connectivity of the aquatic habitat. One of the culverts will be set two feet lower than the second and filled with one foot of natural substrate. Baffles will be installed to hold the material in place. This will allow maintenance of low flow and potential passage for aquatic organisms while the second culvert can accommodate high flows.**

- b. *Depressed Structural Floors* - Is the rigid structural floor of the culvert or bridge depressed below the normal stream bed to allow a natural stream bed to form over the floor?

Yes     No     No rigid structural floor

- c. *Multiple Openings* - The use of a single large culvert or bridge opening is preferred over the use of multiple small openings. Has the design minimized the use of multiple small openings?

Yes     No

If no, explain:

**The use of box culverts downstream of the Mill Pond were selected to accommodate water handling during construction. Additionally, the box culverts are different sizes to accomplish different objectives - the low flow culvert provides a natural bottom for environmental purposes and is at a lower elevation while the high flow culvert is designed to provide additional capacity to accommodate the design discharge. The use of twin 48" culverts under Rte. 31 were selected to accommodate water handling during construction.**

- d. *Sag Vertical Curves* - Does the design utilize solid parapet walls in the sag part of a vertical curve?

Yes     No     Not located in a sag vertical curve

- e. *Debris Blockage* - Is the culvert or bridge prone to blockage by debris?     Yes     No

If yes, has the project design incorporated measures to minimize the potential for debris blockage?

Yes     No

- f. *Topography Change* - Is the culvert or bridge located within a regulatory floodway or Zone A1-30 or AE as designated by the NFIP?     Yes     No

## Section I: Floodplain Management (continued)

g. *State Highways* - Does the watercourse pass under a state roadway?

Yes     No    If no, skip to paragraph 6(g)(2).

If yes, culverts and bridges for state highways shall be designed in accordance with the Connecticut Department of Transportation (DOT) Drainage Manual and all applicants should refer to it for specific design criteria. In general, however, the Drainage Manual requires the following:

(Place a check mark for all applicable criteria utilized)

*Minor Structures* - Minor structures have a drainage area of less than one square mile in which there is no established watercourse. They shall be designed to pass the 25 year frequency discharge.

*Small Structures* - Small structures have a drainage area of less than one square mile in which there is an established watercourse. They shall be designed to pass the 50 year frequency discharge.

*Intermediate Structures* - Intermediate structures have a drainage area greater than one square mile and less than 10 square miles. They shall be designed to pass the 100 year frequency discharge with reasonable underclearance.

*Large Structures* - Large structures have a drainage area greater than 10 square miles and less than 1000 square miles. They shall be designed to pass the 100 year frequency discharge with an underclearance not less than two feet.

*Monumental Structures* - Monumental structures have a drainage area greater than 1000 square miles. They shall be designed to meet the requirements of the Connecticut Department of Environmental Protection, U.S. Army Corps of Engineers, and the U.S. Coast Guard.

*Tidal Structures* - Tidal structures are subject to tidal action and shall be classified as minor, small, intermediate, etc. depending on their drainage area. These structures shall be designed in accordance with the previously listed *classifications*. However if the highway is subject to frequent tidal flooding, the design storm may be made consistent with the frequency of flooding by tidal action. The proposed culvert or bridge is classified as:

Tidal, minor

Tidal, small

Tidal, intermediate

Tidal, large

Tidal, monumental

1. Has the structure been designed in accordance with the criteria established in the DOT Drainage Manual?     Yes     No

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

## Section I: Floodplain Management (continued)

2. Will the proposed culvert or bridge increase upstream water surface elevations in the event of a base flood above that which would have been obtained in the natural channel if the highway embankment were not constructed?  Yes  No

If yes, is the increase in elevation more than one foot? Describe:

There are four (4) locations at which the proposed water surface elevation is more than one foot above the natural water surface elevation. Three of these locations are in the area of the weir located immediately upstream of #30 Mason Street. This area is approximately 1000 feet downstream of the proposed box culverts. The existing and proposed water surface elevations are identical. The proposed work does not affect the existing condition. The fourth location is immediately upstream of #1275 Main Street on Mill Brook. While the proposed water surface elevation is more than one foot above the natural water surface elevation, the proposed water surface elevation is almost one foot lower than the existing water surface elevation. Therefore, the proposed work is an improvement when compared to the existing conditions. In order to reduce the proposed water surface elevation to within one foot of the natural water surface elevation, it may be necessary to remove more of the 1.5' x 9' culvert or remove the building at #1275 Main Street.

3. Will the proposed culvert or bridge be designed so that flooding during the design discharge does not endanger the roadway or cause damage to upstream developed property? (NOTE: The design discharge for culverts and bridges on state highways should be that which was determined by FEMA. If the applicant judges that the FEMA discharge is inappropriate, the project should be analyzed for both the applicant's computed flow and the FEMA discharge. The project, however, must still meet the standards of the NFIP.)  Yes  No

Explain:

The current culvert system conveying Manning Brook south under Route 31 and Mill Brook under adjacent parking lots is undersized. The Manning Brook culverts are considered a small structure based on watershed size and the replacement culverts were designed to convey a 50-year flood. The Mill Brook culverts are considered an intermediate structure and the replacements are sized appropriately to convey the 100-year flood.

- h. *Local Roads & Driveways* - Local roads (not state highways) and driveways may be designed for flood frequencies and underclearances less stringent than those specified in the DOT Drainage Manual when (check all that have been incorporated into the project design):

- 1. the road is at or close to the floodplain grade
- 2. water surface elevations are not increased by more than one foot nor cause damage to upstream properties
- 3. provisions are made to barricade the road when overtopped
- 4. the road or driveway is posted as being subject to flooding
- 5. the road or driveway has low traffic volume
- 6. alternate routes are available

The culvert or bridge has been designed to pass the: **100** year frequency discharge with an underclearance of: **0** feet.

Utilizing the DOT Drainage Manual classifications listed under paragraph 6(g) above, the culvert or bridge is classified as a: **Small and Intermediate** structure.

## Section I: Floodplain Management (continued)

- h. If the culvert or bridge is designed to standards lower than which is stipulated in the DOT Drainage Manual, list such standards and the reasons for the lower design standards:

N/A

- i. *Downstream Peak Flows* - Will the proposed culvert or bridge increase downstream peak flows by decreasing existing headwater depths during flooding events?  Yes  No

If yes, describe the selected design criteria and the impacts to downstream properties:

### 7. *Temporary Hydraulic Facilities*

Temporary hydraulic facilities include all channels, culverts or bridges which are required for haul roads, channel relocations, culvert installations, bridge construction, temporary roads, or detours. They are to be designed with the same care which is used for the primary facility.

If the proposed activity involves a temporary hydraulic facility(s), has such facility been designed in accordance with Chapter 6, Appendix F, "Temporary Hydraulic Facilities," of the DOT Drainage Manual?

Yes  No  No temporary hydraulic facilities

If yes, the design flood frequency is the: **2** year flood.

Describe the temporary facilities:

**Cofferdams or water handling structures will be installed to channel the 2 year flood through the construction area and minimize flood damage during active work. Please see the construction sequencing sheets as part of Attachment C.**

## Section II: Stormwater Management

Name of Applicant: **Connecticut Department of Transportation**

Name of Proposed Project: **Route 31 Reconstruction**

### 1. **Stormwater Runoff**

The proposed project will (check all that apply):

- Increase the area of impervious surfaces
- Increase runoff coefficients
- Alter existing drainage patterns
- Alter time of concentrations
- Change the timing of runoff in relation to adjacent watersheds

Will the proposed project impact downstream areas by increasing peak flow rates, the timing of runoff, or the volume of runoff?       Yes       No

If yes, describe the downstream impacts for the 2, 10 and 100 year frequency discharges:

**While the footprint of the roadway was somewhat reduced, additional sidewalks were added for safety reasons. Several off street parking lots will be repaved for access management purposes. One off street parking lot was upgraded from 50% gravel/50% bituminous pavement to 100% bituminous pavement. The end result was a negligible increase in flow rates and runoff volumes. See the attached "Project Area Drainage Summary".**

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

Return Frequency (Year)	Peak Discharges (CFS)	
	Pre-Development	Post-Development
<b>2</b>	<b>9.70</b>	<b>9.73</b>
<b>10</b>	<b>14.53</b>	<b>14.57</b>
<b>100</b>	<b>20.58</b>	<b>20.64</b>

The above peak discharges were computed utilizing the: **24.0** hour duration storm. This duration storm was selected because:

**This is the standard storm duration required by ConnDOT and CT DEEP Instructions for Completing a Permit Application for Programs Administered by the Inland Water Resources Division."**

**Section II. 1. Project Area Drainage Summary**

The following table represents the Pre and Post development drainage discharges to the Mill Brook generated from the proposed drainage, traffic and offsite parking improvements made as part of the Project. The drainage areas used in the calculations represent flows captured by the drainage improvements proposed.

Drainage System No. And Station Limits	Pre-Dev. Area (ac)	Post-Dev. Area (ac)	Pre-Dev. Runoff (cfs)			Post-Dev. Runoff (cfs)			Increase in Runoff (cfs)		
			2yr	10yr	100yr	2yr	10 yr	100yr	2yr	10yr	100yr
#1 “Trolley Way” System 17+60 to 19+40	3.86	3.86	2.89	4.33	6.14	3.35	5.02	7.11	0.46	0.69	0.97
#2 Fire Pond System 19+40 to 26+75	5.26	5.26	3.76	5.64	7.98	3.23	4.83	6.84	-0.53	-0.81	-1.14
#3 N/F Sanborn 26+75 30+52.5	4.70	4.70	2.08	3.12	4.41	2.16	3.24	4.58	0.08	0.12	0.17
Off Site Improvements flow to Mill Brook	0.63	0.63	0.94	1.41	2.00	0.97	1.45	2.05	0.03	0.04	0.05
<b>Total Project Flow to Mill Brook</b>	<b>14.45</b>	<b>14.45</b>	<b>9.70</b>	<b>14.53</b>	<b>20.58</b>	<b>9.73</b>	<b>14.57</b>	<b>20.64</b>	<b>0.03</b>	<b>0.04</b>	<b>0.06</b>

**Section II: Stormwater Management (continued)**

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

**The design point was Mill Brook because this is the ultimate receiving water for all of the drainage associated with the project improvements.**

**2. Stormwater Detention Facilities**

Does the proposed project include the construction of any stormwater detention facilities?

Yes       No      If no, skip to subsection 3 (**Storm Drainage Systems**).

If yes, has the DEP determined whether a dam construction permit is required?     Yes     No

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

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

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

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

## Section II: Stormwater Management (continued)

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

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

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

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

Explain:

### 3. Storm Drainage Systems

Does the proposed project include the construction of subsurface storm drainage systems?

Yes  No If no, you have completed Section II of the worksheets.

If yes, complete this subsection:

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

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

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

- c. *Future Development* - Has the design of the system considered future development of adjacent properties?  Yes  No

## Section II: Stormwater Management (continued)

- d. *Outlet Protection* - Have the outlets from the system been designed to minimize the potential for downstream erosion?  Yes  No
- e. *Overland Flow* - Has the use of curbing been minimized to encourage overland dispersed flow through stable vegetated areas?  Yes  No
- f. *Vegetated Filter Strips* - Has the design incorporated the use of vegetated filter strips or grass swales to improve the quality of water outletting from the storm drainage system?  Yes  No
- g. *Stormwater Treatment* - Describe features of the stormwater collection system intended to improve the quality of stormwater runoff prior to its discharge to surface waters.

**Currently, the project's roadways are serviced by catch basins with two foot sumps that discharge either into Mill Brook, intermittent streams, or tributary wetlands. Their outfalls have no scour protection. Please see attached supplemental page for further discussion.**

- h. *E & S Control Plan* - Has the design and installation of the storm drainage system been coordinated with the soil erosion and sediment control plan prepared in accordance with the 2002 Connecticut Guidelines for Soil Erosion and Sediment Control?  Yes  No

Explain:

**In accordance with the ConnDOT Form 816 Best Management Practices (Section 1.10.03 – Water Pollution Control), "no construction shall proceed until (i) the Contractor has submitted in writing to the Engineer its erosion and sedimentation control plan (for each phase); (ii) the Engineer has given in writing his approval of said plans." It is incumbent on the contractor to provide detailed, project-specific erosion control plans for approval by the Engineer prior to construction. The SWPCP provides detailed descriptions of erosion control measures, such as silt fence, haybales, construction entrances, temporary diversion swales, stone checkdams, temporary sediment traps, dewatering basins, construction sequencing, and maintenance and inspection procedures. The descriptions of these controls and procedures is in direct compliance with the 2002 Connecticut Guidelines for Soil and Erosion and Sediment Control.**

**Section II. 3. g.**  
**Page 1 of 1**

A closed drainage system of catch basins (many with four foot sumps) is proposed to replace the existing leak offs and capture the runoff currently diverted down the side streets and drives. The project roadways are in a densely developed section of Coventry and the roadway layout is generally limited to the back of sidewalk, leaving little room to place any primary treatment systems. Several alternative locations were investigated in an attempt to provide primary treatment systems. A large parcel of land north of the trolley way (Wetland Impact Area A) was evaluated for use. However, after the parcel was surveyed and flagged, it was determined there was not enough upland to construct a primary treatment facility. Deep sumps are proposed as there was no room for primary treatment. In summary, the project will provide curbing along the roadway in order to collect, transport, and discharge stormwater runoff in a manner that minimizes erosion. Water quality will be significantly improved with the addition of four-foot catch basin sumps and outlet protection designed to prevent scour in receiving streams and channels.

### Section III: State Grants and Loans

Name of Applicant: **N/A**

Name of Proposed Project: **N/A**

1. This Flood Management Certification concerns a:  grant  loan

2. Total amount of grant or loan: \$ **N/A**

3. The recipient of the grant or loan will be:

Name: **N/A**

Mailing Address: **N/A**

City/Town: **N/A**

State:

Zip Code:

Phone: **N/A**

ext.

Fax:

Recipient Contact person:

Name: **N/A**

Mailing Address: **N/A**

City/Town: **N/A**

State:

Zip Code:

Phone: **N/A**

ext.

Fax:

4. The recipient will use the grant or loan to (check all that apply):

- construct a structure, obstruction or encroachment or conduct other work within a floodplain or coastal high hazard area.
- construct a facility or develop a site affecting drainage and stormwater runoff.
- conduct a study or prepare a report concerning land use or land use planning affecting a floodplain, drainage or stormwater runoff.

5. If the grant or loan is for a study or report, describe the anticipated effects on floodplains, drainage or stormwater runoff if the recommendations are implemented:

**N/A**

6. Will the proposed project promote development in floodplains or will utilities servicing the project be located so as to enable floodplain development?  Yes  No

Explain:

**N/A**

If the grant or loan is for construction of a structure, obstruction or encroachment or other work within a floodplain, or if it is for construction of a facility or development of a site that will affect drainage and stormwater runoff, Sections I and/or II of this Worksheet must be completed and the engineering report (Attachment H) and plans (Attachment G) must be provided as part of this application.

## Section IV: Disposal of State Land

Name of Applicant: **N/A**

Name of Proposed Project: **N/A**

1. The grantee will be:

Name: **N/A**

Mailing Address: **N/A**

City/Town: **N/A**

State:

Zip Code:

Phone: **N/A**

ext.

Fax:

Contact Person: **N/A**

Phone:

2. Describe the current state of development and use of the land to be disposed.

**N/A**

3. Why is the agency disposing of the land?

**N/A**

4. Describe the grantee's intended use of the land.

**N/A**

5. Will the disposal of the land promote development in floodplains?  Yes  No

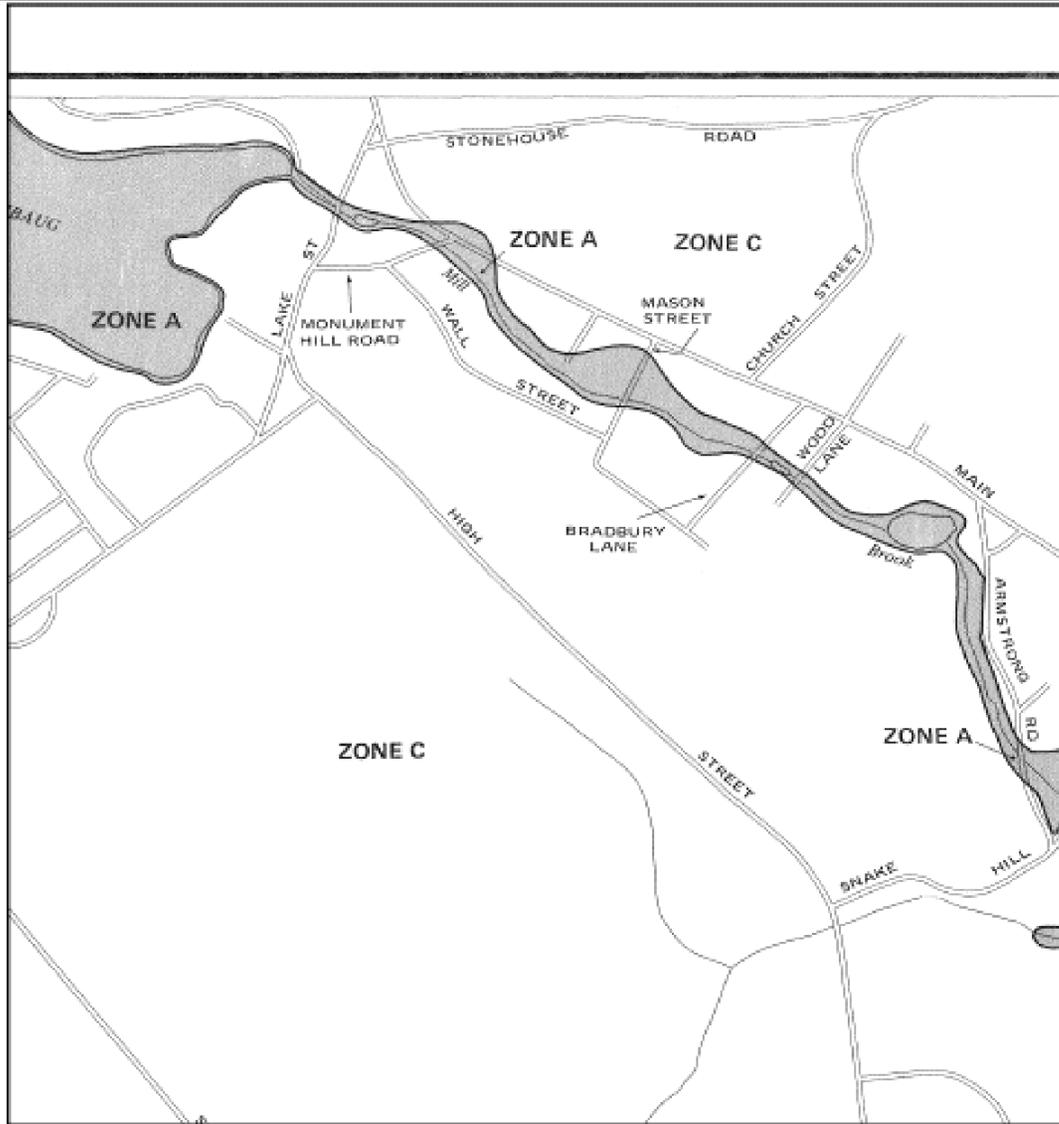
Explain:

**N/A**

6. Will the grantee's use of the land be consistent with the state's flood management statutes and regulations?

Yes  No Explain:

**N/A**



NATIONAL FLOOD INSURANCE PROGRAM

**FIRM**  
FLOOD INSURANCE RATE MAP

TOWN OF  
**COVENTRY,**  
CONNECTICUT  
TOLLAND COUNTY

PANEL 15 OF 15

COMMUNITY-PANEL NUMBER  
090110 0015 C

EFFECTIVE DATE:  
JUNE 4, 1980



U.S. DEPARTMENT OF HOUSING  
AND URBAN DEVELOPMENT  
FEDERAL INSURANCE ADMINISTRATION

This is an official copy of a portion of the above referenced flood map. It was extracted using F-MIT On-Line. This map does not reflect changes or amendments which may have been made subsequent to the date on the title block. For the latest product information about National Flood Insurance Program flood maps check the FEMA Flood Map Store at [www.msc.fema.gov](http://www.msc.fema.gov)

 **BSC GROUP**  
180 Glastonbury Boulevard  
Suite 103  
Glastonbury, Connecticut 06033  
860 652 8227

**RECONSTRUCTION OF ROUTE 31 FROM ROUTE 275  
AND LAKE STREET TO WOODS LANE  
FEMA FIRM MAP**

DATE: 05/13/13

TOLLAND COUNTY  
COVENTRY, CONNECTICUT

APPLICANT: CONNECTICUT DEPARTMENT OF  
TRANSPORTATION  
2800 BERLIN TURNPIKE  
NEWINGTON, CONNECTICUT

SHEET 1 OF 1

Soil Erosion and Sediment Controls (E&SC) for the project have been proposed in accordance with the Department of Environmental Protection's 2002 Connecticut Guidelines for Soil Erosion and Sediment Control (2002 Guidelines) and the 2004 Connecticut Stormwater Quality Manual. Permanent, engineered stormwater control structures are not proposed as part of the project. Please see the Connecticut Department of Transportation (ConnDOT) Plan Plates for Reconstruction of Route 31 in Attachment G for proposed minimum locations of erosion and sediment controls and Construction Sequencing Plans in Attachment C for water handling.

In order to give the contractor the maximum amount of flexibility, the plans show locations of perimeter erosion control barriers. It is the contractor's responsibility to provide additional controls within the project limits to prevent the removal and transportation of sediment off site and to resource areas. In accordance with ConnDOT Form 816 Best Management Practices (Section 1.10.03 – Water Pollution Control), no construction shall proceed until (i) the Contractor has submitted in writing to the Engineer its erosion and sedimentation control plan (for each phase); (ii) the Engineer has given in writing his approval of said plans; and (iii) the Contractor has installed all erosion and sedimentation controls called for by said plans.

## ATTACHMENT I – FLOOD CONTINGENCY PLAN

### **Project Floodplain Information**

Portions of the project route are located within the 100-year floodplain of Mill Brook as designated by the Flood Insurance Rate Maps (FIRM) prepared by the Federal Emergency Management Agency (FEMA). Mapped areas include a section of Route 31 near the intersection with Monument Hill Road and in the vicinity of the Fire Pond and the Manning Brook Crossing. Wetland Impact Areas B1, B2, and B3 are all located within the floodplain.

### **Flood Contingency Plan**

Prior to commencement of any construction, the Contractor will submit to the Engineer for approval, a written Flood Contingency Plan. The Plan will include the following:

- A description of the means by which the Contractor will remove from within the floodplain, all materials, equipment and personnel prior to a predicted major storm. The Contractor is responsible for monitoring local weather conditions and will secure the work site before predicted major storms. A major storm shall be defined as a storm predicted by the N.O.A.A. weather service with warnings of flooding, severe thunderstorms, or similarly severe weather conditions or effects.
- Provisions for notifying workers engaged in work on or near a bridge of an impending storm.
- Provisions for securing work in progress prior to a major storm.

Work within or adjacent to watercourses will be conducted during periods of low flow, whenever possible. The Engineer will remain aware of flow conditions during the conduct of such work and will direct the Contractor to stop this work if flow conditions threaten to cause excessive erosion, siltation, or turbidity. Water diversion structures are proposed to handle the 2-yr storm event. If more severe weather is predicted, the contractor will have to provide measures for stabilization.

During construction, the Contractor will be bound by the conditions set forth in the Department's "Standard Specifications for Roads, Bridges, and Incidental Construction", Form 816, Section 1.10, Environmental Compliance, Best Management Practices, which addresses the need for the Contractor to maintain a stable work area.

The Department will have District inspection personnel assigned to the project to ensure compliance with the provisions of the Standard Specifications. In addition, the Office of Environmental Planning will assign personnel to oversee the contractor for the duration of the contract as necessary to ensure compliance with all environmental requirements.

No buoyant, hazardous, flammable, explosive, soluble, expansive, or any other materials which could be injurious to human, animal, or plant life in the event of a flood, will be stored within the 500 year flood plain at any time. No long term storage of construction equipment and/or material will occur within the floodplain unless such equipment or material is not subject to major flood damage, or is anchored, restrained, or enclosed to prevent it from floating away or is removed prior to flooding.

**ATTACHMENT I – FLOOD CONTINGENCY PLAN**

The responsible parties for implementing the plan shall be:

During Construction

District 1 Office of Construction

District Engineer, Ravi Chandran - (860) 258-4601

Post Construction

District 2 Maintenance

Maintenance Director, Alan White - (860) 258-4501

## ATTACHMENT J– SOIL SCIENTIST REPORT

### Introduction and Methodology

On May 21<sup>st</sup>, 2008, BSC Group, Inc. (BSC) investigated the wetland impact locations for the Route 31 reconstruction project in Coventry, Connecticut in order to document any onsite hydric soils, as defined by Connecticut state statute and the U.S. Army Corps of Engineers (ACOE). BSC prepared data sheets for a total of 4 locations (included with this Attachment). The following discussion summarizes the results of the field investigations.

In accordance with ACOE, and the General Statutes of Connecticut, Title 22a (Chapters 439 to 446m), Sec. 22a-38, BSC documented the condition of soils at each of the project's proposed impact locations. By Connecticut Statute, wetlands are defined as, "land, including submerged land...which consists of any of the soil types designated as poorly drained, very poorly drained, alluvial, and floodplain by the National Cooperative Soils Survey, as may be amended from time to time, of the Natural Resources Conservation Service of the United States Department of Agriculture." The New England Interstate Water Pollution Control Commission (NEIWPCC) "Field Indicators for Identifying Hydric Soils in New England" Manual, Version 3, (the Manual) was used to identify poorly drained and very poorly drained soils with hydric features.

### Background Resources

The attached site soils map was generated from the Natural Resources Conservation Service (NRCS) National Cooperative Soil Survey found on the Web Soil Survey (version 2.0). Impact locations referred to as Fire Pond North/Impact Area B1, Fire Pond/Impact Area B2, and Fire Pond South/Impact Area B3 are located in an area mapped as Udorthents – urban land complex. NRCS categorizes this map unit as well drained. The Trolley Way impact location (Impact Area A) is mapped as Canton and Charlton soils, very stony and well drained. Udorthents – urban land complex, and Canton and Charlton soils are not considered to be hydric under Connecticut state criteria, nor under ACOE guidelines.

### Site Investigations

Due to the fact that impact locations are proposed in close proximity to existing roadway, parking lot, and development, virtually all of the soils investigated were found to be disturbed as the result of human activity. In most cases, refusal was found to occur within a few inches of the surface, and full soil profiles were not obtainable. In general, soils within close proximity to existing Route 31 and adjacent development may be considered to be Udorthents – urban land complex. The attached data sheets provide greater detail regarding specific observations at specific locations.

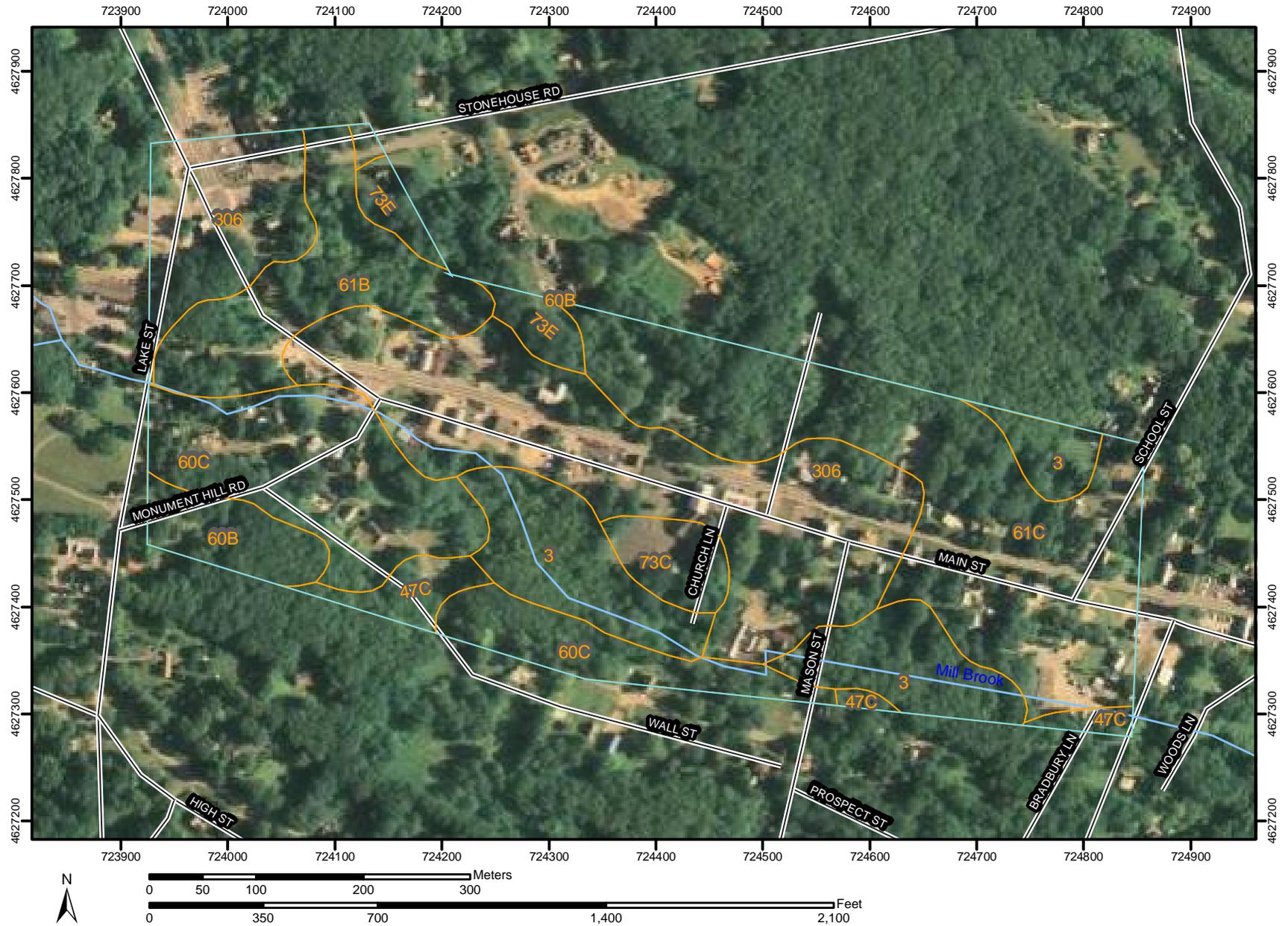
Despite the disturbed nature of the soils associated with proposed impact locations, hydric soil features were observed in the Trolley Way (A) wetland soil pit. The hydric features involved low chroma matrix colors accompanied by relatively strong redoximorphic iron concentrations within the top 12 inches of the soil. Evidence of hydrology and wetland vegetation was relied upon at the other locations (Fire Pond North, Fire Pond, and Fire Pond South) to determine the wetland boundary, as refusal was noted at or near the surface (Fire Pond North and Fire Pond South), or soils were largely submerged (Fire Pond). The table below summarizes BSC's findings regarding proposed impact area soils.

**ATTACHMENT J– SOIL SCIENTIST REPORT**

**Table J.1. The table provides information on the Impact Area soils as mapped by the NRCS as well the field observations.**

<b>Impact Area</b>	<b>Mapped Soil</b>	<b>Mapped Drainage Class</b>	<b>Hydric Soil Observed?</b>	<b>Comments/Observations</b>
A (Trolley Way) Upland pit	Canton/Charlton	Well drained	No	Disturbed soil.
A (Trolley Way) Wetland pit	Canton/Charlton	Well drained	Yes	Disturbed soil with hydric indicators.
B1 (Fire Pond North)	Udorthents – urban land complex	Well drained	No	Stream embankments are rip-rapped or mowed. Little to no associated wetland, no soil pit was dug.
B2 (Fire Pond)	Udorthents – urban land complex	Well drained	No	Highly disturbed and completely surrounded by pavement. Most soil was submerged, no soil pit was dug.
B3 (Fire Pond South)	Udorthents – urban land complex	Well drained	No	Disturbed soil – refusal was observed within a few inches of the soil surface. No soil pit was possible.

Soil Map—State of Connecticut  
(Rt 31, Coventry, CT)



## MAP LEGEND

### Area of Interest (AOI)

 Area of Interest (AOI)

### Soils

 Soil Map Units

### Special Point Features

-  Blowout
-  Borrow Pit
-  Clay Spot
-  Closed Depression
-  Gravel Pit
-  Gravelly Spot
-  Landfill
-  Lava Flow
-  Marsh
-  Mine or Quarry
-  Miscellaneous Water
-  Perennial Water
-  Rock Outcrop
-  Saline Spot
-  Sandy Spot
-  Severely Eroded Spot
-  Sinkhole
-  Slide or Slip
-  Sodic Spot
-  Spoil Area
-  Stony Spot

-  Very Stony Spot
-  Wet Spot
-  Other

### Special Line Features

-  Gully
-  Short Steep Slope
-  Other

### Political Features

#### Municipalities

-  Cities
-  Urban Areas

### Water Features

-  Oceans
-  Streams and Canals

### Transportation

-  Rails

### Roads

-  Interstate Highways
-  US Routes
-  State Highways
-  Local Roads
-  Other Roads

## MAP INFORMATION

Original soil survey map sheets were prepared at publication scale. Viewing scale and printing scale, however, may vary from the original. Please rely on the bar scale on each map sheet for proper map measurements.

Source of Map: Natural Resources Conservation Service  
Web Soil Survey URL: <http://websoilsurvey.nrcs.usda.gov>  
Coordinate System: UTM Zone 18N

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

Soil Survey Area: State of Connecticut  
Survey Area Data: Version 6, Mar 22, 2007

Date(s) aerial images were photographed: 3/31/1991

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

## Map Unit Legend

State of Connecticut (CT600)			
Map Unit Symbol	Map Unit Name	Acres in AOI	Percent of AOI
3	Ridgebury, Leicester, and Whitman soils, extremely stony	37.2	11.3%
17	Timakwa and Natchaug soils	13.5	4.1%
21A	Ninigret and Tisbury soils, 0 to 5 percent slopes	2.9	0.9%
23A	Sudbury sandy loam, 0 to 5 percent slopes	2.7	0.8%
34B	Merrimac sandy loam, 3 to 8 percent slopes	12.8	3.9%
34C	Merrimac sandy loam, 8 to 15 percent slopes	3.1	0.9%
47C	Woodbridge fine sandy loam, 2 to 15 percent slopes, extremely stony	16.1	4.9%
51B	Sutton fine sandy loam, 2 to 8 percent slopes, very stony	10.4	3.2%
60B	Canton and Charlton soils, 3 to 8 percent slopes	5.8	1.8%
60C	Canton and Charlton soils, 8 to 15 percent slopes	28.5	8.7%
61B	Canton and Charlton soils, 3 to 8 percent slopes, very stony	7.4	2.3%
61C	Canton and Charlton soils, 8 to 15 percent slopes, very stony	94.3	28.7%
62D	Canton and Charlton soils, 15 to 35 percent slopes, extremely stony	30.2	9.2%
73C	Charlton-Chatfield complex, 3 to 15 percent slopes, very rocky	2.5	0.7%
73E	Charlton-Chatfield complex, 15 to 45 percent slopes, very rocky	14.9	4.5%
102	Pootatuck fine sandy loam	0.0	0.0%
108	Saco silt loam	10.3	3.1%
302	Dumps	1.0	0.3%
306	Udorthents-Urban land complex	30.0	9.1%
W	Water	5.2	1.6%
Totals for Area of Interest (AOI)		328.7	100.0%

## ATTACHMENT K– ENVIRONMENTAL REPORT

### Introduction and Methodology

This report provides information regarding the existing ecological conditions and anticipated impacts (short term, long term, and cumulative) at wetland impact locations within the project footprint. The evaluation of project impacts is based on wetland and soil delineation, vegetation community surveys, wildlife habitat evaluation, and wetland functions and values assessment. Wetlands were delineated using the federal method in accordance with the U.S. Army Corps of Engineers (ACOE) Wetlands Delineation Manual (1987 Manual) as well as the state method in accordance with General Statutes of Connecticut, Title 22a, Chapter 440, Sec. 22a-38. The boundaries of federally and state-regulated wetlands remain consistent on this project as the areas meeting the soil criteria for state designation also meet the federal three-factor approach of hydrology, hydric soils (best professional judgment in highly altered areas), and hydrophytic vegetation. Transects were attempted in accordance with the 1987 Manual in order to perform an upland and wetland observation plot in each impact area. Wetland observation data sheets were prepared for each of the four (4) impact locations and updated to meet the requirements of the Regional Supplement to the Corps of Engineers Wetland Delineation Manual: Northcentral and Northeast Region. It was determined that portions of the impacts are located in watercourses, below the Ordinary High Water mark. Data sheets describing the dominant vegetation and signs of hydrology are included in the ACOE permit application materials.

An assessment of wetland functions and values was also conducted in accordance with the ACOE New England Division Highway Methodology Workbook Supplement. Information regarding the existing status of wetland functions and values is provided in both text and table format. ACOE functions and values data sheets for four (4) wetland areas are attached with this report. Representative photographs of the site are also included in this Attachment.

The project is not located immediately within state-listed species habitat mapped by the CT DEEP Natural Diversity Database (NDDB), but is within the **previously** regulated ½ mile upstream or downstream of mapped areas. A Review Request was submitted originally, and the NDDB responded with information that past records for wood turtles (*Glyptemus insculpta*), a state listed species of special concern, were located in the mapped habitat. While the NDDB concurred with a project assessment that adverse impacts to state-listed species are unlikely due to the nature of the proposed activities, they no longer review projects located outside of mapped habitat. Further consultation or an updated review is therefore not required.

The following discussion presents the ecological information and assessment for each proposed wetland impact area.

### Overall Site Description

The project corridor consists of 2,000 linear feet of the existing roadway of Route 31 where it traverses the historic Village of Coventry. The area has historically included the presence of several mills where the perennial stream, Mill Brook, had been altered and harnessed for power. The village now consists of a small, independent commercial district, residences, and associated parking areas in a somewhat densely developed setting. Scattered, mature, shade trees, common to older neighborhoods, are present in this area as well as pockets of hardwood forests. Adjacent

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forests are typical dry to mesic with a canopy dominated by maples (*Acer*), ash (*Fraxinus*), oaks (*Quercus*), hickories (*Carya*) and birches (*Betula*).

Mill Brook has since been culverted and placed underground for long stretches under existing parking lots and buildings before entering a vegetated corridor. The stream originates at the dam at the Lake Wangumbaug outlet and flows to the southeast, as part of the larger Willimantic River watershed. Mill Brook has an Inland Surface Water Quality Classification of B which has been designated for recreational use; fish and wildlife habitat; agricultural and industrial supply and other legitimate uses including navigation. Portions of the project corridor are located within the 100-year floodplain as designated by the Federal Emergency Management Agency (FEMA) as well as the 2-year, 10-year 25-year and 50-year floodplains identified with hydraulic modeling.

**Wetland Impact Areas**

All wetland impact areas will occur directly within the Mill Brook channel or in tributary waters or associated wetlands to this system. The majority of the wetland areas to be impacted are highly altered or located at the disturbed edge of larger systems. A number of invasive species were also observed at each of the impact areas.

**Wetland Impact Area A**

Impact Area A is located immediately off Route 31, approximately 400 feet southeast of the intersection with Route 275. The wetland area is best characterized as a Palustrine Broad-leaved Deciduous Forest (PFO1). A scoured channel begins at the edge of the roadway shoulder due to a stormwater drainage outlet from Route 31. This is not a stream crossing as the channel and wetland do not continue on the other side of the roadway. A narrow band of wetland vegetation and soils were delineated along the channel at the impact area, but expands out from the channel just down gradient to the northwest. The channel does flow to a larger wetland system and stream to the north. The majority of the adjacent wetland is physically separated from the channel due to a four-foot high stone wall. Dominant vegetation consists of sugar maple (*Acer saccharum*), white ash (*Fraxinus americana*), American elm (*Ulmus americana*), red oak (*Quercus rubra*), silky dogwood (*Cornus amomum*), choke cherry (*Prunus virginiana*), multiflora rose (*Rosa multiflora*), sensitive fern (*Onoclea sensibilis*), trout lily (*Erythronium americanum*), wild geranium (*Geranium maculatum*), poison ivy (*Toxicodendron radicans*), jewelweed (*Impatiens capensis*) and Jack-in-the-pulpit (*Arisaema triphyllum*). In the immediate impact area, soils are noticeably disturbed by adjacent human activities (roadway, large stone wall, and old trolleyway) but hydric soil indicators were present in the wetland plot. Please see Attachment J for more detailed soil information.

*Functions and Values*

The larger wetland system provides some Groundwater Recharge/Discharge, Floodflow Alteration, Wildlife Habitat, and Nutrient Removal as well as limited Production Export and limited Sediment/Shoreline Stabilization. The primary function of the immediate impact area is Sediment/Toxicant Retention as sediment drops out at the outlet to the scoured channel. Please see attached evaluation forms for more detailed information about the rationale used to assess the wetland.

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*Wildlife Habitat Evaluation*

The surrounding land use at this impact area is a mix of forest and residential with the Route 31 roadway immediately adjacent. The wetland at this location does have relatively good stratification of vegetative layers with a canopy about 60-70 feet tall. A few small snags (dbh < 12 inches) were observed in the area as well as some scattered woody debris. Dense thickets of the invasive species, multiflora rose were observed, offering some cover or nesting areas to wildlife. Poison ivy, highbush blueberry (*Vaccinium corymbosum*), and cherry (*Prunus*) would all provide sources of native food/berries, while the multiflora rose contributes rose hips. The channel is typically dry as its main source of flow appears to be stormwater drainage but water may pond temporarily in some small pockets within the wetland. The area would likely support birds, mammals, reptiles, amphibians and invertebrates common to suburban areas, providing them with potential cover, foraging and denning/nesting habitat. Several songbirds were directly observed including Gray Catbird (*Dumetella carolinensis*), Northern Cardinal (*Cardinalis cardinalis*), and American Robin (*Turdus migratorius*). An Eastern gray squirrel (*Sciurus carolinensis*) and signs of a woodchuck (*Marmota monax*) were noted. Small rodents, Eastern chipmunks (*Tamias striatus*), common raccoon (*Procyon lotor*), and striped skunk (*Mephitis mephitis*) would also be expected here. Since a suitable perennial stream is not present and there is no intact habitat corridor between this area and NDDB habitat polygons mapped near Wangumbaug Lake, it appears unlikely to attract state listed species.

*Impacts proposed*

A total of 0.01 acres (390 square feet (sqft)) of permanent inland wetland impacts are proposed due to the realignment of the Route 31 curve in this location. A new drainage outlet will be placed adjacent to the existing cross culvert and will extend into the channel. A riprap outlet protection pad will also be installed. The proposed activities will require some cut/grading and removal of material to accommodate the culvert and pad. Constructed grades will meet the adjacent, existing profile of the channel and wetland. The adjacent disturbed areas will be replanted with native species. Although the work area will be permanently altered, portions of the wetland will be revegetated and will resume original function. Contractors will use the road shoulder and adjacent upland for equipment access, limiting any temporary, construction-related impacts to an additional 85 square feet. Please see Attachment L for more detailed mitigation information.

As indicated, the relatively minor impacts are located immediately adjacent to the roadway at the disturbed edge of a larger wetland system. We do not anticipate the overall existing functions and values of this wetland to be altered or reduced by the impact, and the work would not change the nature of the area in the long term. The impact to wildlife habitat would be localized and temporary with no anticipated loss of important features. Sediment and Toxicant Retention and Sediment Stabilization will likely increase at this outlet as a result of the scour pad.

**Wetland/Water Impact Area B1**

Impact Area B1 is associated with Manning Brook, an intermittent tributary to Mill Brook. It is located north of Route 31, and drains to the Mill Brook through an existing culvert under the roadway. The resource area is best characterized as an Intermittent Riverine Streambed (R4SB) with little to no associated wetland vegetation. The stream flows past a restaurant and is surrounded by areas of maintained lawn immediately up to its banks as well as paved parking

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areas. The stream is one to three feet wide in most locations and appears to flow from a larger wetland system to the north. Several scattered ash and birch trees were noted in the adjacent lawn. Herbaceous species remaining near the stream include dandelion (*Taraxacum officinale*), Virginia creeper (*Parthenocissus quinquefolia*), horsetail (*Equisetum arvense*), grape (*Vitis spp.*), and poison ivy. Soils are highly disturbed and boulders were placed along the bank. It was determined that the only jurisdictional features here are located below OHW, and all impacts are considered to be to the watercourse.

*Functions and Values*

The intermittent stream has low capacity for functions and values due to the previous alteration. It provides some limited Groundwater Recharge/Discharge, Floodflow Alteration, Sediment/Toxicant Retention, and Visual Quality/Aesthetics. A primary function was not identified. Please see attached evaluation forms for more detailed information about the rationale used to assess the area.

*Wildlife Habitat Evaluation*

Adjacent land use is commercial and residential (historic village) with surrounding parking areas, roadway and lawn. With the exception of being a source of water, the stream appears to provide little to no wildlife habitat function due to the maintained lawn banks, lack of cover, and increased exposure to human activity in the proposed impact area. Consultation with CTDEP Inland Fisheries Division confirmed that fish habitat was negligible in this area.

*Impacts proposed*

A total of 0.01 acres (430 sf), over the course of 58 linear feet, of inland watercourse (intermittent) impacts are proposed. The parking lots associated with the restaurant are being extended and reconfigured in order to provide safer access management in the village. This includes a set of new, extended culverts crossing the stream under Route 31. Approximately 111 sf of temporary impacts will be necessary in order to replace the existing culvert. Riprap scour protection will be installed in the stream, upgradient of the inlet. A layer of more rounded, natural stone will be used over the base. The openness ratio of  $\geq 0.25$  proposed in the Inland Fisheries Division Habitat Conservation and Enhancement Program Stream Crossing Guidelines could not be met for the culvert replacement. However, due to the limited existing habitat, Inland Fisheries determined that providing for fish passage was not necessary at this location. The grading of the constructed/scour-protected portion of the channel is designed to match the profile of the adjacent channel. Although the work area will be permanently altered, portions of the channel will resume original stream function. Contractors will use adjacent uplands for equipment access, limiting any temporary construction-related impacts.

We do not anticipate the overall existing functions and values of this wetland to be altered or reduced by the impact since values are minimal at this location already. An additional 28 feet of the channel will be placed within culverts so there will be some loss of open, intermittent stream, but the overall function will be retained.

**Wetland/Water Impact Area B2**

Impact Area B2 is associated with the perennial stream Mill Brook in an area referred to as the Fire Pond. It is located south of Route 31, and consists of an open pit where Mill Brook daylight

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for a brief section (approximately 55 feet long and 30 feet wide). The area is surrounded by paved parking surfaces and the stream is culverted underground for over 100 feet in either direction. Manning Brook flows under Route 31 and confluences with Mill Brook at this location. The resource area is best characterized as Upper Perennial Riverine with Unconsolidated Bottom (R3UB). Large areas of sand deltas/deposition were observed as sediment drops from the stream and stormwater near the outlet of the 1.5 x 9 ft culvert. The remainder of the stream substrate consisted of both cobble/gravel and silty/organic areas. A small amount of emergent wetland vegetation is present on sand bars located within the pit and interspersed in the riprap along the banks. Other areas consist of vertical concrete headwalls at the inlet and outlet locations. The emergent vegetation observed consists of common reed (*Phragmites australis*), cattail (*Typha latifolia*), soft rush (*Juncus effusus*), sensitive fern, jewelweed, and horsetail. Soils were not available due to the riprap or concrete comprising the banks of the Fire Pond. The remaining soil was inundated by the streamflow. It was determined that the only jurisdictional features here are located below OHW, and all impacts are considered to be to the watercourse.

*Functions and Values*

In this location, Mill Brook has reduced capacity for functions and values due to the previous alteration. It provides some Groundwater Recharge/Discharge, Sediment/Toxicant Retention, and Fish and Shellfish Habitat. It also provides limited Floodflow Alteration, Wildlife Habitat, and Visual Quality/Aesthetics. A primary function was not identified. Please see attached evaluation forms for more detailed information about the rationale used to assess the area.

*Wildlife Habitat Evaluation*

Adjacent land use is commercial and residential (historic village), with a large area of surrounding impervious surfaces. The fire pond area of Mill Brook appears to provide little wildlife habitat function due to the lack of cover, lack of connectivity (over 100-foot long culverts), surrounding paved surfaces, and increased exposure to human activity. It seems unlikely that wildlife would cross the parking areas from the vegetated areas to the south, to reach the limited habitat offered. Consultation with CTDEP Inland Fisheries Division confirmed that fish habitat was present but minor, and limited to warmwater pond species such as smallmouth bass (*Micropterus dolomieu*), yellow perch (*Perca flavescens*), and sunfish (*Lepomis spp*) that were washed from Wangumbaug Lake. While habitat connectivity for fish passage was not a main concern due to the existing alteration, they did request that the existing habitat was maintained for individuals who may become isolated in this stretch of brook. Two individual fish were noted in the Fire Pond during the May 20, 2008 site visit near the 1.5 x 9 ft outlet. Both were approximately 4-5 inches long and appeared to be sunfish.

*Impacts proposed*

The Fire Pond will be narrowed to a nine (9)-foot wide constructed channel in order to remove it from the roadway clear zone. A total of 0.037 acres (1,615 sf) over the course of 48 linear feet of inland watercourse impacts are proposed. However, the activities will daylight approximately 22 linear feet of the stream by removing a portion of existing culverts, for another 198 sf of temporary impacts. The bed of the channel will also be formed into a step-pool design which will require placing natural stone material in a concrete slab. Velocities modeled were too high to place natural material without securing it in place. Interaction with groundwater will be maintained through the use of a number of pipes installed through the slab bottom. The existing twin culverts that convey the stream to the south will also be replaced. As per the Stream

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Crossing Guidelines, one culvert will be placed at an elevation that is able to maintain low flow and will have a natural substrate installed. However, the openness ratio of  $\geq 0.25$  also proposed in the Stream Crossing Guidelines could not be met for the culvert replacement due to the length of the existing crossing under the parking lots. Although the entire area will be permanently altered, portions of the channel will resume enhanced stream function.

Although the changes proposed in this area are fairly significant, we do not anticipate the existing functions and values of this area to be reduced, but some may change in nature. For example, the existing Fish (and Shellfish) Habitat will be replaced by step pool habitat as recommended by Inland Fisheries Division. Floodflow Alteration will also change slightly as the culverts are being properly sized for storm events. Floodwaters currently back up into the existing Fire Pond and flow over the adjacent parking lots. Water will now be conveyed more efficiently to the natural areas downstream. Hydraulic modeling shows the 100-year floodplain water surface elevation downgradient will rise but remain with 0.25 feet of the existing elevation. The step pool design also increases the value of the Visual Quality/Aesthetics of the wetland as it will be used as a feature of interest for patrons at the adjacent businesses.

**Wetland/Water Impact Area B3**

Impact Area B3 is located at the point where Mill Brook outlets south of the Fire Pond into a natural channel. The resource area is best characterized as Upper Perennial Riverine with Unconsolidated Bottom (R3UB). The area is immediately adjacent to a paved parking surface but becomes a forested channel downstream. The southern bank is also forested and is adjacent to a large Palustrine wetland system. Portions of the system can be described as either Broad-leaved Deciduous Forest (PFO1) Scrub-Shrub Broad-leaved Deciduous (PSS1), or Persistent Emergent (PEM1). The impact is occurring with the forested area. Debris and pieces of broken concrete are present where the stream outlets from the degrading culverts. A scour/erosion issue has been identified in this location. The stream substrate consists of a mix of cobbles, sand and silty/organics. Dominant vegetation includes red maple (*Acer rubrum*), black birch (*Betula lenta*), white oak (*Quercus alba*), red oak, highbush blueberry (*Vaccinium corymbosum*), sweet pepperbush (*Clethra alnifolia*), winterberry (*Ilex verticillata*), black cherry (*Prunus serotina*), choke cherry, multiflora rose, wild sarsaparilla (*Aralia nudicaulis*), cinnamon fern (*Osmunda cinnamomea*), white wood-aster (*Aster divaricatus*), poison ivy, common reed, and garlic mustard (*Alliaria petiolata*). Due to adjacent development, soils were highly disturbed at the impact area and we experienced refusal when attempting to evaluate them.

*Functions and Values*

In the immediate impact location, Mill Brook has reduced capacity for functions and values due to the adjacent disturbance and development. However, the larger system does have more intact function. It provides some Fish and Shellfish Habitat and Wildlife Habitat. It also provides limited Groundwater Recharge/Discharge, Sediment/Toxicant Retention, Floodflow Alteration, Production Export, and Visual Quality/Aesthetics. A primary function was not identified. While not located in the wetland, old mill ruins are located in the vicinity of this wetland, adding some Educational Scientific Value and Uniqueness/Heritage to the adjacent land. Please see attached evaluation forms for more detailed information about the rationale used to assess the wetland.

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*Wildlife Habitat Evaluation*

Adjacent land use is forested and residential, and the impact area is located adjacent to the existing commercial area and parking lots. Historic mill ruins are also preserved off the parking lot to the west of the impact area. The larger wetland system does have habitat features available to wildlife, enhanced by the mix of cover types present. This portion of Mill Brook also provides fish habitat as the perennial stream flow is restored to a more natural channel. The stream does have small potential for providing habitat for the wood turtle as it has some connectivity to the larger wetland system and the NDDDB polygons mapped to southeast. Some stratification of vegetative layers was noted in the relatively narrow forested area adjacent to the stream. The highbush blueberry, winterberry, and cherry would all provide sources of native food/berries, while the invasive multiflora rose and Asiatic bittersweet would also contribute. Oak species would provide acorns/mast. The area would likely support birds, mammals, reptiles, amphibians and invertebrates common to suburban areas, providing them with potential cover, foraging and denning/nesting habitat.

Due to the fact the impacts to the stream are occurring adjacent to the existing culvert outlets and parking areas, it seems unlikely wildlife or state-listed species would be rely directly on this area with high potential of human interaction. It is more likely that they utilize the less disturbed areas further downstream or within the larger wetland. Long term impacts to wildlife habitat are not anticipated as the work will not change the overall nature of the area.

*Impacts proposed*

A total of 0.03 acres (1,445 sf) of permanent inland wetland/watercourse impacts are proposed. The new culverts installed from the fire pond channel will outlet approximately 5 feet upgradient and to the west of the existing culverts, resulting in the daylighting of a small additional portion of the stream. A large riprap outlet scour hole will be required in the stream bed and a layer of more rounded, natural stone will be used over the base to mitigate impacts. The adjacent disturbed areas will be replanted with native species. These impacts located immediately adjacent to existing outlets and parking areas, would not change the nature or habitat of the area in the long term. Although the work area will be permanently altered, portions of the channel will resume original stream function. Contractors will use adjacent uplands for equipment access, limiting any temporary construction-related impacts to an additional 350 square feet. The replacement of the double culvert will result in an additional 558 sf of temporary impacts to the watercourse.

We anticipate minimal to no impacts to current functions and values. Fish and Wildlife habitat may improve due to the natural substrate and low flow maintenance planned in the design of the new culverts. Sediment/Toxicant Retention may also increase as the proposed scour pad stabilizes an existing erosion issue and traps material.

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**Table K.1. The table summarizes the functions and values provided by the wetland/water impact areas.**

Wetland/ Water Impact Area	Perm. Impact Area (s.f.)	Wetland/ Water Type	WETLAND FUNCTIONS AND VALUES <sup>(1)(2)</sup>												
			G W R / / D	F F A	S & T R	N R & T	P E	S & S	F & S H	W L H	T & E	R E C	E D / S	U / H	V Q / A
A	390	PFO1	X ↓	X ↓	P	X	X ↓	X		X					
B1	430	R4SB	X	X ↓	X ↓									X ↓	
B2	1,615	R3UB	X	X ↓	X				X	X ↓				X ↓	
B3	1,445	R3UB, PFO1	X ↓	X ↓	X ↓		X ↓		X	X				X ↓	

- (1) List of acronyms for wetland functions and values:  
 GWR/D- Ground Water Recharge/Discharge  
 FFA- Floodflow Alteration  
 S&TR- Sediment and Toxicant Retention  
 NR&T- Nutrient Removal/Retention/Transformation  
 PE – Production Export  
 S&S – Sediment/Shoreline Stabilization

- F&SH- Fish and Shellfish Habitat  
 WLH- Wildlife Habitat  
 T&E- Threatened and Endangered Species  
 REC – Recreation  
 ED/S – Educational/Scientific Value  
 U/H- Uniqueness/Heritage  
 VQ/A- Visual Quality/Aesthetics

- (2) X denotes that this impact area provides this function/value in some capacity  
 ↓ denotes this impact area provides this function to a limited degree  
 P denotes that this function is the Primary function in this impact area

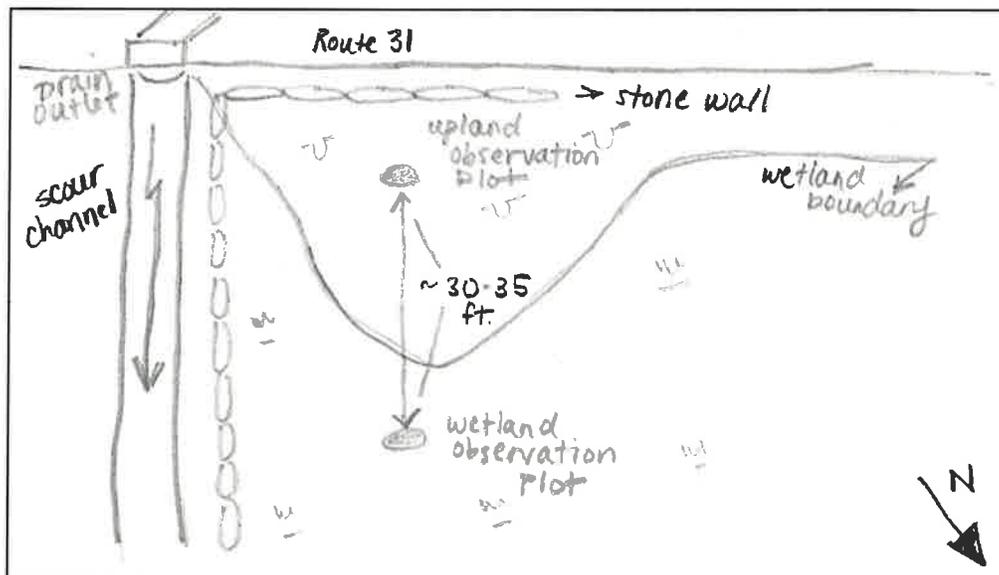
IWRD PERMIT APPLICATION

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WETLAND PHOTOS

Impact Area A – Trolleyway



View of the scoured drainage channel adjacent to Route 31. The wetland area is best characterized as a Palustrine Broad-leaved Deciduous Forest (PFO1).



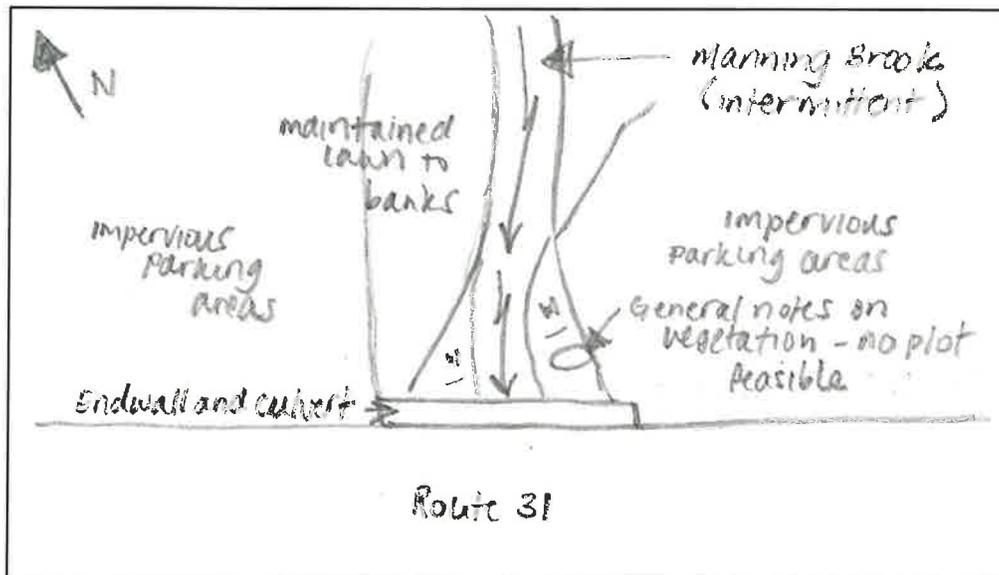
IWRD PERMIT APPLICATION

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WETLAND PHOTOS

Impact Area B1 – Fire Pond North – Manning Brook



View of Manning Brook, an intermittent tributary that flows to Mill Brook through an existing culvert under Route 31. The resource area is best characterized as an Intermittent Riverine Streambed (R4SB) with little to no associated wetland vegetation.



RECONSTRUCTION OF ROUTE 31  
COVENTRY, CT  
STATE PROJECT NO. 32-130

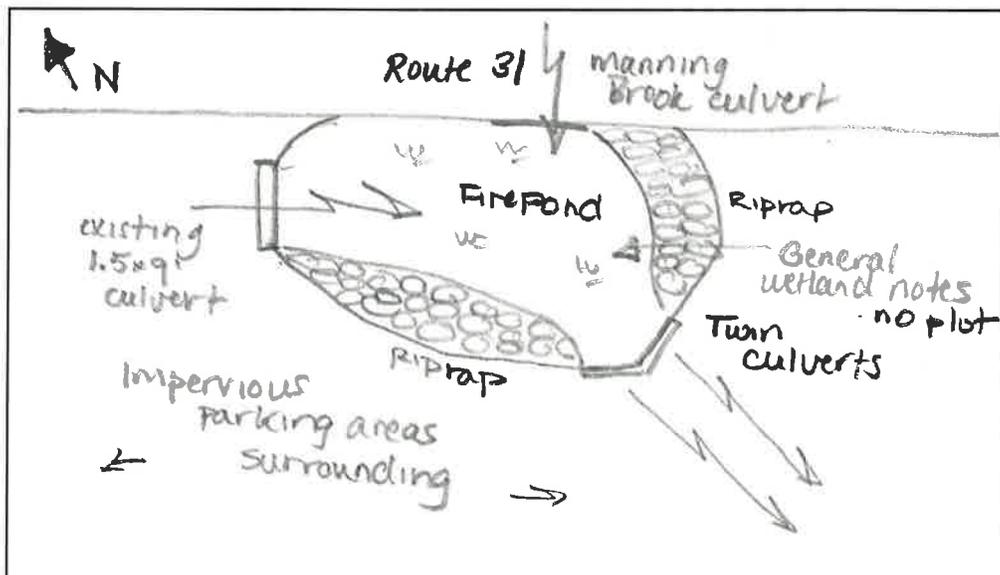
IWRD PERMIT APPLICATION

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WETLAND PHOTOS

Impact Area B2 – Fire Pond Central – Mill Brook



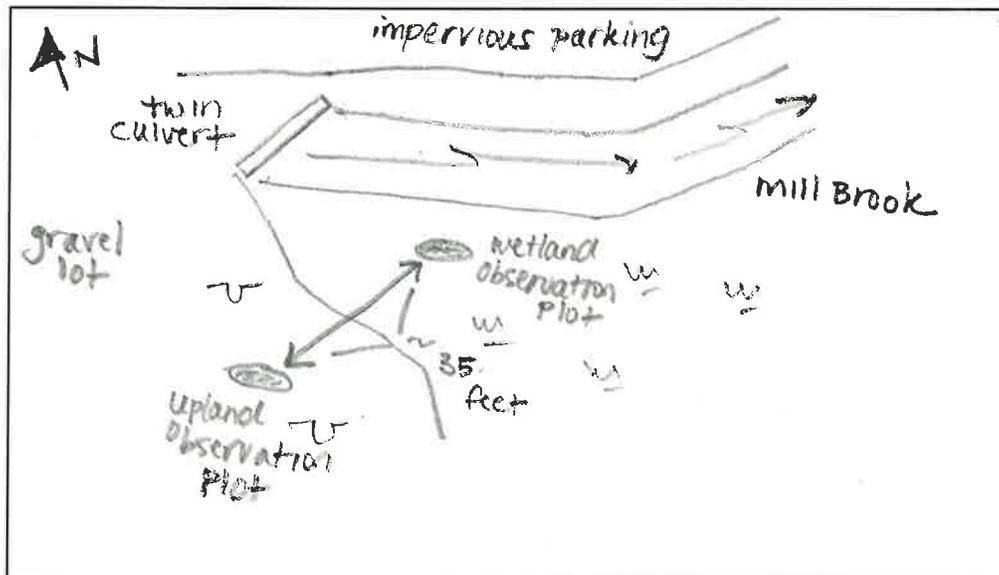
View of the "Fire Pond" south of Route 31 where Mill Brook daylights for a brief section. The area is surrounded by paved parking surfaces and the stream is culverted underground for over 100 feet in either direction. The resource area is best characterized as Upper Perennial Riverine with Unconsolidated Bottom.



Impact Area B3 – Fire Pond South – Mill Brook



Mill Brook outlets south of the Fire Pond into a natural channel. The resource area is best characterized as Upper Perennial Riverine with Unconsolidated Bottom (R3UB). The area is immediately adjacent to a paved parking surface but becomes a forested channel downstream.



# Wetland Function-Value Evaluation Form

Wetland I.D. Trolleyway (Impact Area A)  
 Latitude 41° 44' 10" Longitude 72° 18' 16"  
 Prepared by: DW Date 5/20/08  
 Wetland Impact Type: Drainage/Fill Area 390 SF

Evaluation based on:  
 Office Field   
 Corps manual wetland delineation completed? Y  N

Total area of wetland Not available <sup>impacted</sup> Is wetland part of a wildlife corridor? yes or a "habitat island"? no  
 Distance to nearest roadway or other development immediately adjacent (231)  
 Dominant wetland systems present: PFOA Contiguous undeveloped buffer zone present some  
 Is the wetland a separate hydraulic system? No If not, where does the wetland lie in the drainage basin? near headwaters  
 How many tributaries contribute to the wetland? 0 Wildlife & vegetation diversity/abundance (see attached list)

Function/Value Suitability Y N Rationale (Reference #)\* Principal Function(s)/Value(s) Comments

Function/Value	Suitability Y N	Rationale (Reference #)*	Principal Function(s)/Value(s)	Comments
Groundwater Recharge/Discharge	X	5, 7, 8, 9	no till, no gravel/sandy, no Frangipiper, no high quality no signs of groundwater discharge	
Floodflow Alteration	X	2, 3, 5, 6, 7, 8, 9, 13, 15, 18	close to headwaters, sheet flow from road	
Fish and Shellfish Habitat	X			
Sediment/Toxicant Retention	X	1, 2, 4, 5, 8, 9, 10, 12, 16	HTM - foot of fill - salt + sand, minerals/fine grained soil no open water	
Nutrient Removal	X	3, 4, 5, 6, 7, 8, 9, 11 (some), 14, 15	sediment trapping, no ponded but saturated to surface dense multiflora rose - minimal	
Production Export	X	1, 2, 7, 10	minimal habitat - good stratification but invasives are dominant - low diversity in shrubs	
Sediment/Shoreline Stabilization	X	1, 2, 3, 4, 16	channelized stream - mostly from stormwater somewhat high velocities in stream	
Wildlife Habitat	X	6, 7, 8, 13, 15, 16, 17	good stratification but some invasives minimal but some/present - some passerines	
Recreation	X			
Educational/Scientific Value	X			
Uniqueness/Heritage	X		stone wall, historic trolleyway (#28) but the wetland itself is not the heritage	
Visual Quality/Aesthetics	X	11		
ES Endangered Species Habitat	X			
Other	X			

Notes: Proximity to roadways and houses limits capacity for F+Vs \* Refer to backup list of numbered considerations.

(B1)

# Wetland Function-Value Evaluation Form

Not available Manning Books, but manipulated

Total area of wetland 1 Human made? NO or a "habitat island"? NO  
 Adjacent land use landscaping road, parking lot, restaurant Distance to nearest roadway or other development adjacent  
 Dominant wetland systems present RASB... Contiguous undeveloped buffer zone present 0

Is the wetland a separate hydraulic system? NO If not, where does the wetland lie in the drainage basin? Headwaters  
 How many tributaries contribute to the wetland? 1 Wildlife & vegetation diversity/abundance (see attached list)

Wetland I.D. Tirepond North  
 Latitude 41° 46' 06" N Longitude 72° 18' 05" W  
 Prepared by: STD/BN Date 5/20/08  
 Wetland Impact: drudge/fill Area 430 s.f.

Evaluation based on:  
 Office Field   
 Corps manual wetland delineation completed? Y  N

Function/Value	Suitability Y N	Rationale (Reference #)*	Principal Function(s)/Value(s)	Comments
Groundwater Recharge/Discharge	<input checked="" type="checkbox"/>	5,6,7,15		
Floodflow Alteration	<input checked="" type="checkbox"/>	2,3,13,15		
Fish and Shellfish Habitat	<input checked="" type="checkbox"/>			
Sediment/Toxicant Retention	<input checked="" type="checkbox"/>	12,10		
Nutrient Removal	<input checked="" type="checkbox"/>	4		
Production Export	<input checked="" type="checkbox"/>			
Sediment/Shoreline Stabilization	<input checked="" type="checkbox"/>			
Wildlife Habitat	<input checked="" type="checkbox"/>			
Recreation	<input checked="" type="checkbox"/>			
Educational/Scientific Value	<input checked="" type="checkbox"/>			
Uniqueness/Heritage	<input checked="" type="checkbox"/>			
Visual Quality/Aesthetics	<input checked="" type="checkbox"/>	9,11,12		
ES Endangered Species Habitat	<input checked="" type="checkbox"/>			
Other				

Handwritten notes in comments:  
 (P prior impacts)  
 Proximity to road  
 restaurant + road  
 limit functions  
 + values

Notes: Limited wetland associated w/ intermittent stream  
 vegetation moved to banks

\* Refer to backup list of numbered considerations.

# Wetland Function-Value Evaluation Form

Wetland I.D. Fire Pond (B2)  
 Latitude 41° 46' 05" Longitude 72° 18' 06"  
 Prepared by: STW Date 5/20/08  
 Wetland Impact: Channel Alteration  
 Type Shaded/Fill Area 14.15  
 Evaluation based on:  Field   
 Corps manual wetland delineation completed?  Y  N

Total area of wetland 0.04 acres fully abandoned Is wetland part of a wildlife corridor? No or a "habitat island"? No  
 Adjacent land use Commercial/Residential Distance to nearest roadway or other development adjacent parking  
 Dominant wetland systems present R3UB Contiguous undeveloped buffer zone present No  
 Is the wetland a separate hydraulic system? No If not, where does the wetland lie in the drainage basin? upstream to mid  
 How many tributaries contribute to the wetland? 2 Wildlife & vegetation diversity/abundance (see attached list)

Function/Value	Suitability		Rationale (Reference #)*	Principal Function(s)/Value(s)	Comments
	Y	N			
Groundwater Recharge/Discharge	<input checked="" type="checkbox"/>		5, 7, 9, 15		
Floodflow Alteration	<input checked="" type="checkbox"/>		2, 5, 6, 7, 8, 9, 10, 13, 15		culverts (with lots) are undersized for flood events
Fish and Shellfish Habitat	<input checked="" type="checkbox"/>		4, 10, 12		very minimal but present
Sediment/Toxicant Retention	<input checked="" type="checkbox"/>		1, 2, 3, 6, 10, 12, 16		
Nutrient Removal	<input checked="" type="checkbox"/>		3, 4, 5, 9, 11, 14		
Production Export	<input checked="" type="checkbox"/>		10		
Sediment/Shoreline Stabilization	<input checked="" type="checkbox"/>		1		
Wildlife Habitat	<input checked="" type="checkbox"/>		8, 13		
Recreation	<input checked="" type="checkbox"/>				
Educational/Scientific Value	<input checked="" type="checkbox"/>				
Uniqueness/Heritage	<input checked="" type="checkbox"/>				none directly on wetlands but near old mill ruins
Visual Quality/Aesthetics	<input checked="" type="checkbox"/>		6, 9, 11, 12		Stream harnessed in past to power mills Highly altered but contrasts w/ surrounding pavement
ES Endangered Species Habitat	<input checked="" type="checkbox"/>				
Other					

Notes: This is a small wetland completely surrounded by development, which limits its capacity to perform functions + values

\* Refer to backup list of numbered considerations.

# Wetland Function-Value Evaluation Form

Wetland I.D. Fireland South (133)  
 Latitude 41° 46' 02" N Longitude -72° 18' 06" W  
 Prepared by: SP/DW Date 5/20/08

Total area of wetland not available Human made? Mill Brooks - trap banks altered at impact Is wetland part of a wildlife corridor? yes or a "habitat island"? no  
 Adjacent land use parking lot - forested Distance to nearest roadway or other development 5'  
 Dominant wetland systems present R3UB, PFO1 Contiguous undeveloped buffer zone present minimal

Wetland Impact: Type bridge fill Area 1445sf

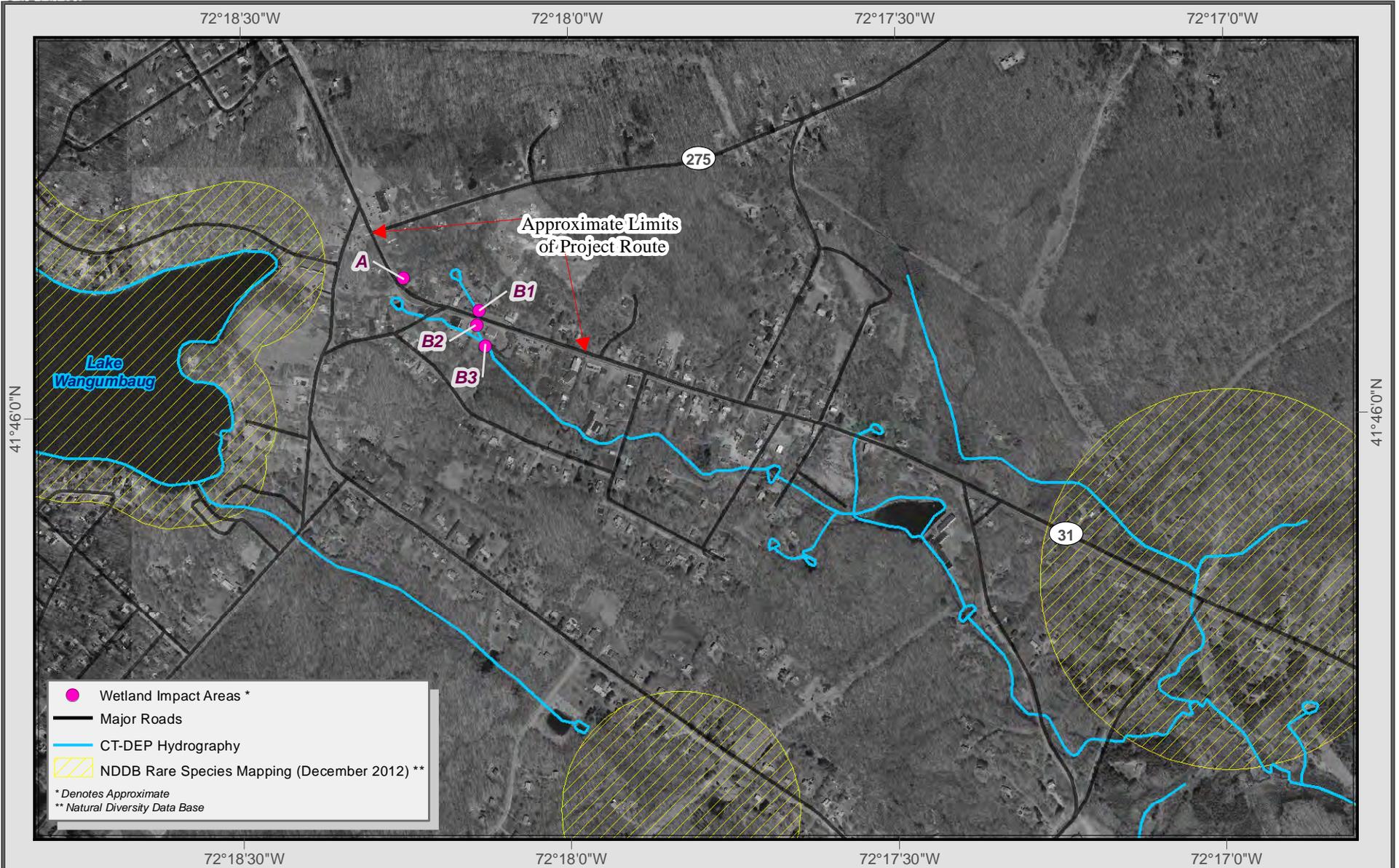
Evaluation based on: Office Field   
 Corps manual wetland delineation completed? Y  N

Is the wetland a separate hydraulic system? no If not, where does the wetland lie in the drainage basin? head to mid  
 How many tributaries contribute to the wetland? 2 Wildlife & vegetation diversity/abundance (see attached list)

Function/Value Suitability (Y/N) Rationality (Reference #)\* Principal Function(s)/Value(s) Comments

Function/Value	Suitability (Y/N)	Rationality (Reference #)*	Principal Function(s)/Value(s)	Comments
Groundwater Recharge/Discharge	<input checked="" type="checkbox"/>	5, 6, 7, 15.		
Floodflow Alteration	<input checked="" type="checkbox"/>	7, 8, 13.		
Fish and Shellfish Habitat	<input checked="" type="checkbox"/>	4, 8, 10, 12, 14, 16		
Sediment/Toxicant Retention	<input checked="" type="checkbox"/>	1, 2, 6, 8, 10.		
Nutrient Removal	<input checked="" type="checkbox"/>			
Production Export	<input checked="" type="checkbox"/>	1, 4, 7, 10.		
Sediment/Shoreline Stabilization	<input checked="" type="checkbox"/>			
Wildlife Habitat	<input checked="" type="checkbox"/>	6, 7, 8, 11, 13, 17		
Recreation	<input checked="" type="checkbox"/>			
Educational/Scientific Value	<input checked="" type="checkbox"/>	11		
Uniqueness/Heritage	<input checked="" type="checkbox"/>	20, 22, 23		None directly in wetlands but near old mill ruins
Visual Quality/Aesthetics	<input checked="" type="checkbox"/>	6, 9, 11		
ES Endangered Species Habitat	<input checked="" type="checkbox"/>			some connectivity to potential wood turtle habitat but low value at impact area
Other				

Notes: Proximity to development limits capacity for F+V lower at immediate impact area  
 \* Refer to backup list of numbered considerations.



- Wetland Impact Areas \*
- Major Roads
- CT-DEP Hydrography
- NDDB Rare Species Mapping (December 2012) \*\*

\* Denotes Approximate  
 \*\* Natural Diversity Data Base

**Scale**

0 500 1,000 Feet

0 0.1 0.2 Miles

**NORTH**

## Overview of Project Wetland Impact Areas In Relation to NDDB Mapping, Route 31 Reconstruction, Coventry, Connecticut

Source: CTDEP, 1994, 2006 & 2012



## ATTACHMENT L – MITIGATION REPORT

### **General Summary of Avoidance and Minimization**

Overall, wetland impacts could not be avoided due to either the nature of the drainage changes proposed and the need to remain consistent with ConnDOT standards (e.g. riprap scour pads/dissipaters at outlets or scour protection in streams), or for safety improvements to the Village of Coventry (e.g. installing sidewalks for pedestrians, moving the existing Fire Pond out of the clear zone, and parking lot reconfiguration for access management at Bidwell Tavern). The project has considered factors in the design that will minimize impacts to wetlands and watercourses. The first consideration made is that the standard width of a ConnDOT roadway is 32 feet while the Route 31 reconstruction proposes a 28-foot wide roadway. The slightly narrowed width of the road is meant to keep consistent with the Context Sensitive Solution approach in this historical village as well as reduce overall wetland impacts. As described in the following Attachment M, the reduction in roadway width results in less proposed wetland impact at Areas A, B1 and B2. The proposed drainage work will improve stormwater quality with the installation of deep sumps in catch basins, and scour pads at outlets. In many of these locations, stormwater currently sheet flows directly to Mill Brook or wetlands without prior treatment. The project proposes to capture the majority of the flow through catch basins. However, the available space does not allow for appropriately sized detention basins or swales which meet the primary treatment guidelines of the 2004 CT Stormwater Quality Manual (2004 Manual).

The proposed permanent wetland/watercourse impacts are divided between forested systems (1,420 sf) and riverine systems (2,460 sf). An additional 435 sf of temporary impacts to wetlands are proposed during construction. The watercourse impacts are occurring along a total of 453 linear feet with both perennial (Mill Brook) and intermittent (Manning Brook) stream impacts proposed. This includes an additional 897 sf of temporary impacts due to the replacement of existing culverts on Mill and Manning Brooks. The majority of the mitigation proposed for this project consists of approximately 730 sf of wetland enhancement with removal of invasive species and planting of native species. Upland plantings and invasive species removal account for approximately 2,385 sf of improvement to areas immediately adjacent to wetlands. Regarding stream impacts and mitigation, a culvert will be extended over 28 linear feet of Manning Brook, but 22 feet of the perennial stream, Mill Brook will be daylighted. The approximately 124 (x2) linear feet of existing culverts on Mill Brook will be upgraded, with the low flow culvert embedded with natural substrate, improving the existing conditions. Step pool creation may also be viewed as an enhancement of the existing conditions of the Mill River in the fire pond.

Considerations were made at each of the identified wetland impact areas that attempt to either reduce or mitigate effects. It is important to note that the majority of the wetland areas impacted by the project have already been altered in some way. In the case of Mill Brook near the Fire Pond, past alterations are extensive and this limited the improvements that could be made and the mitigation options (e.g. replacement culvert openness ratios could not be met). The mitigation measures proposed for each impact area are described below. A representative from ConnDOT's environmental personnel will also be on site during critical portions of construction to in regulated areas. Best management practices will be implemented during construction and upland access will be used to reduce temporary wetland impacts whenever feasible. Contractors will perform interior portions of work in wetland areas first and work their way out along the footprint of permanent impacts.

## ATTACHMENT L – MITIGATION REPORT

### Wetland Impact Area A (Trolleyway)

An existing drainage outlet is located in this area with a resulting intermittent channel. Impacts will be limited to an area immediately adjacent to the roadway. We do not anticipate the overall existing functions and values of this wetland to be altered or reduced by the impact. Sediment and Toxicant Retention may increase at this outlet as a result of the proposed scour pad and deep sump catch basin.

- Prior to construction, existing invasive species such as multiflora rose (*Rosa multiflora*), Asiatic bittersweet (*Celastrus orbiculatus*), honeysuckle (*Lonicera spp.*), and burning bush (*Euonymus alatus*) will be removed from the ConnDOT easement as indicated on the plans.
- Following construction, native species will be planted to restore the disturbed areas adjacent to the drainage pipe and outlet installation.

### Wetland Impact Area B1 (Manning Brook)

This portion of Manning Brook is surrounded by maintained lawn and adjacent parking areas. The proposed reconfiguration of parking lots will result in the replacement and extension of the existing culvert impacts by 28 feet but it is the safest and most desirable in accordance with ConnDOT traffic standards. Although impact numbers include portions of the channel that will technically be permanently altered, they will resume stream function following construction. We do not anticipate the overall existing functions and values of this wetland to be altered or reduced by the impact. Wildlife Habitat may decrease slightly where the culvert is being lengthened but existing habitat is minimal at this location already.

- As recommended by Inland Fisheries Division Habitat Conservation and Enhancement Program Stream Crossing Guidelines, at least one foot of natural rounded, stone will be installed over the base layer of riprap scour protection to mitigate impacts.
- Since vegetation is currently mowed/maintained directly up to the banks of the stream, invasives were not observed and removal will not be necessary.

### Wetland Impact Area B2 (Fire Pond)

Currently, Mill Brook is culverted underground for over 100 feet in either direction from the point that daylight in a small, open pit known as the Fire Pond. The pit will be narrowed to a nine-foot wide channel with form liner stone walls to remove it from the clear zone of the roadway. The open channel could not be widened on the south side due to existing buildings and parking areas. We do not anticipate the existing functions and values of this wetland to be reduced by the impact but some may change slightly in nature. For example, the existing Fish (and Shellfish) Habitat will be replaced by step pool habitat as recommended. Floodflow alteration will also change slightly as the culverts are being properly sized for storm events. Floodwaters currently back up into the existing Fire Pond and flow over the adjacent parking lots. Water will now be conveyed more effectively to the natural areas just downstream.

- Step-pool creation was recommended by CTDEP Inland Fisheries Division to maintain and potentially enhance fish habitat within the channel. A total of three steps were

### ATTACHMENT L – MITIGATION REPORT

- designed and proposed, requiring excavation and an elevation change of almost 3 feet from the outlet to the double inlet.
- The work will also result in daylighting of approximately 22 linear feet of the stream as it removes a section of the existing 1.5' x 9' culvert to the west.
  - Contractor notes will include a requirement that either a representative from ConnDOT environmental or Inland Fisheries be on site during critical portions of construction to direct placement of materials (including natural substrate in the downstream culverts).

#### **Wetland Impact Area B3 (Mill Brook)**

The set of existing culvert pipes that carry Mill Brook from the Fire Pond require replacement because they are undersized, subject to flooding, and deteriorating. We do not anticipate the overall existing functions and values of this wetland to be reduced or altered by the impact. The Wildlife Habitat and Fish (and Shellfish) Habitat immediately within the scour hole installation will be reduced but overall connectivity will be improved with the addition of natural substrate and continuous maintenance of low flow in one of the culverts.

- The new culverts will outlet approximately 5 feet upgradient and to the west of the existing culverts, resulting in the daylighting of a small additional portion of the stream. The culverts will be configured for low flow and natural substrate installation as described in the previous section.
- An existing erosive/scouring problem is present here and the project proposes to alleviate this with a reduced gradient in the culverts and the installation of the scour hole.
- The riprap base of the scour hole will also be covered with more natural stone materials as recommended in new CT Stream Crossing Guidelines.
- Existing debris (pieces of concrete culvert etc) will be removed from within and around the stream at the impact area as indicated on the plans.
- Invasive species such as Japanese barberry (*Berberis thunbergii*), Asiatic bittersweet, common reed, multiflora rose, garlic mustard (*Alliaria petiolata*), and black locust (*Robinia pseudoacacia*) were noted in the vicinity of the impact area. These will be removed from the ConnDOT easement as indicated on the plans. Removal of invasive vegetation will occur in compliance with contract specifications and will be overseen by ConnDOT Office of Environmental Planning.
- Following construction, native species will be planted to restore the disturbed areas adjacent to the outlet installation.

## APPENDIX M – ALTERNATIVES ASSESSMENT

### M.1 No Build Alternative

The no-build alternative will essentially leave the project route in its present state with no improvement to the existing safety issues. The need for the reconstruction and realignment of this portion of Route 31 has been demonstrated in this application. The steep, sharp curve has been the cause of numerous traffic accidents, including fatalities, and the need for access management to parking lots in the village is also a safety concern. In addition, the no-build alternative would eliminate the opportunity to apply the context sensitive design proposed and accepted by the local municipality. The benefits of the improved streetscape and sidewalks would be lost to the businesses and community members.

### M.2 Curve Realignment Alternative

The curve realignment alternative would propose only the work necessary for realignment of the dangerous curve on Route 31, but does not account for the access management work or the context sensitive design for improving the streetscape. This alternative would still require the 0.01 acres of permanent wetland impacts at the trolleyway (Impact Area A) and may have some smaller impacts due to drainage changes just east of the curve, but it would eliminate the majority of wetland impacts to the east. However, this alternative would meet only one of the major objectives of the project. Like the no-build alternative, this option would nullify the extensive discussions between ConnDOT and the community of Coventry, and eliminate the valuable improvements proposed for the streetscape. It would fail to address some of the additional safety concerns in the need for access management and sidewalks for pedestrians. It would also fail to improve some of the existing drainage and flooding issues that have been identified and that will be addressed in the preferred alternative design.

### M.3 Alternative Location

Since the intent of the project is to improve existing roadway and access features, an alternative location is not an option.

### M.4 Preferred Alternative: Avoidance and Minimization Design

The preferred alternative as described in this application has gone through a number of design changes to minimize the impacts to wetlands. In general, the standard width of a ConnDOT roadway is 32 feet while the Route 31 reconstruction proposes a 28-foot wide roadway. This does not include the addition of a sidewalk on one or both sides of the road due to the need to improve pedestrian access and safety in the area. The slightly narrowed width of the road is meant to keep consistent with the Context Sensitive Solution approach in this historical village as well as reduce overall wetland impacts and property takings. The alternative design measures that were evaluated at each impact area are described below:

#### *M.4.1. Wetland Impact Area A (Trolleyway)*

Since one of the main objectives of the reconstruction of Route 31 is to make the steep curve safer, the realignment, drainage changes, and subsequent wetland impacts in this area are necessary.

- During the conceptual design stage, the curve layout included a 900-foot radius. During the preliminary design, the curve radius was reduced to 600 feet, significantly reducing the impact to this wetland.

**APPENDIX M – ALTERNATIVES ASSESSMENT**

*M.4.2. Wetland Impact Area B1 (Manning Brook)*

Reconfiguration of existing parking areas is proposed in this location in order to reduce curb cuts and improve access management for safety reasons. The configuration proposed will result in the replacement and extension of the existing culvert by 28 feet but it is the safest and most desirable in accordance with ConnDOT traffic standards.

- CTDEP Inland Fisheries Division confirmed that upstream fish habitat/passage was negligible and that natural substrate/embeddedness were not required.

*M.4.3. Wetland Impact Area B2 (Fire Pond)*

Currently, Mill Brook daylight in a small, open pit (the Fire Pond) located on the south side of Route 31. It is located in the clear zone of the roadway and the project proposes to move this potential obstacle out of this area. The open channel could not be widened on the south side to compensate for the impacts of moving it out of the clear zone, due to existing buildings and parking areas. (Please see attached supplement, describing the Fire Pond and proposed channel in more detail.)

- Originally two junction chamber/vaults were proposed, effectively placing this small section of the stream underground, corresponding with the culverted configuration upstream and downstream. CTDEP Inland Fisheries Division was consulted and they recommended step-pool creation within the channel to maintain fish habitat in this area.
- The channel design also considered a concrete bottom without natural substrate materials due to the high velocities. This would essentially be an open top culvert and the goal of maintaining fish habitat would not be met.

*M.4.4. Wetland Impact Area B3 (Mill Brook)*

The set of existing culvert pipes that carry Mill Brook from the Fire Pond require replacement because they are undersized, subject to flooding, and deteriorating. The culverts will be configured for low flow and natural substrate as described in the previous section, and will also attempt to alleviate a scouring problem.

- Originally, the design called for the culverts to be lengthened by 125 feet, resulting in further impact to the natural stream bed. With the re-design of the junction chamber alternative, the culverts were also shortened to the existing design.
- Due to the extensive length of the existing culverts and working under the existing private land uses, the openness ratio could not be met for the culverts. However, the bottom of the westerly culvert will be embedded as described previously.
- The outlet will require a large, riprap, scour hole pad for protection in accordance with ConnDOT standards. The pad is required for stability under the ConnDOT standards but it does deviate from the typical 3:1 pad slopes to reduce impacts to the stream. Following the standards, grading impacts would have extended for another 40 feet into the stream channel in order to create a transition. The slope was designed instead at 6:1.

ATTACHMENT M – SUPPLEMENT

**Fire Pond/Stone Lined Channel – An Understanding of the Issues**

A stone lined (stone faced form liner concrete wall) channel is proposed to replace the existing manmade “fire pond” that forms the confluence of Mill Brook and Manning Brook, the intermittent tributary stream that passes under Main Street (Route 31). The Preliminary Design called for the “fire pond” to be replaced with two “Junction boxes”, large concrete boxes with a cover. However, during its review, the DEP Inland Fisheries Division expressed concern that the “fire pond”, a wetland resource and a potential habitat area for fish and aquatic organisms, was being eliminated. The Division requested that another solution be developed to maintain the wetland resource to the extent possible when so much of the adjacent, surrounding stream area had been previously piped. They also requested that aquatic organism passage be provided between the Fire pond and the outfall of the proposed outlet through the installation of natural substrate in the replacement culvert. The Division also recommended that step pools be designed and created within the area of the fire pond replacement channel to maintain fish habitat. As stated in a letter from the Division dated March 5, 2004, the species expected within Mill Brook include warmwater pond species such as smallmouth bass, yellow perch, and sunfish.

The final design of the fire pond replacement was developed in an effort to meet a number of goals. The first goal is environmental; to minimize the amount of wetland fill/alteration and maintain habitat for the wildlife that presently may inhabit the area. No detailed habitat study of the fire pond has been conducted but a crayfish was observed during one visit. The second goal is safety; vehicle and pedestrian. The existing fire pond abuts the roadway, well within the clear zone (the area adjacent to the roadway where a fixed object should not be placed unless protected by guide rail) and an errant vehicle could easily plunge into it. It is also within the area designated for a sidewalk. The pond could not be moved further from the roadway at its current dimensions as expanding it in that direction brings it closer to an existing building. The third goal was in keeping with the “Context Sensitive” nature of the project. South Coventry Village is a registered historic district, the origin of which comes from the use of the Mill Brook to power the mills that dotted the area. Remnants of a few of the mills still remain. In order to harness the water, the flow would be re-directed in stone lined channels and diverted to the mills to run the turbines. Therefore, the preferred solution is to replace the “fire pond” with a 70-foot long, 9-foot wide stone faced walled channel, located just outside the roadway clear zone. The design of the replacement was developed in part to mimic the old stone channel, some of which still can be seen in the Village. Also in keeping with the Context Sensitive” nature of the project, it is anticipated that the channel will become a focal point for tourists and a place for shoppers to rest, view the water passing by, and listen the soothing sound of the water as it falls from one step pool to the next. The top of the channel will be lined with a decorative fence for safety. Benches and shrubs will be installed to attract the passerby. It is anticipated that the property owner, the existing coffee shop, will utilize the area between the channel and their front door for outside dining.

The step pool design was analyzed extensively and it was determined that the unique features of the area required a creative but structurally sound solution. The height, length and slope ratios of the proposed channel are consistent with the State of Maryland step pool creation guidelines. However, due to the narrowness of the channel, the immobility of the stone walls and turbulence from the confluence of the two streams, the velocities of the 25-yr storm were determined to be

ATTACHMENT M – SUPPLEMENT

too high to create the natural step pools that the Division had likely envisioned. The 25-year storm velocity of Mill Brook flow into the channel from the 1.5'x 9' culvert is 13 feet/second while the velocity of Manning Brook flow into the channel from under Route 31 is 15 ft/s. (The velocities of the 100-year storm are actually lower due to tailwater, making the 25-year storm the necessary design storm). The models and calculations run on the velocities indicate that installation of 4-foot average diameter stones would be needed for extended lengths from the outlets to avoid the formation of scour holes and erosion that could potentially undermine the structural walls. The required average stone size would impede on the step pool design as well as be impractical to install. Instead, the proposed design includes the installation of a concrete slab which would be poured on site. A layer of about three to twelve-inch diameter stones will be secured in the concrete slab in the bottom of the step pools before the concrete material hardens. Larger stones will be used to create the outside of the pools and the steps and sand, gravel and natural substrates will be used a filler to seal the gaps. A number of six-inch PVC pipes will be placed at intervals to allow interaction between the groundwater and surface water. Material should be installed so there is at least one foot of natural materials in all locations for benthic organisms.



# STATE OF CONNECTICUT

## State Historic Preservation Office

*Commission on Arts, Tourism, Culture, History and Film*

May 10, 2004

Mr. Thomas A. Harley  
Consultant Design  
ConnDOT  
2800 Berlin Turnpike  
Newington, CT

Subject: Route 31  
Coventry, CT  
ConnDOT #32-130

Dear Mr. Harley:

The State Historic Preservation Office has reviewed preliminary design plans prepared by the BSC Group concerning the above-named project. In addition, our professional staff has undertaken an on-site review of the proposed project boundaries and has consulted with ConnDOT's Office of Environmental Planning and Consultant Design regarding the complexities of the proposed transportation improvements.

The State Historic Preservation Office notes that the proposed undertaking is located within the South Coventry Historic District, which is listed on the National Register of Historic Places. This office understands that ConnDOT will establish a stakeholder group in order to solicit important community input. In this regard, we strongly encourage ConnDOT to initiate a context-sensitive approach for the proposed transportation improvements.

In the opinion of the State Historic Preservation Office, the proposed undertaking, as currently designed, will constitute no adverse effect upon the South Coventry National Register Historic District. This comment is conditional upon ConnDOT coordination with our professional staff regarding the following not-yet-finalized design issues:

- o Sidewalk and landscaping associated with 1365 Main Street.
- o Retention, adaptive use and/or demolition of the historic barn associated with 1312 Main Street.
- o Sidewalk and street lighting design alternatives throughout Main Street.
- o Archaeological sensitivity of potential Mason Street parking lot alternatives.
- o Sideyard parking and granite wall associated with 1140 Main Street.

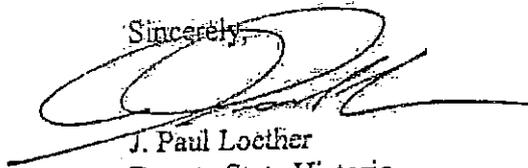
Route 31  
Coventry, CT  
ConnDOT #32-130  
Page 2

The State Historic Preservation Office looks forward to additional coordination with ConnDOT, the community stakeholder group, and all interested parties regarding the expeditious furtherance of the proposed undertaking as well as the professional management of Connecticut's cultural heritage.

This comment updates and supersedes all previous correspondence regarding the proposed project.

For further assistance please contact Dr. David A. Poirier, Staff Archaeologist.

Sincerely,



J. Paul Loether  
Deputy State Historic  
Preservation Officer

cc: Mr. Keith Hall/ConnDOT



STATE OF CONNECTICUT  
 DEPARTMENT OF ENVIRONMENTAL PROTECTION  
 FRANKLIN WILDLIFE MANAGEMENT AREA



391 ROUTE 32  
 NORTH FRANKLIN, CT 06254  
 TELEPHONE: (860) 642-7239

Bureau of Natural Resources

Memorandum WILDLIFE DIVISION

FROM THE DESK OF  
 RICHARD B. ARMSTRONG  
 NAME: [ ] DATE: APR 30 2008

To : Mr. Richard B. Armstrong, Supervising Transportation Engineer  
 DOT-Bureau of Engineering and Highway Operations  
 2800 Berlin Tpke, P. O. Box 317546, Newington, CT 06131-7546

From : Julie Victoria, Wildlife Biologist  
 DEP FWMA, 391 Rte. 32, N. Franklin, CT 06254

Date : April 24, 2008

Subject: Proposed realignment and safety improvements of RT 31 from west of RT 275 to east of Woods Lane, Coventry

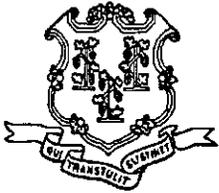
Pertinent to proposed DOT Project realignment and safety improvements of RT 31 from west of RT 275 to east of Woods Lane in Coventry: your request was forwarded to me on 4/23/08 from Dawn McKay of the Department of Environmental Protection's (DEP) Natural Diversity Data Base. They have records of a state species of special concern, Wood turtle (*Glyptemys insculpta*) in the vicinity of your project.

Wood turtles require riparian habitats bordered by floodplain, woodland or meadows. They hibernate in the banks of the river in submerged tree roots. Their summer habitat includes pastures, old fields, woodlands, powerline cuts and railroad beds bordering or adjacent to streams and rivers. This species has been negatively impacted by the loss of suitable habitat.

If Wood turtle habitat exists on the proposed site and will be impacted by your project, the Wildlife Division recommends that a herpetologist familiar with the habitat requirements of this species conduct surveys between April and September to see if they are present. A report summarizing the results of such surveys should include habitat descriptions, reptile species list and a statement/resume giving the herpetologist's qualifications. The DEP doesn't maintain a list of qualified herpetologists. A DEP Wildlife Division permit may be required by the herpetologist to conduct survey work, you should ask if your herpetologist has one. The results of this investigation can be forwarded to the Wildlife Division and, after evaluation, recommendations for additional surveys, if any, will be made.

Standard protocols for protection of wetlands should be followed and maintained during the course of the project. Additionally, all silt fencing should be removed after soils are stable so that reptile and amphibian movement between uplands and wetlands is not restricted.

Please be advised that the Wildlife Division has not made a field inspection of the project nor have we seen detailed timetables for work to be done. Consultation with the Wildlife Division should not be substituted for site-specific surveys that may be required for environmental assessments. The time of year when this work will take place will affect this species if they are present on the site when the work is scheduled. Please be advised that should state permits be required or should state involvement occur in some other fashion, specific restrictions or conditions relating to the species discussed above may apply. In this situation, additional evaluation of the proposal by the DEP Wildlife Division should be requested. If the proposed project has not been initiated within 6 months of this review, contact the NDDDB for an updated review. If you have any additional questions, please feel free to contact me at [Julie.Victoria@ct.gov](mailto:Julie.Victoria@ct.gov), please reference the NDDDB # at the bottom of this letter when you e-mail. Thank you for the opportunity to comment.



STATE OF CONNECTICUT  
 DEPARTMENT OF ENVIRONMENTAL PROTECTION  
 FRANKLIN WILDLIFE MANAGEMENT AREA



391 ROUTE 32  
 NORTH FRANKLIN, CT 06254  
 TELEPHONE: (860) 642-7239

FROM THE DESK OF  
 CYNTHIA S. HOLDEN

JAN 05 2009

	F.Y.I.	PLS. DO	PLS. SEE ME
KEITH T. HALL			
MARK W. ALEXANDER	✓		
PAUL N. CORRENTE			
STEPHEN V. DELPAPA			

Bureau of Natural Resources

Memorandum WILDLIFE DIVISION

To : Mr. Mark Alexander, Supervising Transportation Engineer  
 DOT-Bureau of Engineering and Highway Operations  
 2800 Berlin Tpke, P. O. Box 317546, Newington, CT 06131-7546

From : Julie Victoria, Wildlife Biologist *Julie*  
 DEP FWMA, 391 Rte. 32, N. Franklin, CT 06254

Date : December 22, 2008

Subject: Proposed realignment and safety improvements of RT 31 from west of RT 275 to east of Woods Lane, Coventry

\*\*\*\*\*  
 Pertinent to proposed DOT Project realignment and safety improvements of RT 31 from west of RT 275 to east of Woods Lane in Coventry: your 20 page report and cover memo was received by me on 12/17/08. Again, the Department of Environmental Protection's (DEP) has records of a state species of special concern, Wood turtle (*Glyptemys insculpta*) in the vicinity of your project.

The DEP Wildlife Division concurs with BSC's assessment and recommends that if work must be done during these turtle's active period (April 1 to November 1) that the following precautionary measures be implemented to protect wood turtle habitat:

1. that sweeps be conducted in the impacted and staging areas by DOT personnel prior to the start of work.
2. that the construction crew be apprised of these species descriptions and possible presence and that the area be searched each day prior to construction.
3. that work conducted in these habitats during the early morning and evening hours should occur with special care not to harm basking or foraging individuals.
4. that any turtles encountered be moved out of the way, just outside the construction zone.
5. that if silt fences are used, they should be removed as soon as the project is completed.
6. that no heavy machinery or vehicles be parked in any habitat.

Standard protocols for protection of wetlands should be followed and maintained during the course of the project. Additionally, all silt fencing should be removed after soils are stable so that reptile and amphibian movement between uplands and wetlands is not restricted.

Please be advised that the Wildlife Division has not made a field inspection of the project nor have we seen detailed timetables for work to be done. Consultation with the Wildlife Division should not be substituted for site-specific surveys that may be required for environmental assessments. The time of year when this work will take place will affect this species if they are present on the site when the work is scheduled. Please be advised that should state permits be required or should state involvement occur in some other fashion, specific restrictions or conditions relating to the species discussed above may apply. In this situation, additional evaluation of the proposal by the DEP Wildlife Division should be requested. If the proposed project has not been initiated within 6 months of this review, contact the NDDB for an updated review. If you have any additional questions, please feel free to contact me at [Julie.Victoria@ct.gov](mailto:Julie.Victoria@ct.gov), please reference the NDDB # at the bottom of this letter when you e-mail. Thank you for the opportunity to comment.

cc: NDDB - 16096

**From:** Murphy, Brian [mailto:Brian.Murphy@ct.gov]  
**Sent:** Wednesday, July 09, 2008 10:39 AM  
**To:** Lesay, Kimberly C.  
**Cc:** Aarrestad, Peter; Caiola, Jeff  
**Subject:** DOT project #32-130, Coventry

Basin: 3105

Hi Kim,

I have reviewed revised draft plans regarding the reconstruction of Route 31, Coventry, (DOT project #32-130, Coventry) involving the installation of twin culverts Mill Brook and a tributary stream to Mill Brook and construction of a 70 ft. long concrete channel in Mill Brook. Stone step pools will be created within this channel being secured by mortar into the concrete floor. It is understood that the prior conceptual design of installing large boulder-step weirs in this 70 ft. channel has been abandoned due to anticipated high stream velocities.

The fish community in the upper headwaters of Mill Brook is highly fragmented due to numerous barriers to upstream fish passage in the form of dams, sections of the stream that are buried in culverts and which pass underneath former mill buildings. Mill Brook is expected to primarily support warmwater pond species that emanate from Coventry Lake such as smallmouth bass, sunfish and yellow perch. Fish in this area can move down in the system but are unable to move back upstream. This section of stream in the project area does not support fluvial dependent fish species. The most viable fish habitat begins downstream of this proposed project.

While the Inland Fisheries Division does not normally advocate the creation of an artificial open concrete channel, it will support this design concept given site limitations and the lack of onsite permanent fisheries resources. That being said, the proposed streambed stone liner (minimum 4 inch diameter stone with sand and gravel filler) creates more of a monotypic appearance. As such it is recommended to create a stone liner that includes a more diverse mixture of stone, e.g. heterogeneous mixture of 3 to 12 inch in diameter rounded, non angular stone. Thank you for the opportunity to review this project.

Regards,

Brian D. Murphy, Senior Fisheries Habitat Biologist  
CTDEP Inland Fisheries Division  
Habitat Conservation and Enhancement Program  
209 Hebron Road  
Marlborough, CT 06447  
Phone: 860-295-9523  
Fax: 860-344-2941  
[brian.murphy@ct.gov](mailto:brian.murphy@ct.gov)



**FLOODPLAIN MANAGEMENT**

Connecticut Department of Transportation  
2800 Berlin Turnpike,  
Newington, CT 06131

Attn: Thomas J. Maziarz, Bureau Chief, Policy & Planning

Re: **Approval of Certification**  
**201303245-FM**  
Reconstruction of Route 31  
Coventry, CT

Dear Mr. Maziarz:

The Inland Water Resources Division of the Department of Energy & Environmental Protection has reviewed the flood management certification application prepared by Peter Briere, P.E. of BSC Group, and signed by Thomas J. Maziarz of the Connecticut Department of Transportation.

The certification document dated June 17, 2013 and submitted June 24, 2013 states that the proposed activity has been designed in compliance with the requirements of Section 25-68d(b) of the Connecticut General Statutes (CGS) and Section 25-68h-1 through 25-68h-3 of the Regulations of Connecticut State Agencies (RCSA).

The project consists of the reconstruction of a ~2,000 LF portion of Route 31 in the Town of Coventry, as shown on plans entitled, "*Reconstruction of Route 31, Coventry, Connecticut State Project No. 32-130*," signed by Peter James Briere, dated August 21, 2013. The project is located within the the 100-yr floodplain of Mill Brook.

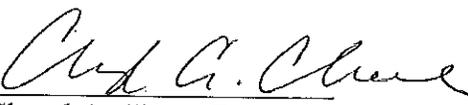
The above referenced certification is hereby approved. This authorization is subject to and does not derogate any present or future property rights or other rights or powers of the State of Connecticut, conveys no property rights in real estate or material nor any exclusive privileges, and is further subject to any and all public and private rights and to any federal, state, or local laws or regulations pertinent to the property or activity affected thereby. No revisions or alterations to the approved plans are allowed without first obtaining written approval from this Division of such alterations.

If there are any questions, contact Colin Clark of the Inland Water Resources Division at 860-424-3214.

Connecticut Department of Transportation  
Reconstruction of Route 31, Coventry, CT  
201303245-FM  
Page 2 of 2

Sincerely,

9/30/13  
Date

  
Cheryl A. Chase, Director  
Inland Water Resources Division

CAC/CJC

cc: Mark A. Alexander, Assistant Planning Director, DOT  
Peter Briere, P.E., BSC Group, Inc., Glastonbury



Permittee: Connecticut Department of Transportation  
2800 Berlin Turnpike  
P.O. Box 317546  
Newington, CT 06131-7546

Attn: Thomas J. Maziarz, Bureau Chief and Planning

Permit No.: **201303243-IW, 201303244- WQC**  
Permit Type: Inland Wetlands and Watercourses and 401 Water Quality Certification  
Town: Coventry, CT  
Project: Reconstruction of 0.5 mile Section of Rte 31, Coventry.

The Commissioner of Energy and Environmental Protection has approved your application to conduct certain regulated activities. Your attention is directed to the conditions of the enclosed permit and / or certificate. You should read the enclosed document carefully, as all construction or work must conform to that which is authorized.

If you have any questions concerning this approval, please contact Jeffrey Caiola the Inland Water Resources Division at (860) 424-3019.

11/4/13  
Date

  
\_\_\_\_\_  
Colin Clark, P.E.  
Inland Water Resources Division

**COPIES FURNISHED TO:**

- Conservation Commission
- Inland Wetland Agency
- Planning & Zoning Commission
- Mark W. Alexander, Transportation Assistant Planning Director, ConnDOT
- Amanda Saul, Transportation Planner, ConnDOT
- DEEP Fisheries
- U.S. Army Corps of Engineers



**INLAND WETLAND & WATERCOURSES PERMIT**  
**WATER QUALITY CERTIFICATION**

Permittee: Connecticut Department of Transportation  
2800 Berlin Turnpike  
P.O. Box 317546  
Newington, CT 06131

Attn: Thomas J. Maziarz, Bureau Chief, Policy & Planning

Permit No: IW-201303243 / WQC-201303244  
Permit Type: Inland Wetlands and Watercourses  
Water Quality Certification

Town: Coventry  
Project: State Project Number 32-130  
Reconstruction of Route 31

Waters: Mill Brook and Manning Brook

Pursuant to Connecticut General Statutes Section 22a-39, the Commissioner of Energy and Environmental Protection (“the Commissioner”) hereby grants a permit to the Connecticut Department of Transportation (“the Permittee”) to conduct activities within inland wetlands and watercourse associated with Mill Brook. In addition, pursuant to Section 401 of the Federal Clean Water Act (33USC 1341), Water Quality Certification is hereby granted for activities, including but not limited to construction or operation of facilities, which may result in any discharge into the waters of the state associated with applications referenced above and filed with this Department on June 24, 2013. The purpose of said activities is to reconstruct a 2,000 linear foot section of Route 31 in the Town of Coventry to improve safety (“the projects” or “the sites”).

**AUTHORIZED ACTIVITY**

Specifically, the permittee is authorized to: replace an existing 36” high (H) x 54” wide (W) x 61’ long (L) pipe carrying Manning Brook under Route 31 with twin 48” diameter 89’ L culverts; install approximately 30’ of inlet scour protection in the channel; daylight approximately 22 linear feet of Mill Brook; replace twin 27” diameter 128’ L concrete pipes which carry Mill Brook under a parking lot with a set of box culverts, one 4’ W x 5’ H x 124’ L and one 5’ W x 3’ H x 124’ L; and place approximately 40 linear feet of rip rap for scour protection.

The activities proposed will impact 0.12 acres / 5,182 square feet (0.03 acres/1,420 square feet of which is permanent impacts to wetlands; 0.01 is temporary) of wetlands and watercourse.

All activities shall be conducted in accordance with plans entitled: “*Reconstruction of Route 31, Coventry, Connecticut State Project No. 32-130,*” signed by Peter James Briere, P.E. of BSC Group,

Inc., and dated August 21, 2013, and submitted as a part of the application.

This authorization constitutes the licenses and approvals required by Section 22a-39 of the Connecticut General Statutes and Section 401 of the Federal Clean Water Act and is subject to and does not derogate any present or future property rights or other rights or powers of the State of Connecticut, conveys no property rights in real estate or material nor any exclusive privileges, and is further subject to any and all public and private rights and to any federal, state, or local laws or regulations pertinent to the property or activity affected thereby. In addition, this authorization does not comprise the licenses or approvals as may be required by Chapters 446i, 446j and 446k of the Connecticut General Statutes.

Said discharge(s) will comply with the applicable provisions of Sections 301, 302, 303, 306 and 307 of the Federal Clean Water Act and will not violate Connecticut's Water Quality Standards.

**THE PERMITTEE'S FAILURE TO COMPLY WITH THE TERMS AND CONDITIONS OF THIS PERMIT SHALL SUBJECT THE PERMITTEE, INCLUDING THE PERMITTEE'S AGENTS OR CONTRACTOR(S) TO ENFORCEMENT ACTIONS AND PENALTIES AS PROVIDED BY LAW.**

This authorization is subject to the following conditions:

**SPECIAL CONDITIONS:**

1. **Wood Turtle.** If work must be done during the Wood Turtle's active period of April 1st to November 1<sup>st</sup>, the permittee shall adhere to the following precautionary measures:
  - a. Install silt fencing around the work area prior to construction;
  - b. Conduct a sweep of the work area after silt fencing is installed and prior to construction;
  - c. The work crew must be apprised of the species description and possible presence and that the area be searched for turtles each day prior to construction;
  - d. Any turtles that are discovered should be moved, unharmed, to an area immediately outside of the fenced area in the same direction that it was walking;
  - e. Work conducted during the early morning (5am-10am) and evening hours (after 5pm) should occur with special care not to harm basking or foraging individuals;
  - f. No heavy machinery or vehicles should be parked in any turtle habitat; and
  - g. All silt fencing shall be removed after soils are stable so that reptile and amphibian movement between uplands and wetlands is not restricted.

**GENERAL TERMS AND CONDITIONS:**

1. **Initiation and Completion of Work.** At least five (5) days prior to starting any construction activity authorized by this permit, the Permittee shall notify the Commissioner, in writing, as to the date activity will start, and no later than five (5) days after completing such activity, notify the Commissioner, in writing, that the activity authorized by this permit has been completed.
2. **Expiration of Water Quality Certification.** This certification shall expire upon the expiration of the U.S. Army Corps of Engineers (USACOE) Section 404 permit for the same activity.
3. **Expiration of Inland Wetlands and Watercourses Permit.** If the activities authorized herein are not completed by five years after the date of the issuance of this permit, or by the expiration date of the permit issued by the U.S. Army Corps of Engineers for any activity authorized by this permit, whichever is sooner, said activity shall cease and, if not previously revoked or specifically extended, this permit shall be null and void.

Upon the written request of the Permittee and without notice, the Commissioner may extend the expiration date of this permit for a period of up to one year, which period may be extended once for a like period, in order for the Permittee to complete activities authorized herein which have been substantially initiated but will not be completed by the expiration date of this permit. Any request to extend the expiration date of this permit shall state with particularity the reasons therefore.

In making his decision to extend the expiration date of this permit, the Commissioner shall consider all relevant facts and circumstances including, but not limited to, the extent of work completed to date, the permittee's compliance with the terms and conditions of this permit and any change in environmental conditions or other information since the permit was issued. Any application to renew or reissue this permit shall be filed in accordance with the Section 22a-39 of the General Statutes and section 22a-3a-5(c) of the regulations of Connecticut State Agencies.

4. **Compliance with Permit.** The Permittee shall comply with the terms and conditions of this permit. Any activity carried out at the site, including but not limited to, construction of any structure, excavation, fill, obstruction, or encroachment, that is not specifically identified and authorized herein shall constitute a violation of this permit and may result in its modification, suspension, or revocation. In undertaking and maintaining the activities authorized herein, the Permittee shall not store, deposit or place equipment or material including without limitation, fill, construction materials, or debris in any wetland or watercourse on or off site unless specifically authorized by this permit.

5. **Transfer of Permit.** This permit is not transferable without the written authorization of the Commissioner.
6. **Reliance on Application.** In making a determination to issue this permit, the Commissioner has relied on information provided by the Permittee in its application. If such information subsequently proves to be false, deceptive, incomplete or inaccurate, this permit may be modified, suspended or revoked. In addition, if the Permittee becomes aware that any such information is materially false, deceptive, incomplete or inaccurate, the Permittee shall immediately report such information to the Commissioner in writing.
7. **Best Management Practices.** In undertaking and maintaining the activities authorized herein, the permittee shall employ best management practices to control storm water discharges and erosion and sedimentation and to prevent pollution. Such practices include, but are not necessarily limited to:
  - a. Prohibiting dumping of any quantity of oil, chemicals or other deleterious material on the ground;
  - b. Immediately informing the Commissioner's Oil and Chemical Spill Section at 424-3338 of any adverse impact or hazard to the environment, including any discharges, spillage or loss of oil or petroleum or chemical liquids or solids, which occurs or is likely to occur as the direct or indirect result of the activities authorized herein;
  - c. Separating staging areas at the site from the regulated areas by silt fences or hay bales at all times;
  - d. Prohibit storage of any fuel and refueling of equipment within 25 feet from any wetland or watercourse;
  - e. Preventing pollution of wetlands and watercourses in accordance with the document "Connecticut Guidelines for Soil Erosion and Sediment Control" as revised. Said controls shall be inspected by the permittee for deficiencies at least once per week and immediately after each rainfall and at least daily during prolonged rainfall. The permittee shall correct any such deficiencies within forty eight (48) hours of said deficiencies being found;
  - f. Stabilizing disturbed soils in a timely fashion to minimize erosion. If a grading operation at the site will be suspended for a period of thirty (30) or more consecutive days, the permittee shall, within the first seven (7) days of that suspension period, seed and mulch or take such other appropriate measures to stabilize the soil involved in such grading operation. Within seven (7) days after establishing final grade in any grading operation at the site the permittee shall seed and mulch the soil involved in

such grading operation or take such other appropriate measures to stabilize such soil until seeding and mulching can be accomplished;

- g. Prohibiting the storage of any materials at the site which are buoyant, hazardous, flammable, explosive, soluble, expansive, radioactive, or which could in the event of a flood be injurious to human, animal or plant life, below the elevation of the five-hundred (500) year flood. Any other material or equipment stored at the site below said elevation shall be firmly anchored, restrained or enclosed to prevent flotation. The quantity of fuel stored below such elevation for equipment used at the site shall not exceed the quantity of fuel that is expected to be used by such equipment in one day; and
  - h. Immediately informing the Commissioner's Inland Water Resources Division (IWRD) and the U.S. Army Corps of Engineers' Permit Compliance Section at (617) 647-8674, of the occurrence of pollution or other environmental damage resulting from construction or maintenance of the authorized activity or any construction associated therewith in violation of this permit. The Permittee shall, no later than 48 hours after the permittee learns of a violation of this permit, report same in writing to the Commissioner. Such report shall contain the following information:
    - (i) the provision(s) of this permit that has been violated;
    - (ii) the date and time the violation(s) was first observed and by whom;
    - (iii) the cause of the violation(s), if known
    - (iv) if the violation(s) has ceased, the duration of the violation(s) and the exact date(s) and times(s) it was corrected;
    - (v) if the violation(s) has not ceased, the anticipated date when it will be corrected;
    - (vi) steps taken and steps planned to prevent a reoccurrence of the violation(s) and the date(s) such steps were implemented or will be implemented;
    - (vii) the signatures of the permittee and of the individual(s) responsible for actually preparing such report, each of whom shall certify said report in accordance with section 10 of this license.
8. **Contractor Liability.** The permittee shall provide a copy of this permit to all of its agents and contractor(s) who will be carrying out the activities authorized herein prior to any such agent or

contractor undertaking any activities and shall receive a written receipt for such copy, signed and dated by such agent or contractor(s). The permittee shall ensure that its agents and contractor(s) conduct all operations at the site in full compliance with this permit.

9. **Monitoring and Reports to the Commissioner.** The Permittee shall record all actions taken pursuant to General Terms and Conditions 7(e) of this permit and shall, on a monthly basis, submit a report to the Commissioner. This report shall indicate compliance or noncompliance with this permit for all aspects of the project covered by this permit. This report shall be signed by the environmental inspector assigned to the site or project by the Permittee and shall be certified in accordance with General Terms and Condition 10 of this permit. Such monthly report shall be submitted to the Commissioner no later than the 15th of the month subsequent to the month being reported. The Permittee shall submit such reports until all activities authorized by this permit are completed.
10. **Certification of Documents.** Any document, including but not limited to any notice, which is required to be submitted to the Commissioner under this permit shall be signed by the Permittee, or a duly authorized representative of the Permittee, as specified in Regulations of Connecticut State Agencies Section § 22a-430-3(b)(2) and by the individual or individuals responsible for actually preparing such document, each of whom shall certify in writing as follows:

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

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

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

Cheryl A. Chase, Director  
DEEP/Inland Water Resources Division  
79 Elm Street, 3rd Floor  
Hartford, Connecticut, 06106-5127

Issued by the Commissioner of Energy and Environmental Protection on:

11/15/13  
Date

  
\_\_\_\_\_  
Macky McCleary, Deputy Commissioner

# **GENERAL PERMIT REGISTRATION**

**For**

**Discharge of Stormwater and Dewatering Wastewaters  
for Construction Activities**

**Reconstruction of Route 31  
Intersection of Route 31 and Route 275  
Project No. 32-130  
Coventry, Connecticut**



**Registrant:**

The State of Connecticut  
Department of Transportation – District 1  
1107 Cromwell Avenue  
Rocky Hill, CT 06067

**Prepared By:**

BSC Group  
300 Winding Brook Drive  
Glastonbury, CT 06033

April, 2014



**General Permit Registration Form for the Discharge of Stormwater and Dewatering**

Prior to completing this form, you **must** read the instructions for the subject general permit available at [DEEP-WPED-INST-015](#).  
 This form must be filled out electronically before being printed.  
 You must submit the registration fee along with this form.

The [status of your registration](#) can be checked on the DEEP's ezFile Portal. Please note that DEEP will no longer mail certificates of registration.

CPPU USE ONLY	
App #:	_____
Doc #:	_____
Check #:	_____
Program:	Stormwater

**Part I: Registration Type**

Select the appropriate boxes identifying the registration type and registration deadline.

Registration Type		Registration Timeline	
<input type="checkbox"/>	<b>Re-registration</b> Existing Permit No. GSN _____	<b>On or before February 1, 2014*</b> *Note: Failure to renew a permit by this date will require submission of new registration. Re-registrants must only complete Parts I, II, III (except Question 8), IV - Question 1, VII and submit Attachment A.	
<input checked="" type="checkbox"/>	<b>New Registration</b> (Refer to Section 2 of the permit for definitions of Locally Exempt and Locally Approvable Projects)	<input type="checkbox"/> <b>Locally Approvable Projects</b> Size of soil disturbance:	<b>New registration - Sixty (60) days prior to the initiation of the construction activity for:</b> Sites with a total soil disturbance area of 5 or more acres
		<input checked="" type="checkbox"/> <b>Locally Exempt Projects</b> Size of soil disturbance: 4.97	<input checked="" type="checkbox"/> <b>New registration - Sixty (60) days prior to the initiation of the construction activity for:</b> Sites with a total disturbance area of one (1) to twenty (20) acres except those with discharges to impaired waters or tidal wetlands
			<input type="checkbox"/> <b>New registration - Ninety (90) days prior to the initiation of the construction activity for:</b> (i) Sites with a total soil disturbance area greater than twenty (20) acres, or (ii) Sites discharging to a tidal wetland (that is not fresh-tidal and is located within 500 feet), or (iii) Sites discharging to an impaired water listed in the "Impaired Waters Table for Construction Stormwater Discharges"

## Part II: Fee Information

1. New Registrations
  - a. Locally approvable projects (registration only):
    - \$625 [#1855]
  - b. Locally exempt projects (registration and Plan):
    - \$3,000 total soil disturbance area  $\geq$  one (1) and < twenty (20) acres. [#1856]
    - \$4,000 total soil disturbance  $\geq$  twenty (20) acres and < fifty (50) acres. [#1857]
    - \$5,000 total soil disturbance  $\geq$  fifty (50) acres. [#1858]
2. Re-Registrations
  - \$625 (sites previously registered prior to September 1, 2012) [#1853]
  - \$0 (sites previously registered between September 1, 2012 and the issuance date of this permit) [#1854]

*The fees for municipalities shall be half of those indicated in subsections 1.a., 1.b., and 2 above pursuant to section 22a-6(b) of the Connecticut General Statutes. State and Federal agencies shall pay the full fees specified in this subsection. The registration will not be processed without the fee. The fee shall be non-refundable and shall be paid by certified check or money order payable to the Department of Energy and Environmental Protection.*

## Part III: Registrant Information

- If a registrant is a corporation, limited liability company, limited partnership, limited liability partnership, or a statutory trust, it must be registered with the Secretary of the State. If applicable, the registrant's name shall be stated **exactly** as it is registered with the Secretary of the State. This information can be accessed at [CONCORD](#).
- If a registrant 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.).

1. Registrant /Client Name: Connecticut Department of Transportation

**State Agency** ↓

Secretary of the State business ID #:           

Mailing Address: 1107 Cromwell Avenue - District 1

City/Town: Rocky Hill

State: CT

Zip Code: 06067

Business Phone: 860-258-4601

ext.:

*Example:(xxx) xxx-xxxx*

Contact Person: Ravi V. Chandran, PE Title:

E-Mail: **Ravi.Chandran@ct.gov**

Additional Phone Number (if applicable):

ext.

2. List billing contact, if different than the registrant:

Name: Same

Mailing Address:

City/Town:

State:

Zip Code:

Business Phone:

ext.:

Contact Person:

Title:

### Part III: Registrant Information (continued)

3. List primary contact for departmental correspondence and inquiries, if different than the registrant:

Name: Same

Mailing Address:

City/Town: State: Zip Code:

Business Phone: ext.:

Site Phone: Emergency Phone:

Contact Person: Title:

Association (e.g. developer, general or site contractor, etc.):

4. List owner of the property on which the activity will take place, if different from registrant:

Name: Same

Mailing Address:

City/Town: State: Zip Code:

Business Phone: ext.:

Contact Person:

5. List developer, if different from registrant or primary contact:

Name: Same

Mailing Address:

City/Town: State: Zip Code:

Business Phone: ext.:

Contact Person: Title:

6. List general contractor, if different from registrant or primary contact:

Name: Not Available

Mailing Address:

City/Town: State: Zip Code:

Business Phone: ext.:

Site Phone: Off Hours Phone:

Contact Person: Title:

7. List any engineer(s) or other consultant(s) employed or retained to assist in preparing the registration and/or Stormwater Pollution Control Plan.  Please select if additional sheets are necessary, and label and attach them to this sheet.

Name: BSC Group - Connecticut, Inc.

Mailing Address: 300 Winding Brook Drive

City/Town: Glastonbury State: CT Zip Code: 06033

Business Phone: 860-652-8227 ext.: 4549

Contact Person: Francis J. Vacca, PE Title: Civil Engineer

Service Provided: **Permit Preparation**

8. List Reviewing Qualified Professional (for locally approvable projects only):

Name: NA Contact Person:

Mailing Address:

City/Town: State: Zip Code:

Business Phone: ext.:

## Part IV: Site Information

1. Site Name: Reconstruction of Route 31

Street Address or Description of Location: 300 ft north of intersection with State Route 275 to 900 ft east of Monument Hill Road

City/Town: Coventry

State: CT

Zip Code: 06238

Brief Description of construction activity: Reconstruction/realignment of a portion of Route 31 to increase the safety of the roadway. The reconstruction includes upgrades to the drainage infrastructure and access management.

Project Start Date: 05 / 2015

Anticipated Completion Date: 11 / 2016

(month/ yr)

(month/ yr)

Normal working hours: 8 am to 5 pm

2. MINING: Is the activity on the site in question part of mining operations (i.e. sand and gravel)?  Yes  No

If yes, mining is not authorized by this general permit. You must submit the Registration Form for the General Permit for the Discharge of Stormwater Associated with Industrial Activity.

3. COMBINED OR SANITARY SEWER: Does all of the stormwater from the proposed activity discharge to a combined or sanitary sewer (i.e. a sewage treatment plant)?  Yes  No

If yes, this activity is not regulated by this permit. Contact the Water Permitting & Enforcement Division at 860-424-3018.

4. INDIAN LANDS: Is or will the facility be located on federally recognized Indian lands  Yes  No

5. 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

The coastal boundaries fall within the following towns: Branford, Bridgeport, Chester, Clinton, Darien, Deep River, East Haven, East Lyme, Essex, Fairfield, Greenwich, Groton (City and Town), Old Lyme, Guilford, Hamden, Ledyard, Lyme, Madison, Milford, Montville, New London, New Haven, North Haven, Norwalk, Norwich, Old Saybrook, Orange, Preston, Shelton, Stamford, Stonington (Borough and Town), Stratford, Waterford, West Haven, Westbrook and Westport.

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 provide documentation the DEEP Office of Long Island Sound Programs or the local governing authority has issued a coastal site plan approval or determined the project is exempt from coastal site plan review. Provide this documentation with your registration as Attachment B. See guidance in Appendix D of the general permit. Information on the coastal boundary is available at the local town hall or at [www.cteco.uconn.edu/map\\_catalog.asp](http://www.cteco.uconn.edu/map_catalog.asp). Additional DEEP Maps and Publications are available by contacting DEEP staff at 860-424-3555.

## Part IV: Site Information (continued)

### 6. ENDANGERED OR THREATENED SPECIES:

In order to be eligible to register for this General Permit, each registrant must perform a self-assessment, obtain a limited one-year determination, or obtain a safe-harbor determination regarding threatened and endangered species. This may include the need to develop and implement a mitigation plan. While each alternative has different limitations, the alternatives are not mutually exclusive; a registrant may register for this General Permit using more than one alternative. See Appendix A of the General Permit. Each registrant must complete this section AND Attachment C to this Registration form and a registrant who does not or cannot do so is not eligible to register under this General Permit.

Each registrant must perform a review of the Department's Natural Diversity Database maps to determine if the site of the construction activity is located within or in proximity (within ¼ mile) to a shaded area.

- a. Provide the date the NDDDB maps were reviewed: December 2013 (Print a copy of the NDDDB map you viewed since it must be submitted with this registration as part of Attachment C.)
- b. For a registrant using a limited one-year determination or safe harbor determination to register for this General Permit, provide the Department's Wildlife Division NDDDB identification number for any such determination: 201400714 (The number is on the determination issued by the Department's Wildlife Division).
- c. verify that I have completed Attachment C to this Registration Form.  Yes

For more information on threatened and endangered species requirements, refer to Appendix A and Section 3(b)(2) of this General Permit, visit the DEEP website at [www.ct.gov/deep/nddbrequest](http://www.ct.gov/deep/nddbrequest) or call the NDDDB at 860-424-3011.

7. WILD AND SCENIC RIVERS: Is the proposed project within the watershed of a designated Wild and Scenic River? ( See Appendix H for guidance)  Yes  No
8. AQUIFER PROTECTION AREAS: Is the site located within a mapped aquifer protection area [www.ct.gov/deep/aquiferprotection](http://www.ct.gov/deep/aquiferprotection) as defined in section 22a-354h of the CT General Statutes? (For additional guidance, please refer to Appendix C of the General Permit)  Yes  No
9. CT GUIDELINES FOR SOIL EROSION AND SEDIMENT CONTROL: Is the activity in accordance with CT Guidelines for Erosion and Sediment Control and local erosion & sediment control ordinances, where applicable?  Yes  No
10. HISTORIC AND/OR ARCHAEOLOGICAL RESOURCES:  
Has the site of the proposed activity been reviewed (using the process outlined in Appendix G of this permit) for historic and/or archaeological resources?  Yes  No
- a. The review indicates the proposed site does not have the potential for historic/ archaeological resources, OR  Yes  No
- b. The review indicated historic and/ or archaeological resource potential exists and the proposed activity is being or has been reviewed by the Offices of Culture and Tourism, OR  Yes  No
- c. The proposed activity has been reviewed and authorized under an Army Corps of Engineers Section 404 wetland permit.  Yes  No
11. 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 D.

## Part V: Stormwater Discharge Information

Table 1						
Outfall #	a) Type	b) Pipe Material	c) Pipe Size	d) Note: To find lat/long, go to: <a href="#">CT ECO</a> . A decimal format is required here. Directions on how to use CT ECO to find lat./long. and conversions can be found in Part V, Section d of the <a href="#">DEEP-WPED-INST-015</a> .		e) What method was used to obtain your latitude/longitude information?
				Longitude	Latitude	
MO-1	pipe	concrete	18"	-7 2.3 0 4 1 9	4 1.7 6 9 2 5	other: Software
MO-2	pipe	concrete	15"	-7 2.3 0 2 4 5	4 1.7 6 8 5 0	other: Software
MO-3	pipe	concrete	12"	-7 2.3 0 2 5 1	4 1.7 6 8 4 5	other: Software
MO-4	pipe	other: concrete	12"	-7 2.3 0 2 2 9	4 1.7 6 8 4 6	other: Software
MO-5	other: Box Culv	other: concrete	other: 4'x9'	-7 2.3 0 2 1 9	4 1.7 6 8 0 4	other: Software

Table 2						
Outfall #	a) For temporary and permanent outfalls, provide a start date. For temporary discharges, also provide a date the discharge will cease.	b) For the drainage area associated with each outfall: Effective Impervious Area Before Construction	c) For the drainage area associated with each outfall: Effective Impervious Area After Construction	d) To what system or receiving water does your stormwater runoff discharge? either "storm sewer" or "wetlands/waterbody" (If you select "storm sewer" proceed to Part VI of the form. If you select "wetlands/waterbody" proceed to next question)	e) For each outfall, does it discharge to any of the following towns: <i>Branford, Kent, Manchester, Meriden, North Branford, Norwalk, or Wilton?</i> (If no, proceed to Part VI of the form. If yes, proceed to next question.)	f) For each outfall, does it discharge to a "freshwater" or "salt water" ? (If you select "freshwater" proceed to Table 3. If you selected "salt water", proceed to Part VI of the form.)
MO-1	05/01-mm/dd-mm/dd	33,400 sq feet	37,300 sq feet	wetlands/waterbody	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No	Select one:
MO-2	05/01-mm/dd-mm/dd	44,060 sq feet	41,518 sq feet	wetlands/waterbody	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No	Select one:
MO-3	05/01-mm/dd-mm/dd	3,690 sq feet	3,540 sq feet	wetlands/waterbody	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No	Select one:
MO-4	05/01-mm/dd-mm/dd	23,091 sq feet	22,498 sq feet	wetlands/waterbody	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No	Select one:
MO-5	05/01-mm/dd-mm/dd	34,837 sq feet	27,161 sq feet	Select one:	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No	Select one:
		<b>(nxt pg) total sq feet</b>	<b>(nxt pg) total sq feet</b>			

## Part V: Stormwater Discharge Information

Table 1						
Outfall #	a) Type	b) Pipe Material	c) Pipe Size	d) Note: To find lat/long, go to: <a href="#">CT ECO</a> . A decimal format is required here. Directions on how to use CT ECO to find lat./long. and conversions can be found in Part V, Section d of the <a href="#">DEEP-WPED-INST-015</a> .		e) What method was used to obtain your latitude/longitude information?
				Longitude	Latitude	
MO-6	pipe	concrete	18"	-7 2.3 0 1 0 3	4 1.7 6 7 9 6	other: Software
	Select One:	Select One:	Select One:	-		Select One:
	Select One:	Select One:	Select One:	-		Select One:
	Select One:	Select One:	Select One:	-		Select One:
	Select One:	Select One:	Select One:	-		Select One:

Table 2						
Outfall #	a) For temporary and permanent outfalls, provide a start date. For temporary discharges, also provide a date the discharge will cease.	b) For the drainage area associated with each outfall: Effective Impervious Area Before Construction	c) For the drainage area associated with each outfall: Effective Impervious Area After Construction	d) To what system or receiving water does your stormwater runoff discharge? either "storm sewer" or "wetlands/waterbody" (If you select "storm sewer" proceed to Part VI of the form. If you select "wetlands/waterbody" proceed to next question)	e) For each outfall, does it discharge to any of the following towns: <i>Branford, Kent, Manchester, Meriden, North Branford, Norwalk, or Wilton?</i> (If no, proceed to Part VI of the form. If yes, proceed to next question.)	f) For each outfall, does it discharge to a "freshwater" or "salt water"? (If you select "freshwater" proceed to Table 3. If you selected "salt water", proceed to Part VI of the form.)
MO-6	05/01-mm/dd-mm/dd	18,200 sq feet	18,300 sq feet	wetlands/waterbody	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No	Select one:
	-mm/dd-mm/dd	sq feet	sq feet	Select one:	<input type="checkbox"/> Yes <input type="checkbox"/> No	Select one:
	-mm/dd-mm/dd	sq feet	sq feet	Select one:	<input type="checkbox"/> Yes <input type="checkbox"/> No	Select one:
	-mm/dd-mm/dd	sq feet	sq feet	Select one:	<input type="checkbox"/> Yes <input type="checkbox"/> No	Select one:
	-mm/dd-mm/dd	sq feet	sq feet	Select one:	<input type="checkbox"/> Yes <input type="checkbox"/> No	Select one:
		<b>157,278 total sq feet</b>	<b>150,317 total sq feet</b>			

**Part V: Stormwater Discharge Information (continued)**

<b>Table 3</b> Provide the following information about the receiving water(s)/wetland(s) that receive stormwater runoff from your site:			
Outfall #	a) What is your 305b ID # (water body ID #)?  (Section 3.b, of the <a href="#">DEEP-WPED-INST-015</a> , explains how to find this information)	b) Is your receiving water identified as a impaired water in the " <a href="#">Impaired Waters Table for Construction Stormwater Discharges</a> "? If yes, proceed to next question. If no, proceed to Part VI: Pollution Control Plan.	c) Has any Total Maximum Daily Load (TMDL) been approved for the impaired water?
■	■	<input type="checkbox"/> Y <input type="checkbox"/> N	<input type="checkbox"/> Y <input type="checkbox"/> N
■	■	<input type="checkbox"/> Y <input type="checkbox"/> N	<input type="checkbox"/> Y <input type="checkbox"/> N
■	■	<input type="checkbox"/> Y <input type="checkbox"/> N	<input type="checkbox"/> Y <input type="checkbox"/> N
■	■	<input type="checkbox"/> Y <input type="checkbox"/> N	<input type="checkbox"/> Y <input type="checkbox"/> N
■	■	<input type="checkbox"/> Y <input type="checkbox"/> N	<input type="checkbox"/> Y <input type="checkbox"/> N

## Part V: Stormwater Discharge Information (continued)

**Impaired waters:** If you answered “yes” to Table 3, question b., **verify** that the project’s Pollution Control Plan (Plan) addresses the control measures below in Question 1 or 2, as appropriate.

- 1. If the impaired water does not have a TMDL**, confirm compliance by selecting 1.a. or 1.b. below:
- a. No more than 3 acres is disturbed at any time;  Yes
- OR**
- b. Stormwater runoff from a 2 yr, 24 rain event is **retained**.  Yes
- 2. If the impaired water has a TMDL**, confirm compliance by selecting 2.a. and 2.b. below and either question 2.c.1. or 2.c.2. below:
- a. The Plan documents there is sufficient remaining Waste Load Allocations (WLA) in the TMDL for the proposed discharge,  Yes
- AND**
- b. Control measures shall be implemented to assure the WLA will not be exceeded,  Yes
- AND**
- c. 1. Stormwater discharges will be monitored for the indicator pollutant identified in the TMDL,  Yes
- OR**
2. The Plan documents specific requirements for stormwater discharges specified in the TMDL.  Yes

## Part VI: Pollution Control Plan (select one of the following four categories)

- I am registering a Locally Exempt project and submitting the required electronic Plan (in Adobe™ PDF or similar publically available format) pursuant to Section 3(c)(2)(E) of this permit.
- Plan is attached to this registration form
- Plan is available at the following Internet Address (URL):
- I am registering a Locally Approvable project and have chosen not to submit the Plan with this registration pursuant to Section 3(c)(1) of this permit.
- I am registering a Locally Approvable project and have chosen to make my Plan electronically available pursuant to Section 4(c)(2)(N) of this permit.
- Plan is attached to this registration form
- Plan is available at the following Internet Address (URL):
- I am registering a Locally Exempt project and do not have the capability to submit the Plan electronically. Therefore, I am submitting a paper copy with this registration as Attachment E.

## Part VII: Registrant Certification

The registrant *and* the individual(s) responsible for actually preparing the registration must sign this part. A registration will be considered incomplete unless all required signatures are provided.

### For New Registrants:

" I hereby certify that I am making this certification in connection with a registration under such general permit,  
 [INSERT NAME OF REGISTRANT BELOW]

submitted to the commissioner by Ravi V. Chandran, District 1 Engineer for  
 [INSERT ADDRESS OF PROJECT OR ACTIVITY BELOW]

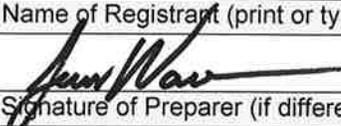
an activity located at Route 31 at intersection with Route 275, Coventry CT and that all terms and conditions of the general permit are being met for all discharges which have been initiated and such activity is eligible for authorization under such permit. I further certify that a system is in place to ensure that all terms and conditions of this general permit will continue to be met for all discharges authorized by this general permit at the site. I certify that the registration filed pursuant to this general permit is on complete and accurate forms as prescribed by the commissioner without alteration of their text. I certify that I have personally examined and am familiar with the information that provides the basis for this certification, including but not limited to all information described in Section 3(b)(8)(A) of such general permit, and I certify, based on reasonable investigation, including my inquiry of those individuals responsible for obtaining such information, that the information upon which this certification is based is true, accurate and complete to the best of my knowledge and belief. I certify that I have made an affirmative determination in accordance with Section 3(b)(8)(B) of this general permit. I understand that the registration filed in connection with such general permit is submitted in accordance with and shall comply with the requirements of Section 22a-430b of Connecticut General Statutes. I also understand that knowingly making any false statement made in the submitted information and in this certification may be punishable as a criminal offense, including the possibility of fine and imprisonment, under Section 53a-157b of the Connecticut General Statutes and any other applicable law."

### For Re-registrants:

" I hereby certify that I am making this certification in connection with a registration under the General Permit for the Discharge of Stormwater and Dewatering Wastewaters from Construction Activities, submitted to the commissioner  
 [INSERT NAME OF REGISTRANT BELOW]

by \_\_\_\_\_ for an activity located at  
 [INSERT ADDRESS OF PROJECT OR ACTIVITY BELOW]

and that all terms and conditions of the general permit are being met for all discharges which have been initiated and such activity is eligible for authorization under such permit. I further certify that all designs and plans for such activity meet the current terms and conditions of the general permit in accordance with Section 5(b)(5)(C) of such general permit and that a system is in place to ensure that all terms and conditions of this general permit will continue to be met for all discharges authorized by this general permit at the site. I certify that the registration filed pursuant to this general permit is on complete and accurate forms as prescribed by the commissioner without alteration of their text. I certify that I have personally examined and am familiar with the information that provides the basis for this certification, including but not limited to all information described in Section 3(b)(8)(A) of such general permit, and I certify, based on reasonable investigation, including my inquiry of those individuals responsible for obtaining such information, that the information upon which this certification is based is true, accurate and complete to the best of my knowledge and belief. I also understand that knowingly making any false statement made in the submitted information and in this certification may be punishable as a criminal offense, including the possibility of fine and imprisonment, under Section 53a-157b of the Connecticut General Statutes and any other applicable law."

Signature of Registrant	Date
<b>Ravi V. Chandran, PE</b>	<b>District 1 Engineer</b>
Name of Registrant (print or type)	Title (if applicable)
	<b>4/15/14</b>
Signature of Preparer (if different than above)	Date
<b>Francis J. Vacca, PE</b>	<b>Civil Engineer</b>
Name of Preparer (print or type)	Title (if applicable)



## Part IX: Reviewing Qualified Professional Certification

The following certification must be signed by a) a Conservation District reviewer OR, b) a qualified soil erosion and sediment control and/or professional engineer

**Review certification by Conservation District:**

1.) District: list of districts

Date of Affirmative Determination:

" I am making this certification in connection with a registration under General Permit for the Discharge of Stormwater and Dewatering Wastewaters from Construction Activities, submitted to the commissioner

[INSERT NAME OF REGISTRANT BELOW]

by \_\_\_\_\_ for an activity located at  
[INSERT ADDRESS OF PROJECT OR ACTIVITY BELOW]

I have personally examined and am familiar with the information that provides the basis for this certification, and I affirm, based on the review described in Section 3(b)(11)(C) of this general permit and on the standard of care for such projects, that the Stormwater Pollution Control Plan is adequate to assure that the activity authorized under this general permit will comply with the terms and conditions of such general permit and that all stormwater management systems: (i) have been designed to control pollution to the maximum extent achievable using measures that are technologically available and economically practicable and that conform to those in the Guidelines and the Stormwater Quality Manual; (ii) will function properly as designed; (iii) are adequate to ensure compliance with the terms and conditions of this general permit; and (iv) will protect the waters of the state from pollution."

\_\_\_\_\_  
Signature of District Professional and Date

\_\_\_\_\_  
Name of District Professional and License Number (if applicable)

**Or**

**Review certification by Qualified Professional**

Company: \_\_\_\_\_

Name: \_\_\_\_\_

License # : \_\_\_\_\_

**Level of independency of professional:**

**Required for all projects disturbing over 1 acre:**

1. I verify I am not an employee of the registrant.  Yes
2. I verify I have no ownership interest of any kind in the project for which the registration is being submitted.  Yes

**Required for projects with 15 or more acres of site disturbance ( in addition to questions 1&2):**

3. I verify I did not engage in any activities associated with the preparation, planning, designing or engineering of the soil erosion and sediment control plan or stormwater management systems plan for this registrant.  Yes
4. I verify I am not under the same employ as any person associated with the preparation, planning, designing or engineering of the soil erosion and sediment control plan or stormwater management systems plan for this registrant.  Yes

**Part IX: Reviewing Qualified Professional Certification (continued)**

"I hereby certify that I am a qualified professional engineer or qualified soil erosion and sediment control professional, or both, as defined in the General Permit for Discharge of Stormwater and Dewatering Wastewaters from Construction Activities and as further specified in Sections 3(b)(11)(A) and (B) of such general permit. I am making this certification in connection with a registration under such general permit,

[INSERT NAME OF REGISTRANT BELOW]

submitted to the commissioner by

[INSERT ADDRESS OF PROJECT OR ACTIVITY BELOW]

for an activity located at

I have personally examined and am familiar with the information that provides the basis for this certification, including but not limited to all information described in Section 3(b)(11)(C) of such general permit, and I certify, based on reasonable investigation, including my inquiry of those individuals responsible for obtaining such information, that the information upon which this certification is based is true, accurate and complete to the best of my knowledge and belief. I further certify that I have made the affirmative determination in accordance with Sections 3(b)(11)(D)(i) and (ii) of this general permit. I understand that this certification is part of a registration submitted in accordance with Section 22a-430b of Connecticut General Statutes and is subject to the requirements and responsibilities for a qualified professional in such statute. I also understand that knowingly making any false statement in this certification may be punishable as a criminal offense, including the possibility of fine and imprisonment, under Section 53a-157b of the Connecticut General Statutes and any other applicable law."

\_\_\_\_\_  
Signature of Reviewing Qualified Professional

Date: \_\_\_\_\_

\_\_\_\_\_  
Name of Reviewing Qualified Professional

License No.: \_\_\_\_\_

Affix P.E./L.A. Stamp Here

## Part X: Supporting Documents

Select the applicable box below for each attachment being submitted with this registration form. When submitting any supporting documents, please label the documents as indicated below (e.g., Attachment A, etc.) and be sure to include the registrant's name as indicated on this certification form.

- Attachment A:** Select here as verification that an 8 ½" X 11" copy of the relevant portion of a USGS Quadrangle Map with a scale of 1:24,000, showing the exact location of the facility has been submitted with this registration. Indicate the quadrangle name on the map, and be sure to include the registrant's name. (To obtain a copy of the relevant USGS Quadrangle Map, call your town hall or DEEP Maps and Publications Sales at 860-424-3555)
- Attachment B:** Documentation related to *Coastal Consistency Review*, if applicable.
- Attachment C:** Threatened and Endangered Species Form and any additional information (such as a copy of a NDDB map)
- Attachment D:** Conservation or Preservation Restriction Information, if applicable.
- Attachment E:** Where applicable, non-electronic Pollution Control Plan.

Note: Please submit the fee along with a completed, printed and signed Registration Form and all additional supporting documents to:

**CENTRAL PERMIT PROCESSING UNIT  
DEPARTMENT OF ENERGY AND ENVIRONMENTAL PROTECTION  
79 ELM STREET  
HARTFORD, CT 06106-5127**

# ATTACHMENT C: THREATENED AND ENDANGERED SPECIES

Information about compliance with the requirements of Section 3(b)(2) of this general permit, regarding threatened and endangered species, is in Appendix A of the general permit. Choose one or more (if applicable) of the following in order to be eligible to register for this General Permit. A registrant who does not or cannot do so is not eligible to register under this General Permit.

- Self Assessment using the NDDDB maps – Select this only if:
- a. The site of the construction activity is not entirely, partially or within a ¼ mile of a shaded area depicted on the Department’s Natural Diversity Database maps and this determination was made not more than six months before the date of submitting this registration;
- AND
- b. The entity registering for this General Permit has no reasonably available verifiable scientific, or other credible information that the construction activity could reasonably be expected to have an adverse impact upon a federal or state species listed as threatened or endangered.

Attach a copy of the NDDDB map used to conduct the self assessment used to register for this general permit.

Note: Both a and b as used in this section, must be true in order for a Registrant to register for this General Permit using the self-assessment option. If neither is true, a Registrant cannot use the self-assessment option to comply with Section 3(b)(2) and Appendix A of the General Permit.

- Limited One-Year Determination – Select this only if:
- a. The entity registering for this General Permit has obtained a limited one-year determination from the Department’s Wildlife Division regarding threatened and endangered species: i) within a year of the date of submitting this registration; or ii) more than 1 year before submitting this registration, but such determination has been extended by the Department within one year of the date of submitting this registration;
- AND
- b. The Registrant has provided to the Department’s Wildlife Division any reasonably available verifiable scientific, or other credible information that the construction activity could reasonably be expected to have an adverse impact upon a federal or state species listed as threatened or endangered.

Provide the date the limited one-year determination was issued by the Department’s Wildlife Division February 24, 2014 ;

or

Provide the date that the most recent extension to a limited one year determination was issued by the Department’s Wildlife Division \_\_\_\_\_.

Note: Both a and b as used in this section, must be true in order for a Registrant to register for this General Permit using the Limited One-Year Determination option. If a Limited One-Year Determination or extension to any such determination was issued by the Department’s Wildlife Division more than one year before the submission of this registration, a Registrant cannot use any such determination or extension to comply with Section 3(b)(2) and Appendix A of the General Permit.

# ATTACHMENT C: THREATENED AND ENDANGERED SPECIES (continued)

- Select here if the Limited One-Year Determination issued by the Department includes a Mitigation Plan.**

Provide the date the Mitigation Plan was approved: \_\_\_\_\_

Governmental Entity Approving the Plan: \_\_\_\_\_

**As of the date this Registration is submitted,**

Has the Mitigation Plan been fully implemented?  Yes  No

Date commenced: \_\_\_\_\_ Date completed: \_\_\_\_\_

Is the Mitigation Plan partially implemented?  Yes  No

If yes, what actions have been taken? \_\_\_\_\_

And which actions are yet to be implemented and what is the timeframe for completion of such actions: \_\_\_\_\_

Is the Mitigation Plan yet to be implemented?  Yes  No

If yes, specify the timeframe for implementation: \_\_\_\_\_ to \_\_\_\_\_

And summarize actions to be implemented: \_\_\_\_\_

- Safe Harbor Determination - Select this only if:

- a. The entity registering for this General Permit has obtained a Safe Harbor Determination from the Department's Wildlife Division regarding threatened and endangered species: i) within 3 years of the date of submitting this registration; or ii) more than 3 years before submitting this registration, but within one-year of a one-year extension issued by the Department's Wildlife Division to a safe harbor determination;

AND

- b. The entity registering for this General Permit has provided to the Department's Wildlife Division any reasonably available verifiable scientific, or other credible information that the construction activity could reasonably be expected to have an adverse impact upon a federal or state species listed as threatened or endangered.

Provide the date the Department's Wildlife Division issued a Safe Harbor Determination: \_\_\_\_\_

If applicable, provide the date that any one-year extension to a Safe Harbor Determination was issued by the Department's Wildlife Division: \_\_\_\_\_.

Note: Both a and b as used in this section, must be true in order for a Registrant to register for this General Permit using the Safe Harbor Determination option. If a Safe Harbor Determination was issued by the Department's Wildlife Division more than three years before the submission of this registration, and has not been extended, a Registrant cannot use any such safe harbor to comply with section 3(b)(2) and Appendix A of this General Permit. If a Safe Harbor Determination was granted and extended for one-year, more than four years before the submission of this registration, a Registrant cannot use any such Safe Harbor Determination to comply with Section 3(b)(2) and Appendix A of the general permit.

# ATTACHMENT C: THREATENED AND ENDANGERED SPECIES (continued)

**Select here if the safe harbor noted above includes a Mitigation Plan.**

Provide the date the Mitigation Plan was approved: \_\_\_\_\_

Governmental Entity Approving the Plan: \_\_\_\_\_

**As of the date this Registration is submitted,**

Has the Mitigation Plan been fully implemented?  Yes  No

Date commenced: \_\_\_\_\_ Date completed: \_\_\_\_\_

Is the Mitigation Plan partially implemented?  Yes  No

If yes, what actions have been taken? \_\_\_\_\_

And which actions are yet to be implemented and what is the timeframe for completion of such actions: \_\_\_\_\_

Is the Mitigation Plan yet to be implemented?  Yes  No

If yes, specify the timeframe for implementation: \_\_\_\_\_ to \_\_\_\_\_

And summarize actions to be implemented: \_\_\_\_\_



Connecticut Department of  
**ENERGY &  
ENVIRONMENTAL  
PROTECTION**

Bureau of Natural Resources  
Wildlife Division  
Natural History Survey – Natural Diversity Data Base

February 24, 2014

Mr. Francis J. Vacca, PE  
BSC Group – Connecticut Inc.  
180 Glastonbury Blvd.  
Glastonbury, CT 06033  
fvacca@bscgroup.com

Regarding: Reconstruction of Route 31 – Project No. 32-130, Coventry, CT  
Natural Diversity Data Base 201400714

Dear Mr. Vacca:

In response to your request for a Natural Diversity Data Base (NDDDB) Review of State Listed Species for the Reconstruction of Route 31 – Project No. 32-130 in Coventry, our records indicate an extant population of a threatened species documented on or within the vicinity of the site:

Wood turtle (*Glyptemys insculpta*) Protection Status: Species of Special Concern

Wood turtles require riparian habitats bordered by floodplain, woodland or meadows. They hibernate in the banks of the river in submerged tree roots. Their summer habitat includes pastures, old fields, woodlands, powerline cuts and railroad beds bordering or adjacent to streams and rivers. This species has been negatively impacted by the loss of suitable habitat.

Recommendation: Precautions should be taken to protect wood turtles. The following guidelines should be met:

- ✚ Silt fencing should be installed around the work area prior to activity;
- ✚ After silt fencing is installed and prior to work being conducted, a sweep of the work area should be conducted to look for turtles;
- ✚ Workers should be apprised of the possible presence of turtles, and provided a description of the species  
([http://www.ct.gov/dep/cwp/view.asp?a=2723&q=473472&depNav\\_GID=1655](http://www.ct.gov/dep/cwp/view.asp?a=2723&q=473472&depNav_GID=1655));
- ✚ Any turtles that are discovered should be moved, unharmed, to an area immediately outside of the fenced area, and position in the same direction that it was walking;

- ✚ Work conducted during early morning and evening hours should occur with special care not to harm basking or foraging individuals; and
- ✚ All silt fencing should be removed after work is completed and soils are stable so that reptile and amphibian movement between uplands and wetlands is not restricted.

The Natural Diversity Data Base includes all information regarding critical biological resources available to us at the time of the request. This information is a compilation of data collected over the years by the Department of Energy and Environmental Protection's Natural History Survey and cooperating units of DEEP, private conservation groups and the scientific community. This information is not necessarily the result of comprehensive or site-specific field investigations. Consultations with the Data Base should not be substituted for on-site surveys required for environmental assessments. Current research projects and new contributors continue to identify additional populations of species and locations of habitats of concern, as well as, enhance existing data. Such new information is incorporated into the Data Base as it becomes available. If the project is not implemented within 12 months, then another Natural Diversity Data Base review should be requested for up-to-date information.

Please be advised that this is a preliminary review and not a final determination. A more detailed review may be conducted as part of any subsequent environmental permit applications submitted to DEEP for the proposed site.

Thank you for consulting the Natural Diversity Data Base. If you have any additional questions, I can be contacted by email at [Elaine.Hinsch@ct.gov](mailto:Elaine.Hinsch@ct.gov).

Sincerely,  
/s/  
Elaine Hinsch  
Program Specialist II  
Wildlife Division

# NATURAL DIVERSITY DATA BASE AREAS

## COVENTRY, CONNECTICUT

### LEGEND

-  State and Federal Listed Species and Significant Natural Communities\*
-  Railroad
-  Interstate
-  US Route
-  State Route
-  Ramp
-  Street
-  State Boundary
-  County Boundary
-  Town Boundary
-  Watercourse
-  Intermittent Watercourse
-  Dam
-  Dredged Channel
-  Aqueduct
-  Open Water
-  Intermittent Water
-  Marsh area on USGS topo map
-  Cranberry Bog
-  Dam
-  Fish Hatchery
-  Aqueduct
-  Sewage Pond
-  Water Tank

### EXPLANATION

This map depicts general locations of state and federal listed species and significant natural communities. The map is intended to be used as a pre-screening tool to determine the potential for impacts on state listed species and the need for a Natural Diversity Data Base review. To use the map, locate the project boundaries and any additional affected areas on the map. If the project is within a shaded area there may be a potential conflict with a listed species or natural community. For more information complete a Request for Natural Diversity Data Base State Listed Species Review form (DEP-APP-007) and submit to the Natural Diversity Data Base along with the required maps and information. More detailed instructions are available along with the request form on the Department of Energy and Environmental Protection (DEEP) webpage. [www.ct.gov/deep/nddbrequest](http://www.ct.gov/deep/nddbrequest)

Date of Map: June 2013  
 Natural Diversity Data Base Digital Data  
 For more information about State Listed Species, contact DEEP, Bureau of Natural Resources, Wildlife Division. Tel: 860-424-3011

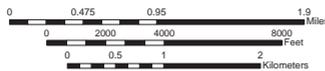
### DATA SOURCES

\*NDDB Information - Locations of state and federal listed species and significant natural communities are based on data collected by the Connecticut Department of Energy & Environmental Protection, private conservation groups and the scientific community and compiled by the Natural Diversity Data Base (NDDB). The information is not necessarily the result of comprehensive or site-specific field investigations; in some cases locations have been derived from literature or museum searches or historic records. Exact locations have been buffered to produce generalized locations. The exact species or community location falls somewhere within the shaded area and not necessarily in the center. Information on this map does not include Natural Area Preserves, designated wetland areas or wildlife concentration areas.

BASE MAP DATA - Based on data originally from 1:24,000-scale USGS 7.5 minute topographic quadrangle maps published between 1969 and 1992. It includes political boundaries, railroads, airports, hydrography, geographic names and geographic places. Streets and street names are from Tele Atlas copyrighted data. Base map information is neither current nor complete.

RELATED INFORMATION  
 This map is intended to be printed at its original dimensions in order to maintain the 1:24,000 scale (1 inch = 2000 feet).

MAPS AND DIGITAL DATA - Visit the CT ECO website ([www.cteco.uconn.edu](http://www.cteco.uconn.edu)) for this map and a variety of others. Visit the DEEP website ([www.ct.gov/deep](http://www.ct.gov/deep)) to download the base map digital spatial data shown on this map.



State Plane Coordinate System of 1983, Zone 2026  
 Lambert Conformal Conic Projection  
 North American Datum of 1983

Map prepared by CT DEEP  
 Map is not colorfast  
 Protect from light and moisture



# **STORMWATER POLLUTION CONTROL PLAN**

**Reconstruction of State Route 31  
Coventry, Connecticut  
Project No. 32-130**



The State of Connecticut  
Department of Transportation – District 1  
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## **APPENDICES**

- Appendix A Stormwater Monitoring Reports (SMR)
- Appendix B Velocity Dissipation Calculations
- Appendix C Notice of Termination Form

## **ATTACHMENTS**

- Attachment 1 Site Location Map
- Attachment 2 Site Plans

## 1.0 INTRODUCTION

The Connecticut Department of Transportation (ConnDOT) is proposing the reconstruction of approximately 2000 feet of State Route 31 (Main Street) through the center of historic South Coventry, Connecticut. The reconstruction shall begin approximately 300 feet northwest of the intersection of Route 275 (Stonehouse Road) and end approximately 900 feet east of Monument Hill Road, in the vicinity of the South Coventry First Congregational Church. Intersecting approaches (Stonehouse Road/Lake Street, and Monument Hill Road) will be reconstructed for lengths that vary from stubs to 175 feet. The entire project will include drainage improvements. Please see Attachment 1 for a site location map.

This Stormwater Pollution Control Plan (SWPCP) has been prepared in accordance with the Connecticut Department of Energy and Environmental Protection (DEEP) “General Permit for the Discharge of Stormwater and Dewatering Wastewaters Associated with Construction Activities”, DEEP-WPED-GP-015 (hereinafter the “General Permit”). ConnDOT has filed registration under the General Permit with DEEP and is therefore the “Permittee”. As this SWPCP is a required component of the General Permit registration, all project participants who are involved with “site” construction (e.g. Construction Manager, General Contractor, Contractor, Subcontractors, etc.) are required to certify to this SWPCP and perform the actions defined by this SWPCP throughout all phases of construction. ConnDOT, as Permittee, will be responsible for compliance with applicable portions of this SWPCP following the completion of construction and turn-over of the new facility.

This SWPCP is intended to be used in concert with technical specification Section 01 5713 – Temporary Erosion and Sedimentation Controls and the Erosion and Sedimentation Control Plans included in Attachment 2. This SWPCP is intended to reduce and/or eliminate to the extent achievable using control measures that are technologically available and economically practicable and achievable in light of best industry practice the following: (1) pollution caused by soil erosion and sedimentation during and after construction; and (2) stormwater pollution caused by use of the site after construction is completed.

## 2.0 SITE PLAN

The project site is located within the South Coventry Historic District in Coventry, Connecticut and is bounded on all sides by private or town properties. The work area is comprised of approximately 4.97 acres.

Roadway work area topography in the vicinity of the route 31 and route 270 intersection slopes to the southeast, with reconstruction starting around elevation 540 at station 10+00. The slope proceeds downward to the southeast around the proposed curve and continues east through the intersection with Monument Hill Road at around elevation 468 (+Station 21+25). The low point of the roadway work area occurs at station 23+50, adjacent to the fire pond at approximate elevation 455. From here the roadway continues relatively flat to the end of the reconstruction at station 30+50 and approximate elevation 452.

Site drawings included in Attachment 2 provide the following information:

- Drainage patterns
- Approximate slopes anticipated after major grading activities
- Areas of soil disturbance
- Location of major structural and non-structural controls
- The location of areas where stabilization practices are expected to occur
- Areas which will be vegetated following construction
- Monitored outfalls

### **3.0 SITE DESCRIPTION**

#### **3.1 Nature of the Construction Activity**

The primary objective of this project is to eliminate a very sharp curve on Route 31 just south of Route 275, which is the cause of numerous accidents. ConnDOT designed the project with a “context sensitive” approach, which includes sidewalks and streetscape improvements. An “Access Management Plan” will also be implemented as part of the project, to reduce the number of curb cuts and control their location and design.

The reconstruction project will include full depth reconstruction, milling and overlay, horizontal and vertical realignment (most notably, the sharp curve 500 feet south of Route 275), as well as drainage improvements and other improvements incidental to the construction of the road, such as sidewalks, retaining walls, utility pole relocation, curbs, and parking lots.

#### **3.2 Site Area and Site Area Disturbance**

The site is 4.97 acres in size. It is anticipated that the entire 4.97 acres will be disturbed by construction activities.

#### **3.3 Runoff Coefficients**

The estimated average runoff coefficient of the site after construction activities are completed is 0.73.

#### **3.4 Receiving Water(s)**

If not infiltrated into the ground, wastewaters discharged under the General Permit will be collected by the ConnDOT operated storm drainage system and will discharge to the Mill Brook watercourse through one of three Main Outlets: MO-1 through MO-3 (Subregional Basin No. 3105-00). Mill Brook discharges to Decew Pond, south of Depot Road in South Coventry and eventually enters Eagleville Brook, which ultimately discharges to the Thames River (Drainage Basin No. 3).

#### **3.5 Wetlands**

There are wetlands associated with the “Trolley Way” drainage ditch and Mill Brook that crosses underneath the site. In total, the wetlands constitute 0.08 acres (approximately 3,500 square feet) within the limits of work.

## 4.0 CONSTRUCTION SEQUENCING

The contractor will have the ability, and the responsibility, to perform the work in phases, so as to minimize disturbance at any one time, minimize disruption to the town and state roadway system, minimize disruption to local businesses, and perform the work in an efficient manner. It is the contractor's responsibility to determine the limit of each phase of work, and comply with the maximum disturbance criteria.

Each phase of construction, regardless of the number of sequences it contains, requires a preconstruction meeting that should include ConnDOT, the contractor, utility representatives, and other agents who have responsibility and authority for the implementation, operation, monitoring and maintenance of the erosion and sediment (E&S) controls. The purpose of the preconstruction meeting is to make all responsible parties aware of the project's needs so that resources can be properly distributed and to identify limitations and restrictions. The preconstruction meeting shall identify modifications needed to the construction sequence and application of special treatments. Included in the preconstruction meeting agenda, at a minimum, shall be a review of plans, permit conditions, the contractors' sequence and schedules for construction, site restrictions and other special needs.

The following sequence is provided as a generic roadway construction guideline applicable for each individual phase. This generic phasing shall be adjusted, by the contractor, to meet project-specific phase needs and conditions. It is also recognized that work will not proceed without delays. When work is suspended within a phase, the contractor shall deploy additional erosion and sediment controls as may be required to secure the site. Erosion and sediment controls shall be installed and maintained as dictated by the plan set (Erosion and Sedimentation Control Sheets) and Section 5.0 (Controls) of this Plan. If additional erosion and sediment controls are required due to specific site conditions, it is the contractor's responsibility to provide controls that are sufficient to prevent the removal and transportation of sediment off site to resource areas, that area also satisfactory to the Engineer.

The generic sequence of construction activities for each phase will generally occur as follows:

1. Preconstruction meeting.
2. Install Erosion and Sediment Controls.
3. Construction activities.
4. Stabilize area.
5. Remove Erosion and Sediment Controls.

In order to give the contractor the maximum amount of flexibility, the plans show locations of perimeter erosion control barriers. It is the contractor's responsibility to provide additional controls within the project limits to prevent the removal and transportation of sediment off site and to resource areas. In accordance with ConnDOT Form 816 Best Management Practices (Section 1.10.03 – Water Pollution Control), no construction shall proceed until (i) the Contractor has submitted in writing to the Engineer its erosion and sedimentation control plan (for each phase); (ii) the Engineer has given in writing his approval of said plans; and (iii) the Contractor has installed all erosion and sedimentation controls called for by said plans.

If the construction sequencing activities create an area of disturbance between two (2) acres and five (5) acres per each discharge point, the contractor must submit to the engineer a revised SWPCP for review and approval. The SWPCP must include locations of the temporary sedimentation trap installed prior to each discharge point with a capacity to contain 134 cubic yards per acre of material in accordance with the 2002 Guidelines. The contractor shall provide

an inspection and maintenance plan for the temporary sedimentation trap as part of the amended SWPCP.

The tentative schedule proposed by ConnDOT for the reconstruction of route 31 is provided as follows:

1. Relocation and flattening of the sharp curve: June – November, 2015
2. Installation of utility infrastructure: July 2015 – May 2016
3. Roadway Reconstruction: May – August, 2016
4. Sidewalk and streetscape construction: July – September, 2016
5. Installation of Parking Lots: July – September, 2016
6. Painting, signing, landscaping, finish-work: August – October, 2016

The total project construction schedule is set from May, 2015 through November, 2016; approximately 76 weeks.

## **5.0 STORMWATER CONTROL MEASURES**

Per the General Permit, this SWPCP must address interim and permanent stabilization practices to address pollution caused by soil erosion and sedimentation during construction, and soil erosion and sedimentation following construction. The project's erosion and sedimentation controls and stormwater management systems have been designed to address both short-term and long-term stormwater quality.

The project's Erosion and Sediment Control Plans include many of the measures indicated below. However, the measures specified on the plans are the minimum requirements for erosion and sediment control at the project, and are shown in general size and location only. All contractors performing site work on the project, construction managers who may engage contractors on the project, and other contractor entities who may have authority over erosion and sedimentation control measures at the project are responsible for ensuring that all measures are configured and constructed in a manner that will minimize erosion of soils and prevent the transport of sediments and other pollutants to any resource areas. In general terms, all entities performing work on the site have a responsibility to minimize the area of exposed soil, control run-off rate and direction, and provide for rapid stabilization of exposed areas.

### **5.1 Erosion and Sediment Controls**

During construction, stormwater run-off is a concern due to the excess amount of exposed areas that do not have vegetation or other cover to prevent the removal and transportation of sediment to resource areas. The primary function of erosion and sedimentation controls, as defined by the 2002 "Connecticut Guidelines for Soil Erosion and Sediment Control" (hereinafter the "2002 Guidelines") is to, "absorb erosional energies and reduce run-off velocities that force the detachment and transport of soil and/or encourage the deposition of eroded soil particles before they reach any sensitive area." The project addresses the short-term concerns by providing erosion control measures in the form of Erosion and Sediment Control Plans (refer to Attachment 2). The proposed erosion and sedimentation controls consider the specific characteristics of the site and the anticipated construction activities, and have been designed in accordance with the 2002 Guidelines.

#### **5.1.1 Soil Stabilization and Protection**

##### **5.1.1.1 Erosion Control Barriers**

*Reference: Section 5-11 of the 2002 Guidelines*

Prior to any construction activity, hay bales, silt fence, or combination hay bale/silt fence barriers will be placed at the limit of work where run-off potential exists, at other key locations within the site where run-off potential exists, and around stockpiles or stockpile areas. These barriers will be inspected once every seven calendar days and within 24 hours after every rainfall generating a discharge. Repair or replace damage or displaced fencing as required. Collected silt will be removed when one-half the barrier height is reached.

### Haybales

Use hay bales for the following:

- To intercept and detain small amounts of sediment from small disturbed areas.
- To decrease the velocity of sheet flows.
- To redirect small volumes of water away from erodible soils.
- To settle and assist in filtering waters discharged from pumping operations.

Applicability-

- Below small disturbed areas where the drainage area (disturbed and undisturbed) is less than 1 acre in size.
- Above disturbed slopes to direct surface water away from erodible areas where the drainage area (disturbed and undisturbed) is less than 1 acre in size.
- Where protection and effectiveness is required for less than 3 months.
- Where sedimentation will reduce the capacity of storm drainage systems or adversely affect adjacent areas, watercourses and other sensitive areas.
- Not for use in drainageways, except in special cases where it is applied with other measures.
- Not intended for use in streams.

### Silt Fence

Use silt fence for the following:

- To intercept and retain sediment from disturbed areas.
- To decrease the velocity of sheet flows and low volume concentrated flows.

Applicability-

- Below small disturbed areas where the contributing drainage area (disturbed and undisturbed) is less than 1 acre in size.
- At storm water drainage inlets and catch basins where sedimentation will reduce the capacity of storm drainage systems or adversely affect adjacent areas, watercourses and other sensitive areas.
- Not for use in areas where rock, frozen ground or other hard surface prevents proper installation of the barrier.
- Prohibited from use in drainageways whose flow is supported by ground water discharge.

5.1.1.2 Temporary Seeding

*Reference: Section 5-3-2 of the 2002 Guidelines*

Areas that will remain disturbed but inactive for at least thirty days will receive temporary seeding or soil protection within seven (7) days in accordance with the 2002 Guidelines. Areas that will remain disturbed beyond the seeding season as identified in the 2002 Guidelines, will receive long-term, non-vegetative stabilization and protection (see below) sufficient to protect the site through the winter. In all cases, stabilization and protection measures shall be implemented as soon as possible in accordance with the 2002 Guidelines or as approved by DEEP.

It is important to note that temporary seeding will not provide the same level of protection that permanent vegetation will provide. Temporary seeding mixtures do not develop a “turf” or “sod.” Temporary seeding does not generally receive the same level of maintenance as permanent seeding.

Temporary seeding will be conducted per the table below:

**Temporary Erosion Control Seeding**

Species (Note 1)	Application Rate, Pounds Per Acre	Application rate, Pounds Per 1,000 sf	Optimum Seed Depth, inches (Note 2)	Optimum Seeding Dates (Note 3)
Annual ryegrass <i>Lolium multiflorum</i>	40	1.00	0.5	3/1 - 6/15 and 8/1 - 10/15
Perennial ryegrass <i>Lolium perenne</i>	40	1.00	0.5	3/15 - 7/1 and 8/1 - 10/15
Winter Rye <i>Secale cereale</i>	120	3.00	1.00	4/5 - 7/1 and 8/15 - 10/15
Oats <i>Avena sativa</i>	86	2	1	3/1 - 6/15 and 8/1 - 9/15
Winter Wheat <i>Triticum aestivum</i>	120	3	1	4/15 - 7/1 and 8/15 - 10/15
Millet <i>Echinochloa crusgalli</i>	20	.5	1	5/15 - 7/15
Sudangrass <i>Sorghum sudanese</i>	30	.7	1	5/15 - 8/1
Buckwheat <i>Fagopyrum esculentum</i>	15	.4	1	4/1 - 9/15
Weeping lovegrass <i>Eragostis curvula</i>	5	.2	.25	6/1 - 7/1
ConnDOT All Purpose Mix	150	3.4	.5	3/1 - 6/15 and 8/1 - 10/15

1 - Listed species may be used in combinations to obtain a broader time spectrum. If used in combinations, reduce each species planting rate by 20% of that listed.

2 - Seed at twice the indicated depth for sandy soils

3 - May be planted throughout summer if soil moisture is adequate or can be irrigated. Fall seeding may be extended 15 days in the coastal towns.

### 5.1.1.3 Soil Stabilization- Mulches

*Reference: Section 5-4-8 of the 2002 Guidelines*

Structural (non-living) soil stabilization is intended to protect the soil surface on a temporary basis without the intention of promoting plant growth.

#### Applicability-

- When grading of the disturbed area will be suspended for a period of 30 or more consecutive days, but less than 5 months, disturbed areas will be stabilized within 7 days of the suspension of grading through the use of mulch, non-bituminous tackifiers, erosion control netting, or other approved materials appropriate for use as a temporary soil protector.
- For surfaces that are not to be reworked within 5 months but will be reworked within 1 year, use temporary seeding, seeding-type mulch (hay, straw, or cellulose fiber) or when slopes are less than 3:1, wood chips, bark chips or shredded bark.

#### Mulch Types-

Hay - The dried stems and leafy parts of plants cut and harvested, such as alfalfa, clovers, other forage legumes and the finer stemmed, leafy grasses. The average stem length should not be less than 4 inches. Hay that can be windblown should be anchored to hold it in place.

Straw - Cut and dried stems of herbaceous plants, such as wheat, barley, cereal rye, or brome. The average stem length should not be less than 4 inches. Straw that can be windblown should be anchored to hold it in place.

Wood Chips - Chipped wood material from logs, stumps, brush or trimmings including bark, stems and leaves having a general maximum size of 0.5 inch by 2 inches and free of excessively fine or long stringy particles as well as stones, soil and other debris. No anchoring is required. If seeding is performed where wood chips have been previously applied, prior to the seeding the wood chips should be removed or tilled into the ground and additional nitrogen applied. Nitrogen application rate is determined by soil test at time of seeding (anticipate 12 lbs. nitrogen per ton of wood chips).

Bark Chips, Shredded Bark - Tree bark shredded as a by-product of timber processing having a general maximum size of 4 inches and free of excessively fine or long stringy particles as well as stone and other debris. Material use is the same as wood chips.

Other Mulch Materials - Other mulch materials may include corn stalks, leaves and other similar materials provided they meet the requirements of the materials in Section 5-4 of the 2002 Guidelines.

#### 5.1.1.4 Soil Stabilization - Blankets/Mats

*Reference: Section 5-4-10 of the 2002 Guidelines*

Erosion control blankets/mats are a manufactured product composed of biodegradable/photodegradable natural or polymer fibers and/or filaments that have been mechanically, structurally or chemically bound together to form a continuous matrix. Their purpose is to provide temporary surface protection to newly seeded and/or disturbed soils to absorb raindrop impact and to reduce sheet and rill erosion and to enhance the establishment of vegetation.

Applicability-

- On disturbed soils where slopes are 2:1 or flatter.
- Where wind and traffic generated air flow may dislodge standard, unarmored mulches.

The success of temporary erosion control blankets is dependent upon strict adherence to the manufacturer's installation recommendations. As such, a final inspection should be planned to ensure that the lap joints are secure, all edges are properly anchored and all staking/stapling patterns follow the manufacturer's recommendations. Inspect temporary erosion control blankets at least once a week and within 24 hours of the end of a storm with a rainfall amount of 0.5 inch or greater for failures. Blanket failure has occurred when (1) soils and/or seed have washed away from beneath the blanket and the soil surface can be expected to continue to erode at an accelerated rate, and/or (2) the blanket has become dislodged from the soil surface or is torn. If washouts or breakouts occur, re-install the blanket after re-grading and re-seeding, ensuring that blanket installation still meets design specifications. When repetitive failures occur at the same location, review conditions and limitations for use and determine if diversions, stone check dams or other measures are needed to reduce failure rate. Repair any dislodged or failed blankets immediately.

#### 5.1.1.5 Temporary Filter Inserts

Temporary Filter Inserts are commercially-available geotextile-fabric filters that are configured to fit into the openings of drainage structures. These filters serve as secondary protective measures to trap (filter) sediment that may bypass other control measures and be carried to drainage structure inlets by stormwater run-off during construction. Temporary Filter Inserts will be installed in catch basins and similar drainage structures as secondary protective measures throughout construction. Temporary Filter Inserts will be placed in each existing catch basin and yard drains prior to the start of construction, and in each new catch basin or yard drain during construction. These devices will be removed upon final site stabilization.

Filter inserts will be inspected once every seven (7) calendar days and within 24 hours after every rainfall of 0.5 inches or greater. Replacement of the inserts will be as often as necessary to maintain function of the drainage structure and prevent excessive ponding due to clogged fabric. Ripped or otherwise damaged inserts will be replaced immediately.

#### 5.1.1.6 Stockpile Management

*Reference: Section 4-9 of the 2002 Guidelines*

Stockpile management of topsoil and other types of erodible soils is necessary to prevent unnecessary damage resulting from erosion of stockpile material. Locate stockpiles so that natural drainage is not obstructed. Attempt to maximize the distance of stockpiles from wetlands, watercourses, drainage ways, and steep slopes. When the stockpile is down gradient from a long slope, divert run-off water away from or around the stockpile. Install a geotextile silt fence or hay bale barrier around the stockpile area approximately 10 feet from the proposed toe of the slope. The side slopes of stockpiled material that is erodible should be no steeper than 2:1. Stockpiles that are not to be used within 30 days need to be seeded and mulched immediately after formation of the stockpile. The seed mix used depends upon the stockpiled material and the length of time it is to remain stockpiled. Information gathered from soil borings and soil delineation can be used to plan the type of seed and any soil amendments that are appropriate for the stockpile. After the stockpile has been removed, the site should be graded and permanently stabilized.

Topsoil stockpiles which will be idle for at least 30 days will be stabilized with temporary seed and mulch no later than 7 days from the last use. Small stockpiles may be covered with impervious tarps or erosion control matting in lieu of seeding and mulching.

#### 5.1.2 Structural Measures

Structural measures are intended to 1) divert flows away from exposed soils, and 2) store flows or otherwise limit runoff and minimize the discharge of pollutants from the site. Unless otherwise specifically approved in writing by DEEP, or if otherwise authorized by another state or federal permit, structural measures shall be installed on upland soils.

Diversion measures include Temporary Fill Berm, Water Bar, Temporary Diversion and Permanent Diversion. These measures serve the common function of redirecting and controlling the direction of water flow. Diversions are used to direct runoff away from or around sensitive construction areas and to fragment drainage areas to reduce the need for a Temporary Sediment Trap. Diversions are preferable to other types of man-made storm water conveyance systems because they more closely simulate natural flow patterns and characteristics. Flow velocities are generally kept to a minimum.

Storage measures include Temporary Sediment Traps. The primary function of these measures is to slow the velocity of sediment laden waters enough to allow suspended sediments to drop out of solution. They are intended to provide 75% –90% trap efficiency<sup>1</sup> for a 10 year, 2 hour return frequency storm.

Evolving site conditions will determine what structural measures are necessary, and the following general principles should be applied to their selection and placement:

- Prevent clean water from becoming turbid, by diverting runoff from upslope areas away from disturbed areas. Earth dikes, temporary swales, perimeter dike/swales, or diversions that outlet in stable areas can be used in this capacity.
- Remove sediment from turbid water before the water leaves the site. The method of sediment removal depends upon how the water drains from the site.

Concentrated flow must be diverted to a trapping device so that suspended sediment can be deposited. Dikes or swales that outlet into traps or basins can accomplish this. A storm drain system may be used to convey concentrated sediment laden water only if the system empties into a trap or basin. Otherwise, all storm drain inlets must be protected so that sediment laden water cannot enter the drainage system before being treated to remove the sediment.

- Surface runoff draining in sheet flow must be controlled and treated before the water leaves the site. Straw bale dikes, silt fences, or vegetative buffer strips can be used to treat sheet flow.
- All practices designed and implemented must be properly maintained in order to remain functional. Sediment accumulated in basins and traps must be removed and disposed of in a manner that stabilizes them on the construction site.

#### 5.1.2.1 Diversion - Temporary Fill Berm

*Reference: Section 5-7-3 of the 2002 Guidelines*

The Temporary Fill Berm is a non-engineered measure that is a very temporary berm used at the top of active fill slopes whose drainage area at the point of discharge is less than 3 acres. It is intended to divert run-off from unprotected fill slopes during construction to a stabilized outlet or sediment-trapping facility. Its intended duration of use is less than 5 days for any specific fill berm. The use of a berm starts when it is constructed and ends when new fill is placed. When filling is complete and it is determined that a diversion is needed at the top of fill to protect the fill until it is stabilized then a Temporary Diversion is needed.

Applicability-

- On active earth fill slopes where the drainage area at the top of fill drains toward the exposed slope and where ongoing fill operations make the use of a Permanent Diversion unfeasible.
- Where the intended use is 5 days or less. For use longer than 5 days use Temporary Diversion or other measure.
- Where the drainage area at the point of discharge is less than 3 acres.

#### 5.1.2.2 Diversion - Water Bar

*Reference: Section 5-7-6 of the 2002 Guidelines*

A Water Bar is a channel with a supporting berm on the down slope side constructed across an unpaved roadway, construction access road, driveway, or other access way. Its purpose is to minimize the concentration of sheet flow across and down sloping roadways and access ways, or similar sloping and unstable areas and to shorten the continuous flow length within a sloping right-of-way. Water bar spacing is provided in Table 2

% Slope of Roadway	Spacing (ft)
1%	400
2%	245
5%	125
10%	78
15%	58

Applicability-

- On construction access road, driveway, log road or other access way.
- Where the drainage area to each separate water bar is less than 1 acre.

Unless the water bar discharges into a heavily vegetated area of sufficient length to adequately filter run-off, discharges should be settled or filtered through a geotextile silt fence, hay bale barrier or temporary sediment trap.

5.1.2.3 Temporary Diversion

*Reference: Section 5-7-9 of the 2002 Guidelines*

Temporary diversion is used to divert sheet flow to a stabilized outlet or a sediment-trapping facility, to direct water originating from undisturbed areas away from areas where construction activities are taking place, and to fragment disturbed areas thereby reducing the velocity and concentration of run-off. When used at the top of a slope, the structure protects exposed slopes by directing run-off away from the disturbed areas. When used at the base of a disturbed slope, the structure protects adjacent and downstream areas by diverting sediment-laden run-off to a sediment trapping facility. Temporary diversions must be installed as a first step in the land-disturbing activity and must be functional prior to disturbing the land they are intended to protect.

Applicability-

- Where the drainage area at the point of discharge is 5 acres or less. For drainage areas greater than 5 acres use Permanent Diversion measure.
- Where the intended use is 1 year or less. For uses greater than 1 year use Permanent Diversion measure.

5.1.2.4 Storage - Temporary Sediment Traps

*Reference: Section 5-11-25 of the 2002 Guidelines*

Temporary Sediment Traps are temporary ponding areas with a stone or engineered outlet formed by excavation and/or construction of an earthen embankment. They are intended to detain sediment-laden run-off from small disturbed areas long enough to allow a majority of the sediment to settle out. If included in the project's erosion and sedimentation control plans, or required based on evolving site conditions, the sizing and location of Temporary Sediment Traps will be completed in conjunction with the project civil engineer.

#### Applicability-

- If the construction sequencing activities create an area of disturbance between two (2) acres and five (5) acres per each discharge point, the contractor must submit to the engineer a revised SWPCP for review and approval. The SWPCP must include locations of the temporary sedimentation trap installed prior to each discharge point with a capacity to contain 134 cubic yards per acre of material in accordance with the 2002 Guidelines. The contractor shall provide an inspection and maintenance plan for the temporary sedimentation trap as part of the amended SWPCP.
- Where the intended use is 2 years or less.
- When diverting sediment-laden water with temporary diversions that meet the above limitations for use.

#### Maintenance-

Inspect temporary sediment traps at least once a week and within 24 hours of the end of a storm with a rainfall amount of 0.5 inch or greater. Check the outlet to ensure that it is structurally sound and has not been damaged by erosion or construction equipment. The height of the stone outlet should be maintained at least 1 foot below the crest of the embankment. Also check for sediment accumulation and filtration performance. When sediments have accumulated to one half the minimum required volume of the wet storage, dewater the trap as needed, remove sediments and restore the trap to its original dimensions. Dispose of the sediment removed from the basin in a suitable area and in such a manner that it will not erode and cause sedimentation problems. The temporary sediment trap may be removed after the contributing drainage area is stabilized. If it is to be removed, refer to the project plans for how the site of the temporary sediment trap is to be graded and stabilized after removal.

## 5.2 Dewatering

*Reference: Form 816, Section 1.10, as amended*

Dewatering may be utilized at the site to lower the groundwater table to allow for the construction of subsurface improvements (utilities, foundations, etc.) within a relatively dry environment. Several dewatering techniques may be utilized at the contractor's discretion based on the specific nature of the work. These may include:

- Sumps
- Wells
- Wellpoints

Dewatering wastewaters shall be managed in accordance with the 2002 Guidelines. Where feasible and appropriate, dewatering wastewaters will be infiltrated into the ground. Dewatering wastewaters discharged to surface waters will be discharged in a manner that minimizes the discoloration of the receiving waters. No discharge of dewatering wastewater(s) shall contain or cause a visible oil sheen, floating solids, or foaming in the receiving water. Unless otherwise specifically approved in writing by DEEP, or if otherwise authorized by another state or federal permit, dewatering measures shall be installed on upland soils.

The following measures will be employed to ensure that dewatering wastewaters will not cause scouring or erosion or contain suspended solids in amounts that could reasonably be expected to cause pollution:

- Divert surface waters away from areas needing dewatering.
- Consider if well points and sumps can be used to lower the groundwater table, reducing the need for settling facilities.
- For sites that don't require continuous pumping, pump work areas before construction activities begin each work day.
- Provide filtration near the suction intake.
- Locate pumps, intake sumps, and other intake structures in areas which will not require constant moving, when possible.
- Locate pump discharge facilities (portable, permanent, or bio-filtering structures) such that a minimum disturbance of existing wetlands and watercourses is incurred.
- Provide protection at outlets from pumping operations to dissipate pumping surges and prevent erosion at the point of discharge.

### 5.2.1 Dewatering Plan

This SWPCP provides general measures for the management of dewatering wastewater based on the measures indicated in the 2002 Guidelines. It is recognized that the use of these measures is dependent upon specific site conditions, the contractor's specific method of operations, and the contractor's dewatering equipment. As this plan provides a general description of dewatering operations, the contractor will be required to submit a project-specific Dewatering Plan. This Dewatering Plan will be submitted to the engineer for review and approval prior to its implementation. The project-specific Dewatering Plan will, at a minimum, identify the following:

1. Locations and associated construction where dewatering is required.
2. Specific methods and devices proposed for dewatering.
3. Details on protection at the inlet and outlet of pumps, method for floating the pump intake, or other methods to minimize and retain the sediment.
4. Proposed location of dewatering discharge and details of infiltration basins or other discharge location. Per the General Permit, where feasible and appropriate, dewatering wastewaters will be infiltrated into the ground.
4. Details on any containment berm construction when dewatering earth materials.
5. Identification of a contingency plan for emergency operations should the dewatering operation prove inadequate to meet the dewatering need or is found to be causing unacceptable turbidity problems (e.g., alternative discharge locations or use of a portable sediment tank). If turbidity or siltation problems are not adequately controlled by the contingency plan, then the operation will be ceased and a revised dewatering plan submitted for approval prior to further implementation.

### **5.3 Post Construction Stormwater Management**

After construction, stormwater runoff is a concern because it may contain contaminants such as suspended solids, petroleum hydrocarbons, nutrients, heavy metals, and salts that may have adverse effects on water quality. The sources of the pollutants are generally associated with urban land use, including automobile exhaust, mechanical wear of vehicles, leaf litter, deicing salts and atmospheric deposition. The pollutants accumulate on the land surfaces and are washed off during storm events into the receiving waterways and wetlands. The objective of the stormwater management system designed for the proposed development is to mitigate, to the most thorough extent possible, suspended solids and floatables (i.e. oil and grease, other floatable liquids, floatable solids, trash, etc.) from stormwater.

Currently, there is no water quality treatment for this portion of Route 31. The existing drainage and outfall protection is inadequate and stormwater is discharged directly to resource areas via leak offs for a portion of the roadway. The proposed design provides a stormwater treatment train and addresses stormwater quality using the following methods:

- Four (4) foot sumps in proposed catch basins, unless prevented by utility or shallow ledge conflicts.
- Outlet protection (scour holes) at all outfalls

The existing characteristics of the work area for the reconstruction of route 31 consist of greater than 40% impervious cover. However, as part of the reconstruction project, the total effective impervious cover will not be increased. As a result, onsite retention of one half of the water quality volume is not required.

#### **5.3.1 Post Construction Controls:**

##### **5.3.1.1 Runoff Reduction and Low Impact Development (LID) Practices:**

Due to the limited physical space available throughout the work area, runoff reduction and LID practices to provide primary stormwater treatment of the main outlets would have required the filling of wetlands and were not pursued.

#### 5.3.1.2 Suspended Solids and Floatables Removal:

Per the 2000 ConnDOT Drainage Manual, ConnDOT considers the use of 10 or less primary deep sump catch basins to be suitable water quality treatment for a given watershed, and do not require any additional treatment. Four (4) foot sump catch basins shall be installed in all locations, barring any utility or ledge conflicts. All proposed roadway areas are designed to route to the catch basins instead of sheet flowing off site to sensitive areas.

#### 5.3.1.3 Velocity Dissipation

Unlike the existing condition, the proposed design will utilize the installation of outlet protection scour holes and riprap velocity attenuation pads engineered to accept the discharge velocities from the newly installed storm system. Details for these devices are included with the erosion control details in Attachment 2.

#### 5.3.2 Permanent Stabilization Practices

Permanent site stabilization practices are included on the drawings in Attachment 2 and include the following:

- **Hardscape** – The majority of the site is hardscape. Hardscape will include reconstructed bituminous pavement roadways, driveways, concrete sidewalks and walkways, and concrete stairs/ramps. Stormwater from these areas will either 1) run-off to an adjacent pervious surface (e.g. grass or landscaping), or 2) run-off to a collection point such as catch basin or area drain, and be conveyed to the roadway stormwater system.
- **Landscaping/Turf Establishment Areas** – After reconstruction of the roadway, several areas of the site will be landscaped and planted or replaced with permanent turf establishment. Landscape and turf areas will provide a stabilized surface, but will allow for direct infiltration of stormwater.

#### 5.3.3 Maintenance of Permanent Stabilization

After construction is completed and accepted by the State, inspection and maintenance of stabilized surfaces will be the responsibility of the State thereafter.

- **Landscape and Turf Areas**: Inspect semi-annually for erosion or dying vegetation. Repair and stabilize any bare or eroded areas and replace vegetation as soon as possible.
- **Hardscape**: Inspect on a regular basis not to exceed weekly for litter and debris. Sweep at least twice a year, with the first occurring as soon as possible after snowmelt and the second not less than 90 days following the first.
- **Catch Basin Sumps**: Inspect semi-annually and clean when the sump is one half full of silt and/or debris.

## 6.0 OTHER POLLUTION CONTROLS

### 6.1 Waste Disposal

6.1.1 Waste Materials - All waste materials generated at the site will be collected and stored in securely lidded, metal dumpsters rented from a licensed solid waste management company. All trash and construction debris from the site will be deposited in the dumpsters. When at capacity, the dumpsters will be removed from the site and transported to a state-licensed waste transfer or waste disposal facility. No construction waste materials will be burned, buried, or otherwise disposed-of on-site.

All personnel will be instructed regarding the correct procedure for waste disposal. Notices stating these practices will be posted in the office trailer and a competent person will be assigned day-to-day operation responsibilities.

6.1.2 Recycling – Waste materials generated at the site that are designated for recycling will be collected and stored in securely lidded, metal dumpsters rented from a licensed solid waste management company. Materials designated for recycling will be deposited in the appropriate dumpster based on material type. When at capacity, the dumpsters will be removed from the site and transported to a state-licensed transfer or recycling facility.

6.1.3 Liquid Waste Materials - The dumping of liquid wastes in storm sewers is prohibited. All liquid waste materials generated at the site will be collected and stored in secure containers suitable for the particular type of waste if such liquid waste is not suitable for the “Washout Area” (see below). Containers storing liquid waste will be removed from the site for disposal by a state-licensed company.

6.1.4 Hazardous Materials - All waste materials that are considered “hazardous” such as oils, greases, oil-based paints, solvents, etc. generated by construction will be stored and disposed of in accordance with local, state, and federal regulations. Site personnel must be instructed in the practices of handling, collecting and storage of hazardous materials, and a competent person will be assigned responsibility for seeing that these practices are followed.

6.1.5 Sanitary Waste - All sanitary waste will be collected from portable units on a regular basis as required by applicable regulations.

### 6.2 Washout Areas

A designated “Washout Area” will be established for the purpose of washing the following:

- Latex paint equipment
- Vehicles, containers, and equipment for concrete
- Applicators and containers for materials which have not contained any oils, greases, oil-based paints, solvents, fuels, lubricants, etc.

The Washout Area shall be established as follows:

- (1) Outside of any buffers and at least 50 feet from any stream, wetland or other sensitive resource; or
- (2) In an entirely self-contained washout system.

The Washout Area shall be clearly delineated with fencing, flagging, or similar highly-visible materials. Washout activities are only permitted within the Washout Area. All wash water shall be directed into a container or pit designed such that no overflows can occur during rainfall or after snowmelt. There shall be no surface discharge of washout wastewaters from the Washout Area.

Hardened concrete waste from the Washout Area will be removed and disposed-of consistent with practices developed for the “Waste Materials” above. At least once per week, any containers or pits used for washout will be inspected to ensure structural integrity, adequate holding capacity, and to check for leaks or overflows. If there are signs of leaks, holes or overflows in the containers or pits that could lead to a discharge, the containers will be repaired prior to further use. For concrete washout areas, all hardened concrete waste will be removed whenever the hardened concrete has accumulated to a height of one-half (½) of the container or pit or as necessary to avoid overflows. A record of maintenance and inspections for the Washout Area is included in Appendix C.

### **6.3 Off-Site Vehicle Tracking**

*Reference: Section 5-12 of the 2002 Guidelines*

Stabilized construction entrances (ant-tracking pad) will be used to help reduce the movement of sediments from the site to off-site areas by vehicles. Construction details for these facilities are contained on the project’s Erosion and Sedimentation Control Plans. A stabilized construction entrance will be installed at each primary site access point used by construction equipment.

Stabilized construction entrances will be maintained in a condition which will prevent tracking and washing of sediment onto paved surfaces. Each entrance will be periodically top-dressed with additional stone and/or additional length added as conditions demand.

All sediment spilled, dropped, washed or tracked onto paved surfaces will be immediately removed. Roads adjacent to the site will be left clean at the end of each day. It is also recognized that the use of stabilized construction entrances may not eliminate the need for periodic street sweeping. Therefore, adjacent paved roadways will be swept as necessary.

If the construction entrance is being properly maintained and the action of a vehicle traveling over the stone pad is not sufficient to remove the majority of the sediment, then either (1) the construction entrance will be lengthened, (2) the construction access road surface will be modified, or (3) washing racks (or similar devices) will be installed before the vehicle enters a paved surface. If a washing rack or similar device is to be used to wash sediment from tires, provisions will be employed to intercept the wash water and trap the sediment before it is carried off-site. Per the 2002 Guidelines, the sediment trapping facility will be sized to hold the maximum volume of water that would be used over a 2-hour period.

## **6.4 Dust Control**

The generation of fugitive dust will be minimized during all aspects of the work, and measures to suppress fugitive dust will be employed when work activities are conducted which could generate dust. Construction sequencing will be organized and conducted to the extent possible to leave existing pavement or ground coverings in place until just prior to earth excavation for the purpose of minimizing the migration of dust beyond the project limits into the surrounding area. If the amount of fugitive dust and/or particulate generated during the work is deemed unacceptable or exceeds baseline project site conditions the work will be halted and corrective measures implemented. Dust control and suppression will be implemented as follows:

### **6.4.1 Water**

Water will be applied only at the locations, at such times, and in the amount required to control and suppress dust. The volume of water sprayed for controlling dust shall be minimized so as to prevent the runoff of water. No discharge of dust control water shall contain or cause a visible oil sheen, floating solids, visible discoloration, or foaming in the receiving stream.

### **6.4.2 Calcium Chloride**

Calcium chloride will be applied only at the locations, times, and in the amount approved by the owner (as Permittee). The application of calcium chloride will be by means of a mechanical spreader, or other approved methods.

### **6.4.3 Mulch**

The use of mulch for dust control will be coordinated with erosion and sedimentation control measures. Straw mulch will be applied at a rate of 100 pounds per 1,000 square feet (100 lb/1,000 ft<sup>2</sup>). Wood chips or wood mulch will be applied at such a rate as to form a layer one (1) inch thick.

## **6.5 Spill Prevention**

### **6.5.1 Potential Stormwater Pollution Sources**

During construction, the following are potential sources of pollutants that could impact stormwater:

- Cleared and disturbed grassed/planted areas;
- Pavement and utility removal;
- Construction site entrances and bituminous access drive lot construction;
- Foundation excavation and building construction.
- Topsoil and mulch installation;
- Dewatering operations;
- Final grading and landscaping.

### 6.5.2 Good Housekeeping

The following good housekeeping practices will be followed on-site during the project:

- An effort will be made to store only enough products required to perform the work.
- All materials stored on-site will be stored in a neat, orderly manner in their appropriate containers and, if possible, under a roof or other enclosure.
- Products will be kept in their original containers with the original manufacturer's label.
- Substances will not be mixed with one another unless recommended by the manufacturer.
- Whenever possible, all of a product will be used up before disposing of the container and opening a new container.
- Manufacturers' recommendations for proper use and disposal will be followed.
- The Construction Manager and/or site superintendent will inspect daily to ensure proper use and disposal of materials on-site.
- Dumpsters will be kept covered and drain plugs will remain in place unless being cleaned.
- Products will be kept in original containers unless they are not re-sealable. Leftover product will be properly disposed of or placed in a sealable container.
- Original labels and material safety data will be retained as they contain important product information.
- If surplus product must be disposed of, manufacturers' or local and State recommended methods for proper disposal will be followed.

### 6.5.3 Product Specific Practices

The following product specific practices will be followed on-site:

- Chemical and Petroleum Product Storage - All chemical and petroleum product containers stored on the site (excluding those contained within vehicles and equipment) will be stored in tightly sealed containers that are clearly labeled. All chemical and petroleum product containers will be provided with impermeable containment which will hold at least 110% of the volume of the largest container, or 10% of the total volume of all containers in the area, whichever is larger, without overflow from the containment area. All chemicals and their containers will be stored under a roofed area except for those chemicals stored in containers of 100 gallon capacity or more, in which case a roof is not required. Double-walled tanks satisfy this requirement.
- Petroleum Products - All on-site construction vehicles will be monitored for leaks and receive regular preventive maintenance to reduce the chance of leakage. Any asphalt substances used on-site will be applied according to the manufacturer's recommendations. Spill kits will be included with any fueling sources and maintenance activities.

- Fertilizers - Fertilizers used will be applied only in the minimum amounts recommended by the manufacturer. Once applied, fertilizer will be worked into the soil to limit exposure to stormwater. Fertilizer will not be stored on site.
- Paints - All containers will be tightly sealed and stored when not required for use. Excess paint will not be discharged to the storm sewer system, but will be properly disposed of according to manufacturers' instructions or State and local regulations. Spray guns will be cleaned on a removable tarp.

#### 6.5.4 Spill Control Practices

In addition to the good housekeeping and material management practices discussed in the previous sections of this plan, the following practices will be followed for spill prevention and cleanup:

- Manufacturer's recommended methods for spill cleanup will be clearly posted and site personnel will be made aware of the procedures and the location of the information.
- Materials and equipment necessary for spill cleanup will be kept in the designated material storage areas on-site. Equipment and materials will include, but not be limited to, brooms, dustpans, mops, rags, gloves, goggles, kitty litter, sand, sawdust, Speedi-Dry and plastic and metal trash containers specifically made for this purpose.
- All spills will be cleaned up immediately after discovery.
- The spill area will be kept well ventilated and personnel will wear appropriate protective clothing to prevent injury from contact with a hazardous substance.
- Spills of toxic or hazardous materials will be reported to the appropriate State and/or local government agency, regardless of the size. The National Response Center number is 800-424-8802. The CT DEEP Emergency Reporting number is 800-424-3333.
- The site construction superintendent will be responsible for the day-to-day operations, and act as the person responsible for spill prevention and cleanup. The names of responsible construction spill containment and cleanup personnel will be posted in the material storage area and in the office trailer on-site.

### 6.6 Post-Construction Cleaning

All post-construction stormwater structures will be cleaned of construction sediment and any remaining silt fence shall be removed upon stabilization of the site, prior to filing notice of termination.

## 7.0 INSPECTION AND MONITORING

Throughout all phases of construction, the erosion control measures will be routinely inspected, cleaned, repaired, and replaced as necessary. Maintenance of erosion and sedimentation control measures is critical to their effectiveness. Maintenance will be an ongoing process during the period of construction and will continue until long-term vegetation is established. Mulching and seeding will be inspected throughout all phases of construction: at the end of each workday, if precipitation is forecast and after each rainfall. At the end of each workweek, prior to weekends, all erosion and sediment control measures will be inspected and repairs/replacements made as required.

Throughout the construction process, extra stocks of hay bales and filter fabric will be kept on-site to replace those that may become damaged and/or deteriorated.

Any erosion and sediment control measures, which upon inspection, are found to be damaged, deteriorated, or not functioning properly, will be repaired, replaced and corrected immediately after inspection.

Inspection procedures will be addressed and implemented in the following manner:

### 7.1 Plan Implementation Inspections

Within the first 30 days following commencement of construction activity on the site, a representative of the Permittee will inspect the site. The Permittee's representative for Plan Implementation Inspections is:

ConnDOT District 1 Construction Office  
1107 Cromwell Avenue  
Rocky Hill, CT 06067

The Permittee's representative will inspect the site at least once and no more than three times during the first 90 days of commencement of the construction activity to confirm compliance with the General Permit and proper initial implementation of all control measures designated in this SWPCP for the site for the initial phase of construction.

### 7.2 Routine Inspections

The Permittee will routinely inspect the site for compliance with the General Permit and this SWPCP for the site until a Notice of Termination has been submitted. Inspection procedures for these Routine Inspections will be addressed and implemented in the following manner.

#### 7.2.1 Qualified Inspector

The Permittee will retain a Qualified Inspector meeting the following definition:

*“an individual possessing either (1) a professional license or certification by a professional organization recognized by the commissioner related to agronomy, civil engineering, landscape architecture, soil science, and two years of demonstrable and focused experience in erosion and sediment control plan reading, installation, inspection and/or report writing for residential and commercial construction projects in accordance with the Guidelines; or (2) five years of demonstrable and focused experience in erosion and sediment control plan reading, installation, inspection and/or report writing for residential and*

*commercial construction projects in accordance with the Guidelines; or (3) certification by the Connecticut Department of Transportation (DOT)”.*

The Permittee’s Qualified Inspector will be an individual(s) from:

ConnDOT District 1 Construction Office  
1107 Cromwell Avenue  
Rocky Hill, CT 06067

#### 7.2.2 Rainfall Measurement

The Permittee will maintain a rain gauge on-site to document rainfall amounts.

#### 7.2.3 Inspection Criteria

At least once a week and within 24 hours of the end of a storm that generates a discharge, the Qualified Inspector, will inspect, at a minimum, the following:

- Disturbed areas of the construction activity that have not been finally stabilized.
- All erosion and sedimentation control measures.
- All structural control measures.
- Soil stockpile areas.
- Washout Areas.
- Locations where vehicles enter or exit the site.

For storms that end on a weekend, holiday or other time after which normal working hours will not commence within 24 hours, an inspection is required within 24 hours only for storms that equal or exceed 0.5 inches. For storms of less than 0.5 inches, an inspection will occur immediately upon the start of the subsequent normal working hours. Where sites have been temporarily or finally stabilized, inspections will be conducted at least once every month for three months.

The areas noted above will be inspected for evidence of, or the potential for, pollutants entering the drainage system and impacts to the receiving waters. Locations where vehicles enter or exit the site will also be inspected for evidence of off-site sediment tracking. Where sites have been temporarily or finally stabilized, such inspection will be conducted at least once every month for three months.

The Qualified Inspector will evaluate the effectiveness of erosion and sediment controls, structural controls, stabilization practices, and any other controls implemented to prevent pollution and determine if it is necessary to install, maintain, or repair such controls and/or practices to improve the quality of stormwater discharge(s).

#### 7.2.4 Inspection Report

Following each inspection, the Qualified Inspector will prepare a report that will summarize the following:

- The scope of the inspection.
- Name(s) and qualifications of personnel making the inspection.
- The date(s) of the inspection.
- Weather conditions including precipitation information.
- Major observations relating to erosion and sediment controls and the implementation of the SWPCP.
- A description of the stormwater discharge(s) from the site.
- Any water quality monitoring performed during the inspection.

Report forms are included in Appendix A. The report will be signed by the Permittee or his authorized representative. Reports will be retained as part of the SWPCP.

The report will include a statement that, in the judgment of the Qualified Inspector(s) conducting the Routine Inspection, the site is either in compliance or out of compliance with the terms and conditions of this SWPCP and General Permit. If the site inspection indicates that the site is out of compliance, the inspection report will include a summary of the remedial actions required to bring the site back into compliance. Non-engineered corrective actions (as identified in the 2002 Guidelines) will be implemented on site within 24 hours and incorporated into a revised SWPCP within three (3) calendar days of the date of inspection unless another schedule is specified in the 2002 Guidelines. Engineered corrective actions (as identified in the 2002 Guidelines) shall be implemented on site within seven (7) days and incorporated into a revised SWPCP within ten (10) days of the date of inspection, unless another schedule is specified in the 2002 Guidelines or is approved by DEEP. During the period in which any corrective actions are being developed and have not yet been fully implemented, interim measures will be implemented to minimize the potential for the discharge of pollutants from the site.

Inspectors from DEEP may inspect the site for compliance with the General Permit at any time construction activities are ongoing and upon completion of construction activities to verify the final stabilization of the site and/or the installation of post-construction stormwater management measures.

#### 7.2.5 Turbidity Monitoring

The Permittee via the Qualified Inspector, will perform turbidity monitoring at each of the 3 “Main Outlet” locations indicated on the registration and in accordance with the following:

##### Monitoring Frequency

- Sampling will be conducted at least once every month, when there is a discharge of stormwater from the site while construction activity is ongoing, until final stabilization of the drainage area associated with each outfall is achieved.

- The Permittee will collect samples during normal working hours, which for this project are Monday through Friday, between the hours of 8:00 am and 5:00 pm.
- If sampling is discontinued due to the end of normal working hours, the Permittee will resume sampling the following morning or the morning of the next working day following a weekend or holiday, as long as the discharge continues.
- Sampling may be temporarily suspended any time conditions exist that may reasonably pose a threat to the safety of the person taking the sample. Such conditions may include high winds, lightning, impinging wave or tidal activity, intense rainfall or other hazardous condition. Once the unsafe condition is no longer present, sampling will resume.
- If there is no stormwater discharge during a month, sampling will not be conducted.

#### Sample Collection

- All samples will be collected from discharges resulting from a storm event that occurs at least 24 hours after any previous storm event generating a stormwater discharge.
- Any sample containing snow or ice melt must be identified on the Stormwater Monitoring Report form. Sampling of snow or ice melt in the absence of a storm event is not a valid sample.
- Samples shall be grab samples taken at least three separate times during a storm event and shall be representative of the flow and characteristics of the discharge(s). Samples may be taken manually or by an in-situ turbidity probe or other automatic sampling device equipped to take individual turbidity readings (i.e. not composite). The first sample shall be taken within the first hour of stormwater discharge from the site. In cases where samples are collected manually and the discharge begins outside of normal working hours, the first sample shall be taken at the start of normal working hours.

#### Sampling Locations

- Sampling is required of all point source discharges of stormwater from disturbed areas.
- Where there are two or more discharge points that discharge substantially identical runoff, based on similarities of the exposed soils, slope, and type of stormwater controls used, a sample may be taken from just one of the discharge points. In such case, the Permittee will report that the results also apply to the substantially identical discharge point(s).
- No more than 5 substantially identical outfalls may be identified for one representative discharge. If such project is planned to continue for more than one year, the Permittee shall rotate twice per year the location where samples are taken so that a different discharge point is sampled every six months.
- The outfalls authorized by the General Permit are identified on the Erosion and Sedimentation Control Plans.

### Sampling and Analysis

Sampling and turbidity analysis will be conducted in accordance with ASTM D6855. Results will be reported in Nephelometric Turbidity Units (NTU).

### Turbidity Values

The stormwater discharge turbidity value for each sampling point will be determined by taking the average of the turbidity values of all samples taken at that sampling point during a given storm.

#### 7.2.6 Stormwater Monitoring Reports

Within thirty (30) days following the end of each month, the Permittee will submit the stormwater sampling result(s) on the Stormwater Monitoring Report (SMR) form included in Appendix B. If there was no discharge during any given monitoring period, the Permittee will submit the form as required with the words “no discharge” entered in place of the monitoring results. If the Permittee monitors any discharge more frequently than required by the General Permit, the results of this monitoring will be included in additional SMRs for the month in which the samples were collected.

## 8.0 CERTIFICATION

The following Certification Statement applies to this SWPCP. All project participants who are involved with “site” construction (e.g. Construction Manager, General Contractor, Contractor, Subcontractors, etc.) are required to certify to this plan by signing in the space provided. By signing, each project participant certifies the following:

**“I certify under penalty of the law that I have read and understand the terms and conditions of the General Permit for the Discharge of Stormwater and Dewatering Wastewaters from Construction Activities. I understand that as a contractor or subcontractor at the site, I am authorized by this general permit, and must comply with the terms and conditions of this general permit, including, but not limited to, the requirements of the Stormwater Pollution Control Plan prepared for the site.”**

1	<p>_____</p> <p>Signature</p> <p>_____</p> <p>Printed Name</p> <p>_____</p> <p>Date</p>	<p>On behalf of (company):</p> <p>_____</p> <p>Telephone Number:</p> <p>Responsible for (project role):</p>
2	<p>_____</p> <p>Signature</p> <p>_____</p> <p>Printed Name</p> <p>_____</p> <p>Date</p>	<p>On behalf of (company):</p> <p>_____</p> <p>Telephone Number:</p> <p>Responsible for (project role):</p>
3	<p>_____</p> <p>Signature</p> <p>_____</p> <p>Printed Name</p> <p>_____</p> <p>Date</p>	<p>On behalf of (company):</p> <p>_____</p> <p>Telephone Number:</p> <p>Responsible for (project role):</p>

4	<p>_____</p> <p>Signature</p> <p>_____</p> <p>Printed Name</p> <p>_____</p> <p>Date</p>	<p>On behalf of (company):</p> <p>_____</p> <p>Telephone Number:</p> <p>Responsible for (project role):</p>
5	<p>_____</p> <p>Signature</p> <p>_____</p> <p>Printed Name</p> <p>_____</p> <p>Date</p>	<p>On behalf of (company):</p> <p>_____</p> <p>Telephone Number:</p> <p>Responsible for (project role):</p>
6	<p>_____</p> <p>Signature</p> <p>_____</p> <p>Printed Name</p> <p>_____</p> <p>Date</p>	<p>On behalf of (company):</p> <p>_____</p> <p>Telephone Number:</p> <p>Responsible for (project role):</p>
7	<p>_____</p> <p>Signature</p> <p>_____</p> <p>Printed Name</p> <p>_____</p> <p>Date</p>	<p>On behalf of (company):</p> <p>_____</p> <p>Telephone Number:</p> <p>Responsible for (project role):</p>
8	<p>_____</p> <p>Signature</p> <p>_____</p> <p>Printed Name</p> <p>_____</p> <p>Date</p>	<p>On behalf of (company):</p> <p>_____</p> <p>Telephone Number:</p> <p>Responsible for (project role):</p>

**APPENDIX A**  
**Stormwater Monitoring Reports**



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

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

**SITE INFORMATION**

Permittee: \_\_\_\_\_  
 Mailing Address: \_\_\_\_\_  
 Business Phone: \_\_\_\_\_ ext.: \_\_\_\_\_ Fax: \_\_\_\_\_  
 Contact Person: \_\_\_\_\_ Title: \_\_\_\_\_  
 Site Name: \_\_\_\_\_  
 Site Address: \_\_\_\_\_  
 Receiving Water (name, basin): \_\_\_\_\_  
 Stormwater Permit No. GSN \_\_\_\_\_

**SAMPLING INFORMATION (Submit a separate form for each outfall)**

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

**MONITORING RESULTS**

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

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

Avg = \_\_\_\_\_

**STATEMENT OF ACKNOWLEDGMENT**

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

Authorized Official: \_\_\_\_\_  
 Signature: \_\_\_\_\_ Date: \_\_\_\_\_

Please send completed form to:

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

**APPENDIX B**  
**Velocity Dissipation Calculations for Outlet Control Sizing**

FINAL DESIGN DRAINAGE REPORT  
RECONSTRUCTION OF ROUTE 31  
COVENTRY, CT  
STATE PROJECT NO. 32-130

Appendix G  
Outlet Protection Worksheets

**Appendix A – Outlet Protection Form**

**OUTLET PROTECTION**

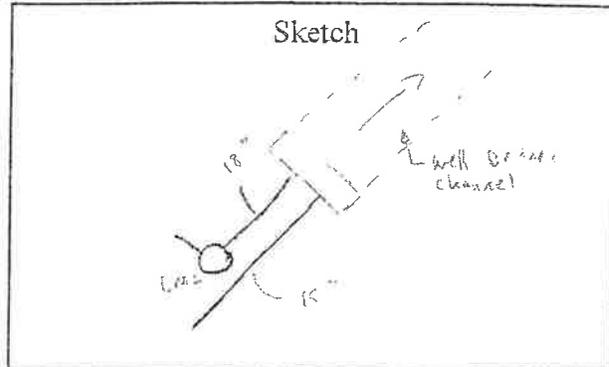
Project No.: 32-130  
 Town: Coventry  
 Route: 31

Designed By: WGW Date: 7/16/08  
 Checked By: JLF Date: 7/16/08  
 Station: STA 17+62 – 27.8 LT

**1. Assess the erosion potential at the outlet and other critical site factors**

Describe the conditions at the outlet location:  
Outlet will consist of (1) endwall with (2) pipes (1-15" brook crossing, 1-18" roadway system with the same invert). A level scour hole will be constructed just upstream of the existing well-defined channel.

- No well-defined channel  
 Well-defined channel



**2. Determine the tailwater (TW) conditions at the outlet**

TW depth: 1.40 ft TW elevation: 495.00  
 TW computational method: HGL at roadway system outlet (Bernoulli's Equation)  
 Channel bed elevation: 493.60 Estimated velocity in channel: 7.06 fps

**3. Calculate and evaluate the outlet velocity for the design discharge**

Design Discharge: 11.34 cfs (combined) Design Frequency: 25-Year  
 Outlet Pipe Size: (1)-15", (1)-18" Type: RCP  
 Length: 9' (18"), 66' (15") Slope: 1.10% (18"), 2.90% (15") Outlet Invert Elevation: 493.60  
 Outlet Velocity at design discharge: 7.06 fps (18"), 6.46 fps (15")  
 Velocity computational method: Bernoulli's Equation

**4. Select the type of outlet protection**

Riprap Apron  
 (See Figures 11-13 & 11-14)  
 Type \_\_\_\_\_ (A,B,C)  
 Riprap type: \_\_\_\_\_  
 Length (L<sub>a</sub>): \_\_\_\_\_  
 Width (W<sub>1</sub>): \_\_\_\_\_  
 Width (W<sub>2</sub>): \_\_\_\_\_  
 Width-Type C (W<sub>3</sub>): \_\_\_\_\_

Preformed Scour Hole  
 (See Figure 11-15)

	Type 1	Type 2
d <sub>50</sub>	<u>0.20 ft</u>	_____
F	<u>0.75 ft</u>	_____
C	<u>12.75 ft</u>	_____
B	<u>10.00 ft</u>	_____
S <sub>p</sub>	<u>2.75 ft</u>	_____

Proposed Type: 1  
 Riprap Type: Modified

FINAL HYDRAULIC DESIGN REPORT  
RECONSTRUCTION OF ROUTE 31  
COVENTRY, CT  
STATE PROJECT NO. 32-130

Appendix E  
Outlet and Inlet Protection Computations

# Calculation Sheet



**Project No.** 83160.00  
**Subject** Route 31 Reconstruction  
**Location** Coventry, CT

**Calc By** B. Sherman  
**Date** 2/25/2008  
**Revised** 1/14/2009  
**Checked by** \_\_\_\_\_  
**Date** \_\_\_\_\_

## NORTH TRIBUTARY (STA 00+50)

CULVERT 2-48 "Ø	Q50 = 137 CFS	Q100 = 164 CFS
	V50 (UP) = 8.29 FPS	V100 (UP) = 8.93 FPS
	V50 (DN) = 5.45 FPS	V100 (DN) = 6.53 FPS

(STA 00+13) TW (DW 50) = 4.41' TW (DN 100) = 5.18'

USE Q100 & V100 FOR PURPOSES OF DESIGN

QD = 164 CFS VD = 6.53 FPS TWD = 5.18'

# Calculation Sheet



Project No. 83160.00  
 Subject Route 31 Reconstruction  
 Location Coventry, CT

Calc By B. Sherman  
 Date 2/25/2008  
 Revised 12/29/2008  
 Checked by \_\_\_\_\_  
 Date \_\_\_\_\_

**PREFORMED SCOUR HOLE TYPE 1  
 FROM CONNECTICUT DOT DRAINAGE MANUAL (MAY 2002)**

Tributary North Discharge Sta. 00+50

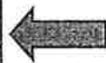
GIVEN:  $R_p =$  4.00 maximum inside pipe rise, ft  
 $S_p =$  10.00 inside dia. of circular sections or max. inside pipe span for non-circular sections (ft)  
 value is based on the sum of both culverts (4'+4'+2' separation)  
 $Q =$  164.00 cfs (use Qfull at 100-year design event)  
 $T_w =$  5.18 ft (at 100 year event)

FIND:  $D_{50}$  = Average Rock Diameter Required  
 $D_{50} = ((0.0125 * R_p^2) / T_w) * (Q / (R_p^{2.5}))^{1.333} =$  0.4 feet  
4.8 inches  
 Use: 6 inches

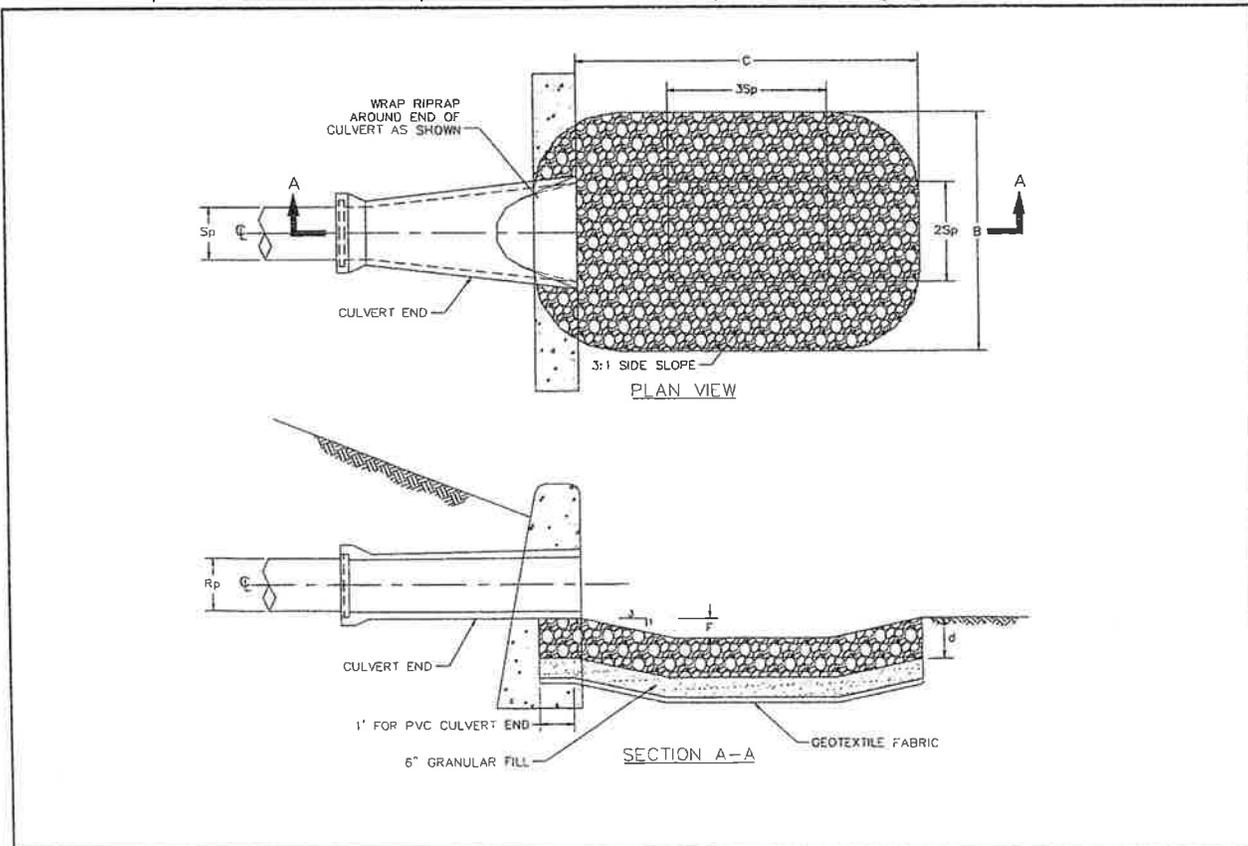
$F = 0.5 R_p =$  Basin Depression = 2 feet  
 $C = 3 S_p + 6 F =$  Basin Length = 42.00 feet  
 $B = 2 S_p + 6 F =$  Basin Inlet and Outlet Width = 32.00 feet

The type of riprap is as follows:

Modified	$d_{50} < 0.13$ m (0.42 ft)
Intermediate	$0.13$ m (0.42 ft) $< d_{50} < 0.20$ m (0.67 ft)
Standard	$0.20$ m (0.67 ft) $< d_{50} < 0.38$ m (1.25 ft)
Special Design	$0.38$ m (1.25 ft) $< d_{50}$



Reference: Report No. FHWA-RD-75-508 ("culvert Outlet Protection Design: computer Program Documentation")



# Calculation Sheet



**Project No.** 83160.00  
**Subject** Route 31 Reconstruction  
**Location** Coventry, CT

**Calc By** B. Sherman  
**Date** 2/25/2008  
**Revised** 1/14/2009  
**Checked by** \_\_\_\_\_  
**Date** \_\_\_\_\_

## MILL BROOK WEST (STA 29+47)

EXIST CULVERT 9' W X 1.5' H

Q25 = 75 CFS  
V25 (UP) = 5.56 FPS  
V25 (DN) = 12.88 FPS

Q100 = 79 CFS  
V100 (UP) = 5.85 FPS  
V100 (DN) = 5.85 FPS

(STA 28+12) TW 25 = 0.65'

TW 100 = 2.96'

USE Q25 & V25 FOR PURPOSES OF DESIGN

QD = 75 CFS VD = 12.88 FPS TWD = 0.65'

# Calculation Sheet



Project No. 83160.00  
 Subject Route 31 Reconstruction  
 Location Coventry, CT

Calc By B. Sherman  
 Date 2/25/2008  
 Checked by \_\_\_\_\_  
 Date \_\_\_\_\_

**PREFORMED SCOUR HOLE TYPE 1  
 FROM CONNECTICUT DOT DRAINAGE MANUAL (MAY 2002)**

Mill Brook West Discharge Sta. 29+47

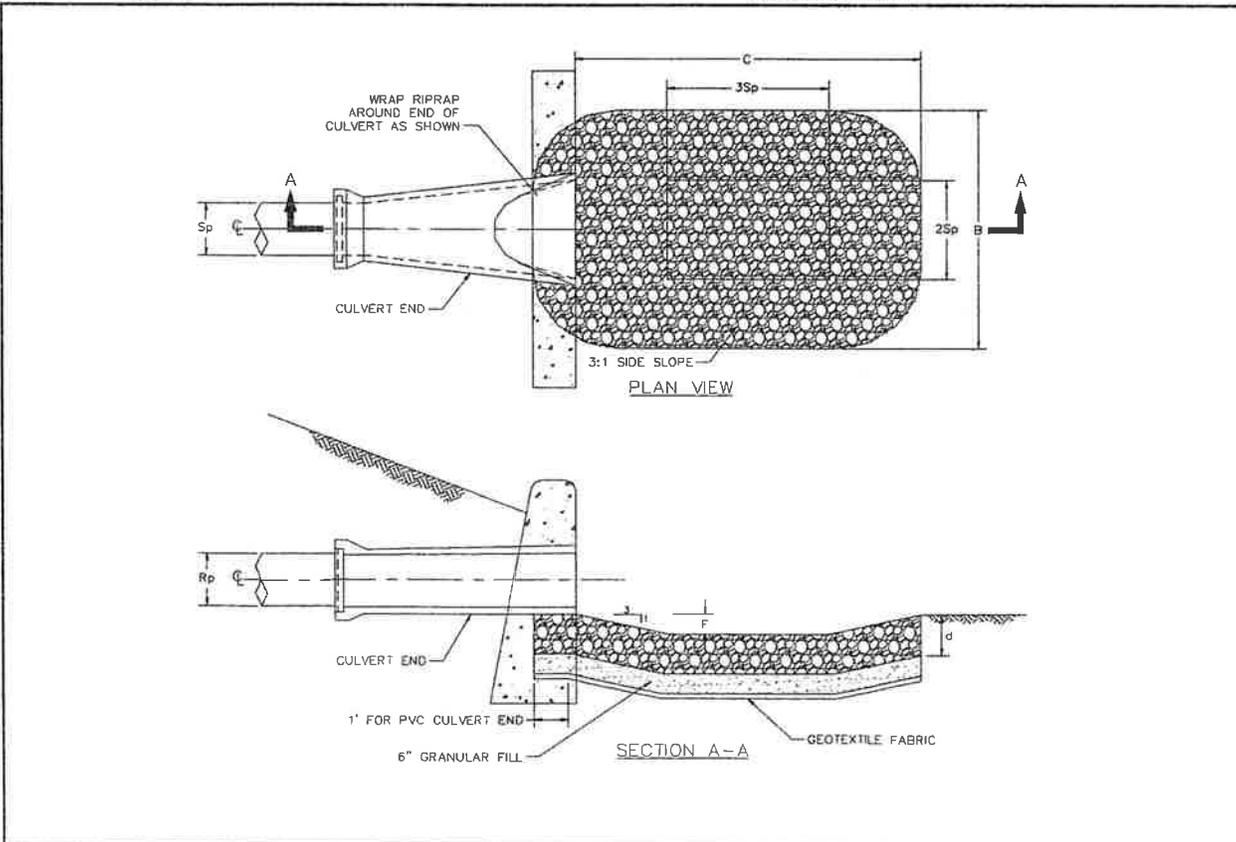
GIVEN:  $R_p =$  1.50 maximum inside pipe rise, ft  
 $S_p =$  9.00 inside dia. of circular sections or max. inside pipe span for non-circular sections (ft)  
 $Q =$  75.00 cfs (use Qfull at 25-year design event)  
 $T_w =$  0.65 ft (at 25 year event)

FIND:  $D_{50} =$  Average Rock Diameter Required  
 $D_{50} = ((0.0125 \cdot R_p^2) / T_w) \cdot (Q / (R_p^{2.5}))^{(1.333)} =$  3.6 feet  
43.2 inches  
 Use: 48 inches  
 $F = 0.5 R_p =$  Basin Depression = 0.75 feet  
 $C = 3S_p + 6F =$  Basin Length = 31.50 feet  
 $B = 2S_p + 6F =$  Basin Inlet and Outlet Width = 22.50 feet

The type of riprap is as follows:

Modified	$d_{50} < 0.13$ m (0.42 ft)
Intermediate	$0.13$ m (0.42 ft) $< d_{50} < 0.20$ m (0.67 ft)
Standard	$0.20$ m (0.67 ft) $< d_{50} < 0.38$ m (1.25 ft)
Special Design	$0.38$ m (1.25 ft) $< d_{50}$

Reference: Report No. FHWA-RD-75-508 ("culvert Outlet Protection Design: computer Program Documentation")



# Calculation Sheet



Project No. 83160.00  
 Subject Route 31 Reconstruction  
 Location Coventry, CT

Calc By B. Sherman  
 Date 2/25/2008  
 Checked by \_\_\_\_\_  
 Date \_\_\_\_\_

**PREFORMED SCOUR HOLE TYPE 2  
 FROM CONNECTICUT DOT DRAINAGE MANUAL (MAY 2002)**

Mill Brook West Discharge Sta. 29+47

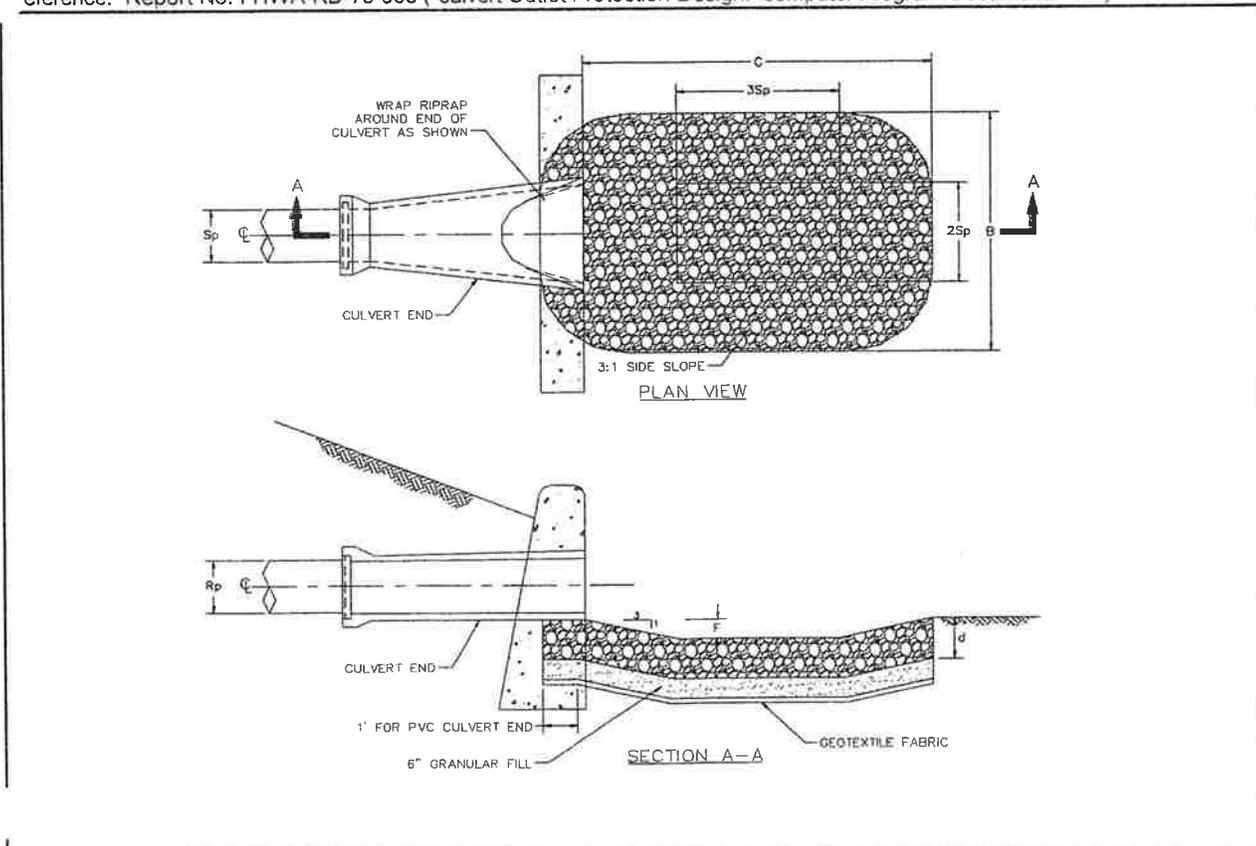
GIVEN:  $R_p =$  1.50 maximum inside pipe rise, ft  
 $S_p =$  9.00 inside dia. of circular sections or max. inside pipe span for non-circular sections (ft)  
 $Q =$  75.00 cfs (use  $Q_{full}$  at 25-year design event)  
 $T_w =$  0.65 ft (at 25 year event)

FIND:  $D_{50} =$  Average Rock Diameter Required  
 $D_{50} = ((0.0082 * R_p^2) / T_w) * (Q / (R_p^{2.5}))^{1.333} =$  2.4 feet  
 Use: 28.8 inches  
30 inches  
 $F = R_p =$  Basin Depression = 1.50 feet  
 $C = 3S_p + 6F =$  Basin Length = 36.00 feet  
 $B = 2S_p + 6F =$  Basin Inlet and Outlet Width = 27.00 feet

The type of riprap is as follows:

Modified	$d_{50} < 0.13$ m (0.42 ft)
Intermediate	$0.13$ m (0.42 ft) $< d_{50} < 0.20$ m (0.67 ft)
Standard	$0.20$ m (0.67 ft) $< d_{50} < 0.38$ m (1.25 ft)
Special Design	$0.38$ m (1.25 ft) $< d_{50}$

Reference: Report No. FHWA-RD-75-508 ("culvert Outlet Protection Design: computer Program Documentation")





# Calculation Sheet



Project No. 83160.00  
Subject COVENTRY HYDRAULICS  
Location Coventry, CT

Calc By B. Sherman  
Date 2/21/2008  
Checked by \_\_\_\_\_  
Date \_\_\_\_\_

## MILL BROOK EAST CULVERTS KNOWN INFORMATION:

### LOW FLOW CULVERT -

US INVERT = 447.00  
DS INVERT = 444.00  
LENGTH = 124'  
SLOPE = 2.42%

Q25 = 101.53 CFS  
V25 (UP) = 9.35 FPS  
V25 (DN) = 9.57 FPS  
TW 25 (DN) = 2.61 FT

Q100 = 129.70 CFS  
V100 (UP) = 10.14 FPS  
V100 (DN) = 10.42 FPS  
TW 25 (DN) = 2.97 FT

### HIGH FLOW CULVERT -

US INVERT = 448.0  
DS INVERT = 445.0  
LEN = 124'  
SLOPE = 2.42%

Q25 = 86.47 CFS  
V25 (UP) = 8.23 FPS  
V25 (DN) = 14.15 FPS  
TW25 (DN) = 2.61 FT

Q100 = 117.30 CFS  
V100 (UP) = 7.82 CFS  
V100 (DN) = 15.72 CFS  
TW100 (DN) = 2.97 FT.

\* VALUES OBTAINED FROM HEC-RAS

QT25 = 188 CFS  
QT100 = 247 CFS

BASED ON FLOWS AND VELOCITIES AT THE DISCHARGE LOCATION, THE TYPE 1 PERFORMED SCOUR HOLES ARE PROPOSED FOR THIS LOCATION. (SEE ATTACHED CALCULATIONS)

# Calculation Sheet



Project No. 83160.00  
 Subject Route 31 Reconstruction  
 Location Coventry, CT

Calc By B. Sherman  
 Date 2/21/2008  
 Revised 3/26/2009  
 Checked by \_\_\_\_\_  
 Date \_\_\_\_\_

**PREFORMED SCOUR HOLE TYPE 1  
 FROM CONNECTICUT DOT DRAINAGE MANUAL (MAY 2002)**

New Mill Brook Discharge Sta. 25+98

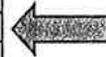
GIVEN:  $R_p =$  4.00 maximum inside pipe rise, ft  
 $S_p =$  9.00 inside dia. of circular sections or max. inside pipe span for non-circular sections (ft)  
 value is based on the sum of both culverts (5'+5')  
 $Q =$  247.00 cfs (use  $Q_{full}$  at 100-year design event)  
 $T_w =$  2.97 ft (at 100 year event)

FIND:  $D_{50} =$  Average Rock Diameter Required  
 $D_{30} = ((0.0125 * R_p^2) / T_w) * (Q / (R_p^{2.5}))^{1.333} =$  1.1 feet  
13.2 inches  
 Use: 15 inches

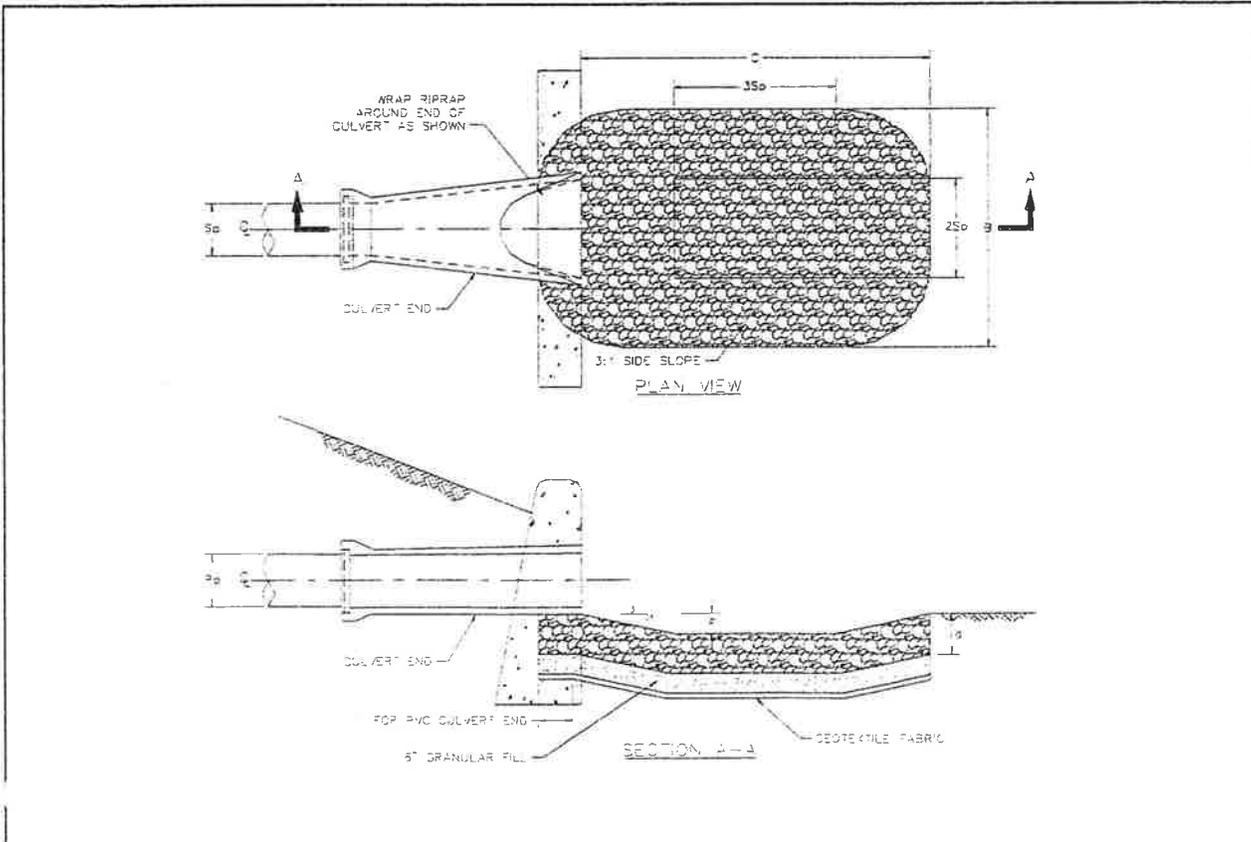
$F = 0.5 R_p =$  Basin Depression = 2 feet  
 $C = 3S_p + 6F =$  Basin Length = 39.00 feet  
 $B = 2S_p + 6F =$  Basin Inlet and Outlet Width = 30.00 feet

The type of riprap is as follows:

Modified	$d_{50} < 0.13$ m (0.42 ft)
Intermediate	$0.13$ m (0.42 ft) $< d_{50} < 0.20$ m (0.67 ft)
Standard	$0.20$ m (0.67 ft) $< d_{50} < 0.38$ m (1.25 ft)
Special Design	$0.38$ m (1.25 ft) $< d_{50}$



Reference: Report No. FHWA-RD-75-508 ("culvert Outlet Protection Design: computer Program Documentation")



# Calculation Sheet



Project No. 83160.00  
 Subject Route 31 Reconstruction  
 Location Coventry, CT

Calc By B. Sherman  
 Date 2/21/2008  
 Revised 3/26/2009  
 Checked by \_\_\_\_\_  
 Date \_\_\_\_\_

**PREFORMED SCOUR HOLE TYPE 2  
 FROM CONNECTICUT DOT DRAINAGE MANUAL (MAY 2002)**

New Mill Brook Discharge Sta. 25+98

GIVEN:  $R_p =$  4.00 maximum inside pipe rise, ft  
 $S_p =$  9.00 inside dia. of circular sections or max. inside pipe span for non-circular sections (ft)  
 value is based on the sum of both culverts (5'+5')  
 $Q =$  247.00 cfs (use Qfull at 100-year design event)  
 $T_w =$  2.97 ft (at 100 year event)

FIND:  $D_{50} =$  Average Rock Diameter Required  
 $D_{50} = ((0.0082 * R_p^2) / T_w) * (Q / (R_p^{2.5}))^{(1.333)} =$  0.7 feet  
8.4 inches  
 Use: 12 inches

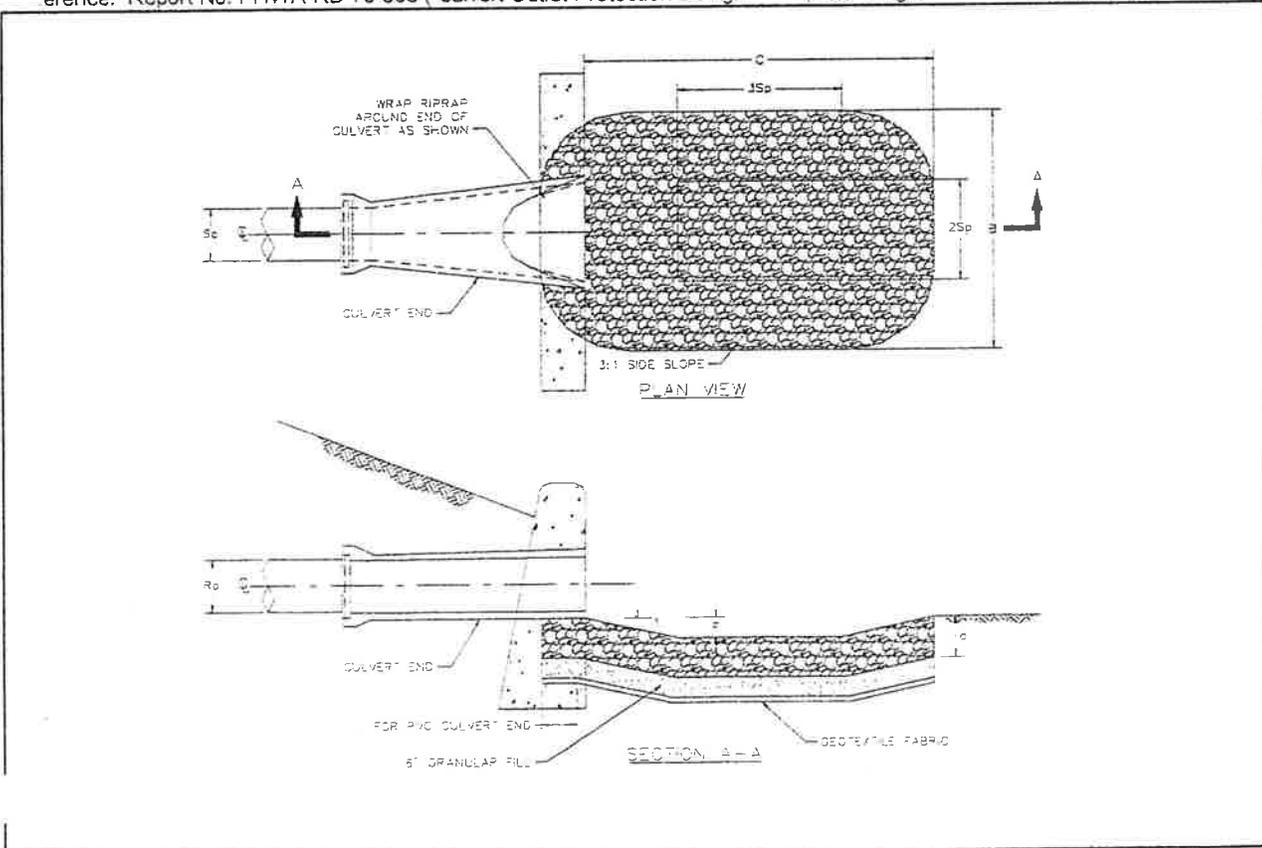
$F =$   $R_p =$  Basin Depression = 4.00 feet  
 $C = 3S_p + 6F =$  Basin Length = 51.00 feet  
 $B = 2S_p + 6F =$  Basin Inlet and Outlet Width = 42.00 feet

The type of riprap is as follows:

Modified	$d_{50} < 0.13$ m (0.42 ft)
Intermediate	$0.13$ m (0.42 ft) $< d_{50} < 0.20$ m (0.67 ft)
Standard	$0.20$ m (0.67 ft) $< d_{50} < 0.38$ m (1.25 ft)
Special Design	$0.38$ m (1.25 ft) $< d_{50}$



Reference: Report No. FHWA-RD-75-508 ("culvert Outlet Protection Design: computer Program Documentation")



# Calculation Sheet



Project No. 83160.00  
 Subject Route 31 Reconstruction  
 Location Coventry, CT

Calc By \_\_\_\_\_  
 Date 3/30/2009  
 Checked by \_\_\_\_\_  
 Date \_\_\_\_\_

**RipRap Basin**

File External View Options Help

Title: 32-130\_RS2730\_HFC Span: 5 ft Fall water: 1.00 ft  
 Shape: Rectangular Velocity (Vo): 15.7 ft/s Reference depth: 1.490 ft  
 Flow (Q): 117.3 ft<sup>3</sup>/s Depth (Yo): 1.49 ft Froude (Fr): 2.267

Input  
 D50: 0.65 ft Max Depth: 0 ft

Output

Basin output		RipRap output				
	ft	L/De	L	VL/vo	VL	Rock size D50
			ft		ft/s	ft
Basin Length (LB):	<u>31.225</u>	10	<u>30.8</u>	<u>0.59</u>	<u>9.22</u>	<u>0.53</u>
Pool Length (LP):	<u>20.817</u>	15	<u>46.2</u>	<u>0.39</u>	<u>6.17</u>	<u>0.21</u>
Apron Length (LA):	<u>10.408</u>	20	<u>61.6</u>	<u>0.30</u>	<u>4.65</u>	<u>0.10</u>
TB:	<u>1.700</u>	25	<u>64.7</u>	<u>0.24</u>	<u>3.74</u>	<u>0.05</u>
TA:	<u>2.550</u>					
HS:	<u>2.082</u>					

Hs/D50: 2.449 Design meets criteria?  Yes

(High Flow Cell)

**RipRap Basin**

File External View Options Help

Title: 32-130\_RS2730\_LFC Span: 4 ft Fall water: 2.90 ft  
 Shape: Rectangular Velocity (Vo): 10.5 ft/s Reference depth: 3.000 ft  
 Flow (Q): 129.7 ft<sup>3</sup>/s Depth (Yo): 3 ft Froude (Fr): 1.068

Input  
 D50: 0.65 ft Max Depth: 0 ft

Output

Basin output		RipRap output				
	ft	L/De	L	VL/vo	VL	Rock size D50
			ft		ft/s	ft
Basin Length (LB):	<u>19.611</u>	10	<u>39.1</u>	<u>0.59</u>	<u>6.17</u>	<u>0.21</u>
Pool Length (LP):	<u>13.074</u>	15	<u>58.6</u>	<u>0.39</u>	<u>4.13</u>	<u>0.07</u>
Apron Length (LA):	<u>6.537</u>	20	<u>78.2</u>	<u>0.30</u>	<u>3.11</u>	<u>0.02</u>
TB:	<u>1.300</u>	25	<u>82.1</u>	<u>0.24</u>	<u>2.50</u>	<u>0.00</u>
TA:	<u>1.950</u>					
HS:	<u>1.307</u>					

Hs/D50: 2.011 Design meets criteria?  Yes

(Low Flow Cell)

**RipRap Basin**

File External View Options Help

Title: 32-130; RS2730\_COMB Span: 9 ft Tail water: 2.100 ft

Shape: Rectangular Velocity (Vo): 13 ft/s Reference depth: 2.100 ft

Flow (Q): 247 ft<sup>3</sup>/s Depth (Yo): 2.1 ft Froude (Fr): 1.581

---

Input

D50: 0.8 ft Max Depth: 0 ft

---

OutPut

Basin output		RipRap output				
	ft	L/D <sub>e</sub>	L	VL/V <sub>o</sub>	VL	Rock size D50
			ft		ft/s	ft
Basin Length (LB):	37.821	10	49.1	0.59	7.64	0.35
Pool Length (LP):	27.000	15	73.6	0.39	5.11	0.13
Apron Length (LA):	10.821	20	98.1	0.30	3.85	0.08
TB:	1.600	25	103.0	0.24	3.09	0.02
TA:	2.400					
HS:	2.164					

Hs/D50: 2.705 Design meets criteria?  Yes

(Approximate Average of High and Low Flow Cells)

Note: Input data for HY-8 RipRap Basin sizing provided by ConnDOT Hydraulic and Drainage section.

# Connecticut Department of Transportation

Project No. _____	Prepared by _____	Date _____
Route No. _____	Checked by _____	Date _____
Town _____	Stream _____	
Discharge <u>100 YR</u>	Unit <u>English</u>	

## Riprap Revetment Design Based on HEC-11

$$D_{50} = 0.001 Va^3 / (d_{avg}^{0.5} K_1^{1.5}) C_{sf}$$

*Average velocity (Va) and Average flow depth(d ave) in main channel*

Cross Section No. <u>RS 2570</u>	Va (fps)= <u>7.45</u>
Flow Area (sq.ft)= <u>42.11</u>	Top Width (ft)= <u>39.53</u>

d avg (ft) = 1.07

Side Slope= 2 : 1

Bank angle (degrees)

θ = 26.6

Riprap Class	Φ	K <sub>1</sub>	D <sub>50</sub>	Acceptable Range	Check
Modified	41.2	0.7342	<b>0.64</b>	d50 < 0.42'	<b>NG</b>
Intermediate	41.6	0.7391	<b>0.63</b>	0.42' < d50 < 0.67'	<b>G</b>
Standard	41.8	0.7300	<b>0.64</b>	0.67' < d50 < 1.25'	<b>G</b>
Other	42	0.7438	<b>0.62</b>	d50 > 1.25'	

Assumed Specific Gravity of Rock Riprap = 2.65

Angle of Repose (degrees) = Φ

Bank Stability Factor = K<sub>1</sub>

Median riprap particle size (ft) for Stability Factor of 1.2 = D<sub>50</sub>

use larger Stability Factor if applying at channel bends

### Stability Factors (SF) and Correction Factor (C<sub>sf</sub>)

SF	C <sub>sf</sub>	D <sub>50</sub> (Φ = 41.2)	D <sub>50</sub> (Φ = 41.6)	D <sub>50</sub> (Φ = 41.8)	D <sub>50</sub>   Φ = 42
1.0	0.76	<b>0.48</b>	<b>0.48</b>	<b>0.49</b>	<b>0.48</b>
1.1	0.88	<b>0.56</b>	<b>0.55</b>	<b>0.56</b>	<b>0.55</b>
1.2	1.00	<b>0.64</b>	<b>0.63</b>	<b>0.64</b>	<b>0.62</b>
1.3	1.13	<b>0.72</b>	<b>0.71</b>	<b>0.72</b>	<b>0.70</b>
1.4	1.26	<b>0.80</b>	<b>0.79</b>	<b>0.81</b>	<b>0.79</b>
1.5	1.40	<b>0.89</b>	<b>0.88</b>	<b>0.90</b>	<b>0.87</b>
1.6	1.54	<b>0.98</b>	<b>0.97</b>	<b>0.99</b>	<b>0.96</b>
1.7	1.69	<b>1.07</b>	<b>1.06</b>	<b>1.08</b>	<b>1.05</b>
1.8	1.84	<b>1.17</b>	<b>1.16</b>	<b>1.18</b>	<b>1.15</b>
1.9	1.99	<b>1.27</b>	<b>1.26</b>	<b>1.28</b>	<b>1.24</b>
2.0	2.15	<b>1.37</b>	<b>1.36</b>	<b>1.38</b>	<b>1.34</b>

**Recommendation:** use Intermediate Riprap

# CALCULATION SHEET



PROJECT NO: 83-10-10  
 SUBJECT: Inlet Protection Sizing  
 HEC-11 cases  
 LOCATION: Rte 31 Reconstruction  
 Covington, CT

CALC BY: J White  
 DATE: 12-18-08  
 CHECKED BY: DEV  
 DATE:

REFER TO:

Twin 48"  $\phi$  culverts. - Inlet Protection

- size for 50 yr flow  
 $Q_{50} = 68.5 \text{ cfs}$  (per culvert)  
 $V_{50} = 8.29 \text{ fps}$

Find:  $D_{50}$  = median riprap particle size  
 $= 0.001 V_a^3 / (d_{avg}^{0.5} K_1^{1.5})$  (6) pg 30

$V_a$  = avg velocity = 8.29 fps  
 $C$  = correction factor = assume 1.0 (based on specific gravity Riprap = 2.65)  
 $d_{avg}$  = avg depth of flow =  $\frac{454.59}{3.0} = 151.5$  (WS elev from HECRAS @ 1+06) (~bottom of channel)

$$K_1 = [1 - (\sin^2 \theta / \sin^2 \phi)]^{0.15} \quad (7) \text{ pg 30}$$

$\theta$  = bank angle w/ horizontal =  $26.6^\circ$  (2:1 slope)

$\phi$  = riprap material  $\phi$  repose =  $39^\circ$   
 (Chart 4, ~ 1' dia  $D_{50}$ , very angular)



$$K_1 = [1 - (\sin^2(26.6^\circ) / \sin^2(39^\circ))]^{0.15} = 0.703$$

$$D_{50} = 0.001 (8.29 \text{ fps})^3 / ((3.0 \text{ ft})^{0.5} * (0.703)^{1.5}) = \boxed{0.558' \approx 7''}$$

From ConnDOT Spec, use Intermediate Rip Rap  $0.13\text{m} (0.42\text{ft}) < d_{50} < 0.20\text{m} (0.67\text{ft})$

Extent of protection (Section 3.6.1 & 3.6.2)

Length:  $\boxed{90 \text{ ft}}$  (from start of west wingwall to start of 48" pipes)

Vertical extent: 456.0 ft minimum (top of bank)

CALC SHEET 1 OF SHEETS

# CALCULATION SHEET



PROJECT NO 83160.00  
 SUBJECT Inlet Protection Sizing  
 HEC II Calcs  
 LOCATION Rte 31 Reconstruction  
 Coventry, CT

CALC BY J. White  
 DATE 12.18.08  
 CHECKED BY DEV

REFER TO

Layer thickness (4.3)

(a)  $D_{100} = 1.7 D_{50} = 1.7(0.67) = 1.14$  (table 2 p.36) ← larger value.  
 or  $1.5 D_{50} = 1.5(0.67) = 1.01$

(b) Not less than 12 in.

(c) Increase by 50% for placement under water - assume NO

∴ Min thickness =  $17 \text{ in} \approx 1.7 \text{ ft}$

Filter Layer (Section 4.4 and Form 3-5)

(a) Filter Material Size

$$\frac{D_{15}(\text{coarser layer})}{D_{85}(\text{finer layer})} < 5 < \frac{D_{15}(\text{coarser layer})}{D_{15}(\text{finer layer})} < 40$$

Try 1" uniformly graded coarse gravel filter

$$\frac{0.03}{0.14} = 0.21 < 5 < \frac{0.03}{0.005} = 6 < 40 \checkmark$$

∴ Soil interface ok.

For rip rap to filter interface:

$$\frac{D_{15}(\text{rip rap})}{D_{85}(\text{filter})} = \frac{0.23}{0.22} = 1.05 < 5 \checkmark$$

$$\frac{D_{15}(\text{rip rap})}{D_{15}(\text{filter})} = \frac{0.23}{0.03} = 7.67 < 40 \checkmark$$

∴ 1" filter material is adequate

(b) Filter layer thickness

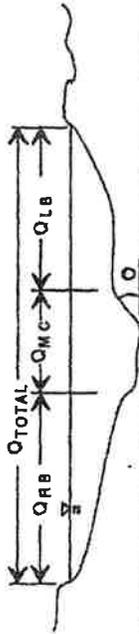
- Use a thickness of  $12 \text{ in}$

Note - designed gravel  
 < rip rap layer. Soil  
 layer characteristics  
 taken from HEC-II  
 calcs for outlet protec  
 sizing (assumed  
 properties of existing  
 bank soil)

CALC			
SHEET	2	OF	SHEETS

Project No. 32-130  
 Description Reconstruction of Rte 31, County of CT  
 Prepared by/date J White, 12/30/08  
 Checked by/date \_\_\_\_\_ of \_\_\_\_\_ sheet \_\_\_\_\_

Definition Sketch:

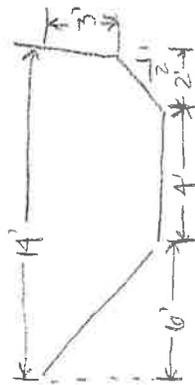


Soil Characteristics:  
 D15 0.005  
 D50 0.032  
 D85 0.14

Q TOTAL 08.5  
 Q MC \_\_\_\_\_  
 Q LB \_\_\_\_\_  
 Q RB \_\_\_\_\_

DEPTH OR W.S. (ft)	A <sub>s</sub> (ft <sup>2</sup> )	V <sub>0</sub> (ft/sec)	d <sub>a</sub> (ft)	θ	φ	K <sub>1</sub>	D <sub>50</sub> (ft)	SF	S <sub>s</sub>	C	C <sub>p/A</sub>	D <sub>50</sub> (ft)	NOTES
4.5	2.9	8.29	3.0	2:1	39	0.71	0.558	1.2	2.65	1.0	N/A	0.50	14

Design Sketch



RIPRAP CHARACTERISTICS:

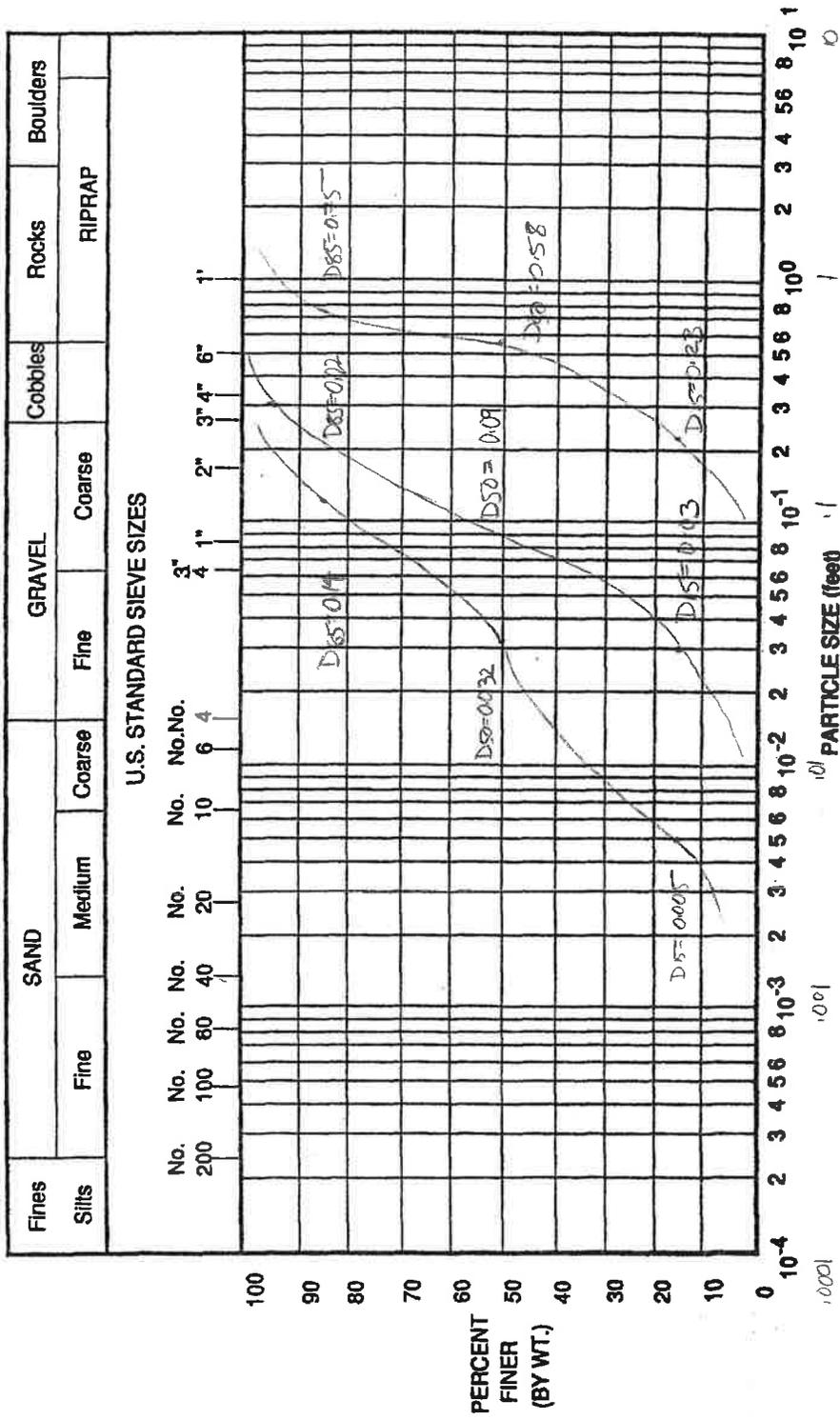
Size: 7" Thickness: 14"  
 D<sub>50</sub> Class: 1/4" size for D<sub>100</sub> Use: 18"  
 AASHTO Gradation: Size: 18' 1.5' 7' 0.5' <2" 0.17  
 Percent Finer: 100 50 5-10

FABRIC CHARACTERISTICS:

Granular: Size: Percent Finer: 85 50 15  
 Fabric: AOS < Perm. >  
 Average Opening Size

- ① Water Surface Elevation
- ② Main channel flow area
- ③ Main channel average velocity
- ④ Main channel average depth
- ⑤ Bank angle
- ⑥ Riprap angle of repose (Chart 4)
- ⑦ Bank angle correction (Chart 3)
- ⑧ Riprap size (Chart 1)
- ⑨ Stability Factor
- ⑩ Riprap specific gravity
- ⑪ Riprap size correction factor (Chart 2)
- ⑫ Plar/Abutment Correction (3.38 if applicable)
- ⑬ Correction D<sub>50</sub> = ⑥ • ⑪ • ⑫
- ⑭ Notes or Comments

Form 1. Riprap size - particle erosion



Form 3. Material gradation

PROJECT No 32 - 130 DESCRIPTION Reconstruction of Rte 31 - 70venting of Inlet Protection of Twin 48" conduits	Prepared by/Date: : 12/30/08 JWW Checked by/Date: : / / Sheet 1 of 1
--	--

**GRANULAR FILTER:**

LAYER	DESCRIPTION	D <sub>15</sub> (#)	D <sub>85</sub> (#)	RATIO	D <sub>15</sub> COARSE D <sub>85</sub> FINE	< 5 <	D <sub>15</sub> COARSE	
							D <sub>15</sub> FINE	< 40
1	Soil layer	0.005	0.14	$\frac{0.03}{0.14}$		< 5 <	$\frac{0.03}{0.005}$	
2	Gravel filter	0.03	0.22	$\frac{0.23}{0.22}$	0.21	< 5 <	$\frac{0.23}{0.03}$	6
3	Rip Rap	0.23	0.75	$\frac{0.23}{0.22}$	1.05	< 5 <	$\frac{0.23}{0.23}$	7.67

**SUMMARY:**

LAYER DESCRIPTION	D <sub>15</sub>	D <sub>85</sub>	THICKNESS
gravel filter	0.03	0.22	12"

**FABRIC FILTER:**

PHYSICAL PROPERTIES CLASS: \_\_\_\_\_  
 HYDRAULIC PROPERTIES  
 PIPING RESISTANCE < 50% PASSING #200 AOS < 0.6 mm  
 < 50% PASSING #200 AOS < 0.3 mm  
 PERMEABILITY SOIL PERMEABILITY < FABRIC PERMEABILITY  
 SELECTED FABRIC FILTER SPECIFICATIONS: \_\_\_\_\_

Form 5. Filter design

**APPENDIX C**  
**Notice of Termination**



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

## Notice of Termination Form

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

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

### Part I: Registrant Information

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

### Part II: Certification

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

Note: Please submit this Notice of Termination Form to:

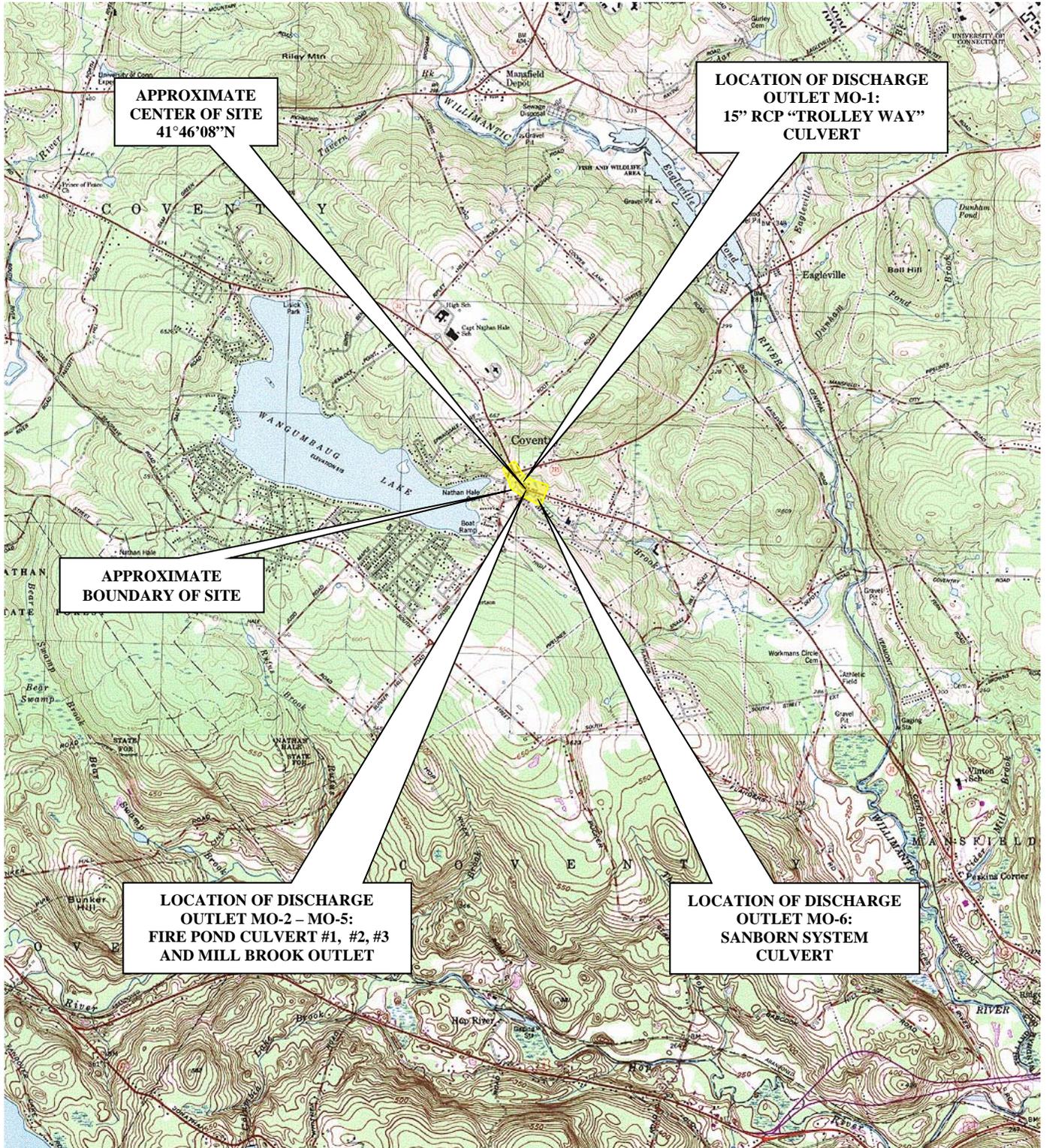
STORMWATER PERMIT COORDINATOR  
BUREAU OF WATER MANAGEMENT  
DEPARTMENT OF ENVIRONMENTAL PROTECTION  
79 ELM STREET  
HARTFORD, CT 06106-5127

**Attachment 1**  
**Site Location Map**

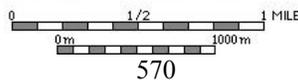
# Attachment 1

## USGS Quadrangle Map: 40 - Coventry

Registrant: Connecticut Department of Transportation  
*Reconstruction of State Route 31*  
 Coventry, Connecticut  
 Scale-1:24,000



72°21'27" W  
 N ↑ TN  
 1/4"



WGS84 72°15'02" W

**Attachment 2**  
**Site Plans**

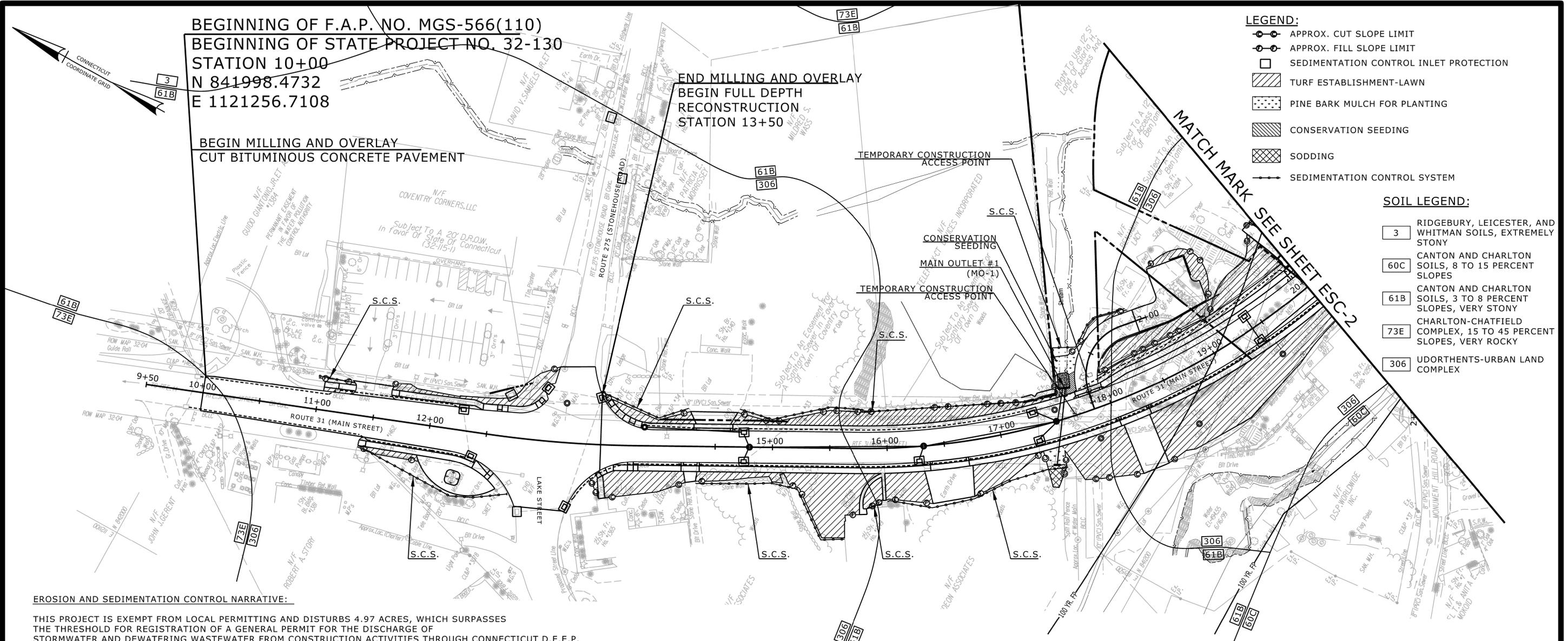
BEGINNING OF F.A.P. NO. MGS-566(110)  
 BEGINNING OF STATE PROJECT NO. 32-130  
 STATION 10+00  
 N 841998.4732  
 E 1121256.7108

BEGIN MILLING AND OVERLAY  
 CUT BITUMINOUS CONCRETE PAVEMENT

END MILLING AND OVERLAY  
 BEGIN FULL DEPTH  
 RECONSTRUCTION  
 STATION 13+50

- LEGEND:**
- APPROX. CUT SLOPE LIMIT
  - APPROX. FILL SLOPE LIMIT
  - SEDIMENTATION CONTROL INLET PROTECTION
  - ▨ TURF ESTABLISHMENT-LAWN
  - ▨ PINE BARK MULCH FOR PLANTING
  - ▨ CONSERVATION SEEDING
  - ▨ SODDING
  - SEDIMENTATION CONTROL SYSTEM

- SOIL LEGEND:**
- 3 RIDGEBURY, LEICESTER, AND WHITMAN SOILS, EXTREMELY STONY
  - 60C CANTON AND CHARLTON SOILS, 8 TO 15 PERCENT SLOPES
  - 61B CANTON AND CHARLTON SOILS, 3 TO 8 PERCENT SLOPES, VERY STONY
  - 73E CHARLTON-CHATFIELD COMPLEX, 15 TO 45 PERCENT SLOPES, VERY ROCKY
  - 306 UDORTHENTS-URBAN LAND COMPLEX



**EROSION AND SEDIMENTATION CONTROL NARRATIVE:**

THIS PROJECT IS EXEMPT FROM LOCAL PERMITTING AND DISTURBS 4.97 ACRES, WHICH SURPASSES THE THRESHOLD FOR REGISTRATION OF A GENERAL PERMIT FOR THE DISCHARGE OF STORMWATER AND DEWATERING WASTEWATER FROM CONSTRUCTION ACTIVITIES THROUGH CONNECTICUT D.E.E.P.

THE EXISTING SITE CONSISTS OF TEMPORARY PAVED STREETS, SIDEWALKS AND PAVED PARKING LOTS WITH GREATER THAN 40% IMPERVIOUS COVER, WHICH TRIGGERS THE PERMIT RECOMMENDATION TO STORE ONE-HALF THE WATER QUALITY VOLUME (WQV). HOWEVER, AS PART OF THE RECONSTRUCTION PROJECT, THE TOTAL EFFECTIVE IMPERVIOUS COVER WILL NOT BE INCREASED. AS A RESULT, ONSITE RETENTION OF ONE-HALF OF THE WATER QUALITY VOLUME IS NOT REQUIRED PER GENERAL PERMIT SECTION 5(b)(2)(C)(i)(a). STORMWATER QUALITY TREATMENT WILL BE ACHIEVED USING DEEP SUMP CATCH BASINS. ALL OFFSITE DISCHARGE LOCATIONS ARE DESIGNED INCLUDING VELOCITY DISSIPATING OUTLET PROTECTION PADS OR SCOUR HOLES.

**EROSION AND SEDIMENTATION CONTROL NOTES:**

1. THE NARRATIVE PROVIDED IN THE STORMWATER POLLUTION CONTROL PERMIT IS PART OF THE EROSION CONTROL REQUIREMENTS, WHICH THE CONTRACTOR SHALL FOLLOW ALONG WITH THE "2002 CT E&S GUIDELINES".
2. THE EROSION AND SEDIMENT CONTROL PLANS REQUIRE THAT THE DOWNSTREAM SLOPE LIMITS WITHIN THE PROJECT BE PROTECTED WITH SEDIMENTATION CONTROL SYSTEM (SCS), WHICH SHALL BE IN PLACE PRIOR TO THE START OF ANY CONSTRUCTION WITHIN THAT PHASE. THE SCS MUST BE IN ACCORDANCE WITH THE CTDEEP'S 2002 CONNECTICUT GUIDELINES FOR SOIL EROSION AND SEDIMENT CONTROL AND THE 2004 CONNECTICUT STORMWATER QUALITY MANUAL (THE MATERIALS/PRODUCTS USED IN THE SCS SHALL BE AT THE DISCRETION OF THE CONTRACTOR AND AS APPROVED BY THE ENGINEER). THOSE SYSTEMS ARE TO BE MAINTAINED THROUGHOUT THE ENTIRE CONSTRUCTION PERIOD, OR UNTIL DISTURBED AREAS/SLOPES ARE FULLY STABILIZED, WHICHEVER IS LONGER. ALL STORM WATER OUTFALLS, AND CULVERTS, ARE TO BE CONSTRUCTED FROM DOWNSTREAM TO UPSTREAM, COMMENCING ONLY AFTER PLACEMENT OF THE REQUIRED SCS ACROSS THE DISCHARGE POINT OR OTHER TECHNIQUES NOTED, AND THE TEMPORARY DIVERSION OF ANY EXISTING FLOW, TO THE SATISFACTION OF THE PROJECT ENGINEER.
3. THE DESIGN OF THE PROJECT STORM DRAINAGE SYSTEMS CONFORMS TO THE CONNDOT DRAINAGE MANUAL AND "ONSITE MITIGATION FOR CONSTRUCTION ACTIVITIES". OUTLET PROTECTION AND CHANNEL PROTECTION HAS BEEN INCLUDED WITHIN EACH SYSTEM DESIGN. TEMPORARY CONDITIONS SHALL FOLLOW THE SAME CRITERIA.
4. WHERE CONSTRUCTION ACTIVITIES HAVE BEEN PERMANENTLY HALTED, OR HAVE BEEN TEMPORARILY SUSPENDED FOR MORE THAN SEVEN (7) DAYS, OR WHEN FINAL GRADES HAVE BEEN ACHIEVED IN ANY PORTION OF THE PROJECT, THE CONTRACTOR SHALL IMPLEMENT STABILIZATION PRACTICES WITHIN THREE (3) DAYS. AREAS THAT WILL REMAIN DISTURBED AND INACTIVE FOR AT LEAST THIRTY (30) DAYS SHALL RECEIVE TURF ESTABLISHMENT.

5. AREAS OF LARGE CUTS AND FILLS MUST BE TEMPORARILY STABILIZED EVERY FIFTEEN (15) FEET OF DISTURBED SLOPE. THIS STABILIZATION MUST BE ACHIEVED BEFORE CONTINUING WITH THE CUT OR FILL BEYOND THE FIFTEEN (15) FEET.
6. ALL PAVED AREAS ADJACENT TO THE PROJECT LIMITS, WHERE CONSTRUCTION IS OCCURRING, SHALL BE SWEEPED DAILY TO REMOVE EXCESS MUD, DIRT OR ROCK TRACKING FROM THE PROJECT. DUMP TRUCKS HAULING MATERIAL FROM THE PROJECT MUST BE COVERED WITH A TARPULIN. ANTI-TRACKING PADS SHALL BE PLACED, AND MAINTAINED, AT ALL POINTS OF ACCESS AND EGRESS TO PAVED AREAS.
7. THE FOLLOWING PERMITS HAVE BEEN OBTAINED FOR THE PROJECT AND ARE INCORPORATED INTO THE CONTRACT DOCUMENTS:  
 U.S. ARMY CORPS OF ENGINEERS- SECTION 404- CONNECTICUT GENERAL PERMIT - CATEGORY 2  
 CONNECTICUT DEPARTMENT OF ENERGY AND ENVIRONMENTAL PROTECTION (CT DEEP) GENERAL PERMIT FOR THE DISCHARGE OF STORM WATER AND DEWATERING WASTEWATER ASSOCIATED WITH CONSTRUCTION ACTIVITIES  
 CT DEEP FLOOD MANAGEMENT CERTIFICATION  
 CT DEEP INLAND WETLAND AND WATERCOURSES PERMIT  
 CT DEEP 401 WATER QUALITY CERTIFICATION
8. ALL DRAINAGE STRUCTURES SHALL BE CLEANED WITHIN THE PROJECT LIMITS AND ALL SILT FENCE SHALL BE REMOVED PRIOR TO THE FILING OF THE NOTICE OF TERMINATION IN ACCORDANCE WITH THE GENERAL PERMIT.
9. NO STAGING, STORING OF EQUIPMENT OR MATERIAL SHALL OCCUR WITHIN THE 100-YEAR FLOOD LIMITS.
10. THE CONSTRUCTION SITE SHALL BE CLEAN, WITHOUT ANY ACCUMULATION OF RUBBISH OR CONSTRUCTION DEBRIS IN ACCORDANCE WITH SWPCP SECTION 6.1. PROPER SANITARY DEVICES SHALL BE MAINTAINED ON-SITE AT ALL TIMES. ALL NECESSARY PRECAUTIONS SHALL BE OBSERVED TO AVOID THE SPILLAGE OF FUEL OR OTHER POLLUTANTS ON THE CONSTRUCTION SITE, AS WELL AS THE ADHERENCE TO ALL APPLICABLE POLICIES AND REGULATIONS RELATED TO SPILL PREVENTION AND RESPONSE.
11. DESIGNATE A "WASHOUT" AREA ON THE SITE IN ACCORDANCE WITH SWPCP SECTION 6.2.

FINAL DESIGN REVIEW

REV. DATE	REVISION DESCRIPTION	SHEET NO.	DESIGNER/DRAFTER: PJB-MSR / MSR	STATE OF CONNECTICUT DEPARTMENT OF TRANSPORTATION	PROJECT TITLE:	TOWN:	PROJECT NO.	
			CHECKED BY: PJB		RECONSTRUCTION OF ROUTE 31	COVENTRY	32-130	
SCALE IN FEET 0 40 80 SCALE 1"=40'			ENGINEER: BSC GROUP	DATE:	DRAWING TITLE:		DRAWING NO.	
Border Version: 11/14/08			APPROVED BY:		EROSION AND SEDIMENTATION CONTROL PLAN		ESC-1	
							SHEET NO.	51



- SOIL LEGEND:**
- 3 RIDGEBURY, LEICESTER, AND WHITMAN SOILS, EXTREMELY STONY
  - 60B CANTON AND CHARLTON SOILS, 3 TO 8 PERCENT SLOPES
  - 60C CANTON AND CHARLTON SOILS, 8 TO 15 PERCENT SLOPES
  - 61B CANTON AND CHARLTON SOILS, 3 TO 8 PERCENT SLOPES, VERY STONY
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  - 306 UDORTHENTS-URBAN LAND COMPLEX

- LEGEND:**
- APPROX. CUT SLOPE LIMIT
  - APPROX. FILL SLOPE LIMIT
  - SEDIMENTATION CONTROL INLET PROTECTION
  - ▨ TURF ESTABLISHMENT-LAWN
  - ▨ PINE BARK MULCH FOR PLANTING
  - ▨ CONSERVATION SEEDING
  - SEDIMENTATION CONTROL SYSTEM
  - ▨ DOUBLE SHREDDED HARDWOOD MULCH
  - ▨ WETLAND SEED MIX
  - ▨ SODDING

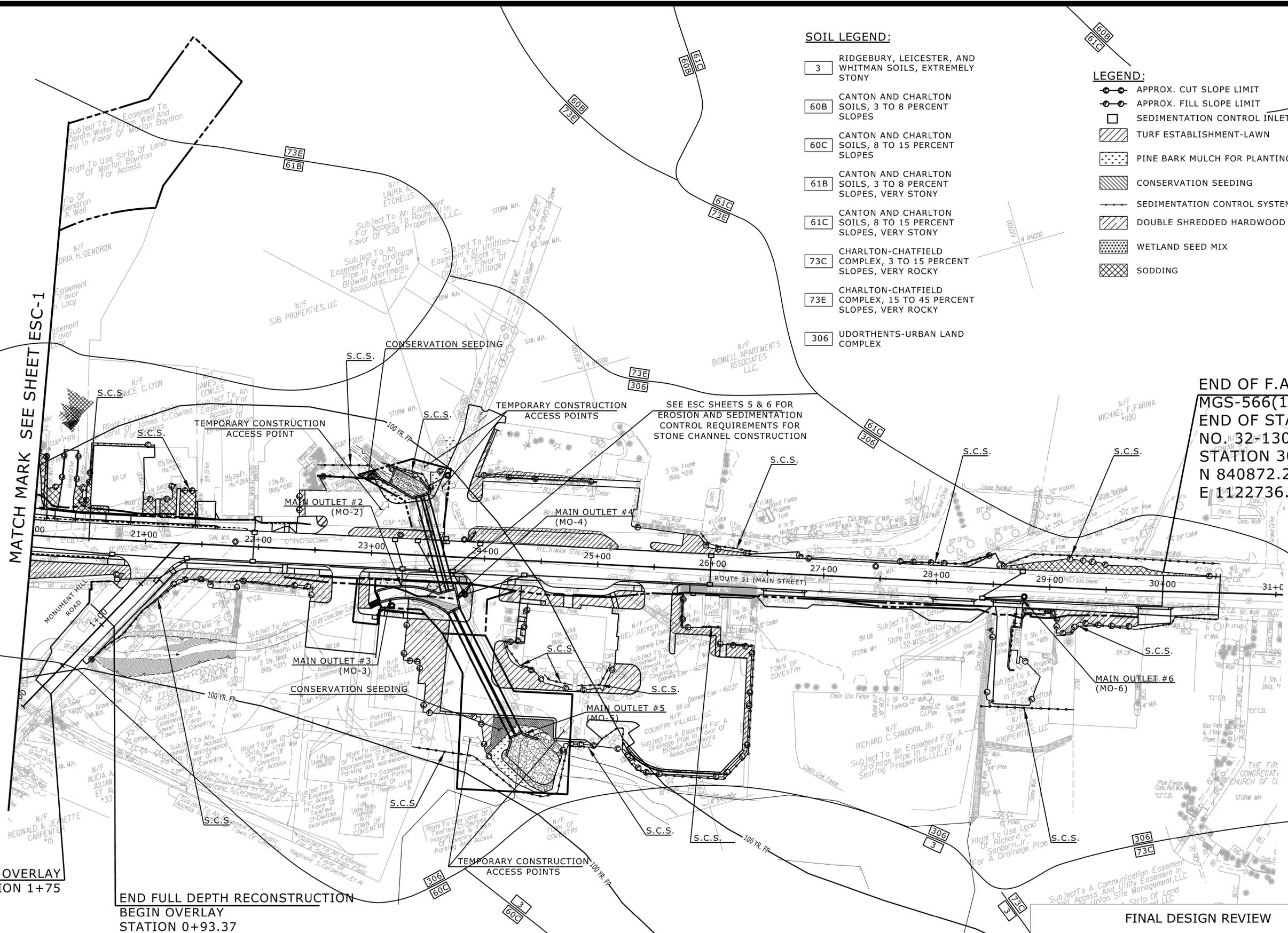
MATCH MARK SEE SHEET ESC-1

END OF F.A.P. NO.  
MGS-566(110)  
END OF STATE PROJECT  
NO. 32-130  
STATION 30+00  
N 840872.2090  
E 1122736.7591

END OVERLAY  
STATION 1+75

END FULL DEPTH RECONSTRUCTION  
BEGIN OVERLAY  
STATION 0+93.37

FINAL DESIGN REVIEW



DESIGNER/DRAFTER: PJB-MSR / MSR CHECKED BY: PJB SCALE IN FEET 0 40 80 SCALE 1"=40' ENGINEER: BSC GROUP APPROVED BY: _____ DATE: _____		PROJECT TITLE: <b>RECONSTRUCTION OF ROUTE 31</b>		TOWN: <b>COVENTRY</b>		PROJECT NO. <b>32-130</b> DRAWING NO. <b>ESC-2</b> SHEET NO. <b>52</b>	
REV.	DATE	REVISION DESCRIPTION	SHEET NO.	DRAWING TITLE: <b>EROSION AND SEDIMENTATION CONTROL PLAN</b>			

**U.S. ARMY CORPS OF ENGINEERS  
APPLICATION FOR DEPARTMENT OF THE ARMY PERMIT**

33 CFR 325. The proponent agency is CECW-CO-R.

OMB APPROVAL NO. 0710-0003  
EXPIRES: 28 FEBRUARY 2013

Public reporting for this collection of information is estimated to average 11 hours per response, including the time for reviewing instructions, searching existing data sources, gathering and maintaining the data needed, and completing and reviewing the collection of information. Send comments regarding this burden estimate or any other aspect of the collection of information, including suggestions for reducing this burden, to Department of Defense, Washington Headquarters, Executive Services and Communications Directorate, Information Management Division and to the Office of Management and Budget, Paperwork Reduction Project (0710-0003). Respondents should be aware that notwithstanding any other provision of law, no person shall be subject to any penalty for failing to comply with a collection of information if it does not display a currently valid OMB control number. Please DO NOT RETURN your form to either of those addresses. Completed applications must be submitted to the District Engineer having jurisdiction over the location of the proposed activity.

**PRIVACY ACT STATEMENT**

Authorities: Rivers and Harbors Act, Section 10, 33 USC 403; Clean Water Act, Section 404, 33 USC 1344; Marine Protection, Research, and Sanctuaries Act, Section 103, 33 USC 1413; Regulatory Programs of the Corps of Engineers; Final Rule 33 CFR 320-332. Principal Purpose: Information provided on this form will be used in evaluating the application for a permit. Routine Uses: This information may be shared with the Department of Justice and other federal, state, and local government agencies, and the public and may be made available as part of a public notice as required by Federal law. Submission of requested information is voluntary, however, if information is not provided the permit application cannot be evaluated nor can a permit be issued. One set of original drawings or good reproducible copies which show the location and character of the proposed activity must be attached to this application (see sample drawings and/or instructions) and be submitted to the District Engineer having jurisdiction over the location of the proposed activity. An application that is not completed in full will be returned.

**(ITEMS 1 THRU 4 TO BE FILLED BY THE CORPS)**

1. APPLICATION NO. [ ]	2. FIELD OFFICE CODE [ ]	3. DATE RECEIVED [ ]	4. DATE APPLICATION COMPLETE [ ]
---------------------------	-----------------------------	-------------------------	-------------------------------------

**(ITEMS BELOW TO BE FILLED BY APPLICANT)**

5. APPLICANT'S NAME First - <u>Mark</u> Middle - <u>W.</u> Last - <u>Alexander</u> Company - <u>Connecticut Department of Transportation</u> E-mail Address - <u>Mark.W.Alexander@ct.gov</u>			8. AUTHORIZED AGENT'S NAME AND TITLE (agent is not required) First - [ ] Middle - [ ] Last - [ ] Company - [ ] E-mail Address - [ ]		
6. APPLICANT'S ADDRESS: Address- <u>2800 Berlin Turnpike</u> City - <u>Newington</u> State - <u>CT</u> Zip - <u>06131</u> Country - <u>USA</u>			9. AGENT'S ADDRESS: Address- [ ] City - [ ] State - [ ] Zip - [ ] Country - [ ]		
7. APPLICANT'S PHONE NOs. w/AREA CODE a. Residence [ ] b. Business <u>860-594-2931</u> c. Fax <u>860 594-3028</u>			10. AGENTS PHONE NOs. w/AREA CODE a. Residence [ ] b. Business [ ] c. Fax [ ]		

**STATEMENT OF AUTHORIZATION**

11. I hereby authorize, [ ] to act in my behalf as my agent in the processing of this application and to furnish, upon request, supplemental information in support of this permit application.

 [ ] [ ]  
 SIGNATURE OF APPLICANT DATE

**NAME, LOCATION, AND DESCRIPTION OF PROJECT OR ACTIVITY**

12. PROJECT NAME OR TITLE (see instructions) <u>Reconstruction of Route 31, Coventry</u>			
13. NAME OF WATERBODY, IF KNOWN (if applicable) <u>Mill Brook and associated tributaries</u>		14. PROJECT STREET ADDRESS (if applicable) Address <u>Route 31 (Main Street)</u>	
15. LOCATION OF PROJECT Latitude: +N <u>41° 46' 04"</u> Longitude: -W <u>72° 17' 55"</u>		City - <u>Coventry</u> State- <u>CT</u> Zip- [ ]	
16. OTHER LOCATION DESCRIPTIONS, IF KNOWN (see instructions) State Tax Parcel ID [ ] Municipality <u>Coventry - Tolland County - See additional</u> Section - [ ] Township - [ ] Range - [ ]			

17. DIRECTIONS TO THE SITE

I-84 to exit 70 (Rt 32); After almost 10 miles, turn right on Rt 275; turn left on Rt 31 (Main St). Follow the roadway around the curve and down the hill. The Fire Pond and Mill Brook are located in a parking area to the right. Please see additional.



18. Nature of Activity (Description of project, include all features)

The Connecticut Department of Transportation (ConnDOT) proposes to reconstruct Route 31 (Main Street) through the town of Coventry. The reconstruction project will include full depth reconstruction, milling and overlay, horizontal and vertical realignment, a five-foot sidewalk and a three-foot snow shelf/utility strip on one or both sides of the roadway, and drainage improvements. The total impacts proposed to inland wetlands and watercourses is 0.12 acres / 5,182 square feet. This total includes the temporary and permanent work occurring along 453 linear feet of intermittent and perennial stream channels. Permanent impacts to wetlands comprise 0.03 acres / 1,420 sqft of this total while 435 sqft is considered temporary impacts for additional space needed during construction. A total of 482 cubic yards (cy) will be excavated in wetlands or watercourses to accommodate grading and the installation of pipes, scour protection, endwalls, step pools, etc. Most areas will be filled with approximately equal volume of these materials with an overall total of 585 cy. Channel alteration is proposed along with the creation of step pools. Please see additional.



19. Project Purpose (Describe the reason or purpose of the project, see instructions)

The project's primary objective is to improve safety by eliminating a very sharp curve and steep grade on Route 31 just south of its intersection with Route 275 in Coventry. The roadway topography and drainage downgradient from the curve also leads to some pooling water and icing. Existing conditions at this curve have been responsible for numerous accidents, including several fatalities. The reconstruction project will include full depth reconstruction, milling and overlay, horizontal and vertical realignment, a five-foot sidewalk separated from the travel way by a three-foot snow shelf/utility strip on one or both sides of the roadway, and drainage improvements. The proposed roadway width of Route 31 will be 28 feet wide with granite curb on both sides. Intersecting approaches (Stonehouse Road/Lake Street, and Monument Hill Road) will be reconstructed for lengths that vary from stubs to 175 feet and will include drainage improvements. See additional.



**USE BLOCKS 20-23 IF DREDGED AND/OR FILL MATERIAL IS TO BE DISCHARGED**

20. Reason(s) for Discharge

A total of 482 cy of existing material will be excavated from wetland/watercourse areas. Most of the 585 cy of proposed fill consists of replacement materials such as culvert pipes and endwalls or riprap for scour protection at updated drainage outlets. The Fire Pond/Mill Brook channel will be narrowed into the stone channel to remove the open area from the clear zone of the roadway. Please see additional for details at each Impact Area.



21. Type(s) of Material Being Discharged and the Amount of Each Type in Cubic Yards:

Type Amount in Cubic Yards	Type Amount in Cubic Yards	Type Amount in Cubic Yards
Concrete, rock, earthen fill, stone liner wall	: 585cy	

22. Surface Area in Acres of Wetlands or Other Waters Filled (see instructions)

Acres  or  
Linear Feet

23. Description of Avoidance, Minimization, and Compensation (see instructions)

All permanent and temporary, wetland and watercourse impacts for the project total 5,182 sf, which is just over the threshold for requiring an individual mitigation plan. However coordination with the New England District of ACOE has indicated that strict adherence to mitigation ratios or an individual plan won't be required due to the relatively small proportion of permanent wetland impacts proposed. The project has considered factors in the design that will minimize impacts to wetlands and watercourses including reducing the overall standard width of the roadway. See additional.



24. Is Any Portion of the Work Already Complete?  Yes  No IF YES, DESCRIBE THE COMPLETED WORK

N/A

25. Addresses of Adjoining Property Owners, Lessees, Etc., Whose Property Adjoins the Waterbody (if more than can be entered here, please attach a supplemental list).

a. Address- Please see attached abutters list.

City - State - Zip -

b. Address-

City - State - Zip -

c. Address-

City - State - Zip -

d. Address-

City - State - Zip -

e. Address-

City - State - Zip -

26. List of Other Certificates or Approvals/Denials received from other Federal, State, or Local Agencies for Work Described in This Application.

AGENCY	TYPE APPROVAL*	IDENTIFICATION NUMBER	DATE APPLIED	DATE APPROVED	DATE DENIED
CTDEP	IWRD Permit		Concurrent applicat <sup>+</sup>		
CTDEP	Flood Certification		Concurrent applicat <sup>+</sup>		
CTDEP	Gen. Permit		Future application		
	Stormwater				

\* Would include but is not restricted to zoning, building, and flood plain permits

27. Application is hereby made for permit or permits to authorize the work described in this application. I certify that this information in this application is complete and accurate. I further certify that I possess the authority to undertake the work described herein or am acting as the duly authorized agent of the applicant.

SIGNATURE OF APPLICANT DATE SIGNATURE OF AGENT DATE

The Application must be signed by the person who desires to undertake the proposed activity (applicant) or it may be signed by a duly authorized agent if the statement in block 11 has been filled out and signed.

18 U.S.C. Section 1001 provides that: Whoever, in any manner within the jurisdiction of any department or agency of the United States knowingly and willfully falsifies, conceals, or covers up any trick, scheme, or disguises a material fact or makes any false, fictitious or fraudulent statements or representations or makes or uses any false writing or document knowing same to contain any false, fictitious or fraudulent statements or entry, shall be fined not more than \$10,000 or imprisoned not more than five years or both.



DEPARTMENT OF THE ARMY  
US ARMY CORPS OF ENGINEERS  
NEW ENGLAND DISTRICT  
696 VIRGINIA ROAD  
CONCORD MA 01742-2751

March 10, 2014

Regulatory Division  
CENAE-R-PEB  
Permit Number: NAE-2013-1470

Attn: Mr. Mark Alexander  
Connecticut Department of Transportation  
2800 Berlin Turnpike  
P.O. Box 317546  
Newington, CT 06131-7546

Dear Mr. Alexander:

We have reviewed your application to excavate/grade/place fill in approximately 5,182 SF (3,380 SF permanent, 1,302 SF temporary) of Manning Brook, and Mill Brook and adjacent wetlands (4 impact sites) in association with the reconstruction of approximately 2000 LF of Route 31 (Main Street) in Coventry, Connecticut. The project extends from 300 LF north of the Stonehouse Road (Route 275)/Route 31 intersection to about 1000 LF east of Monument Hill Road), and includes reconstruction of short sections of affected intersecting roads (Stonehouse Road, Lake Street and Monument Hill Road) within the project limits. The work is described and shown on the attached plans entitled "RECONSTRUCTION OF ROUTE 31, COVENTRY, CONNECTICUT, STATE PROJECT NO. 32-130", on eighteen (18) sheets, all sheets dated "05/13/13", and on attached "Table 1-2: Wetland Impact Summary Table", undated.

Impacts on stream areas and wetlands are associated with riprap scour protection at culvert endwall/outlet areas, culvert replacements and extension on Manning Brook and Mill Brook, channel improvements (formed concrete liner/stone channel and step pool creation in Mill Brook for fisheries enhancement). Temporary cofferdams/sheet pile containment will be required. The project includes invasive species removal in the project areas at impact areas A and B3.

Based on the information you have provided, we have determined that the proposed activity, which includes a discharge of dredged or fill material in waters or wetlands, will have only minimal individual or cumulative impacts on waters of the United States, including wetlands. Therefore, this work is authorized under the attached Federal permit known as the Connecticut General Permit (GP). This work must be performed in accordance with the terms and conditions of the GP.

You are responsible for complying with all of the GP's requirements. Please review the attached GP carefully, in particular the GP conditions, to be sure you understand its requirements. You should ensure that whoever does the work also fully understands these requirements and that a copy of the permit document and this authorization letter are at the project site throughout the time the work is being performed.

The Connecticut Department of Energy & Environmental Protection (DEEP) has issued a Water Quality Certification (WQC) for this project, as required under Section 401 of the Clean Water Act, based on their review of the project. You must comply with the special conditions of the WQC

approval (attached) issued by the CT DEEP for this project.

This authorization expires on July 15, 2016, unless the GP is modified, suspended, or revoked before then. You must commence or be under contract to commence the work authorized herein by that expiration date and complete the work by July 15, 2017. If not, you must contact this office to determine the need for further authorization before beginning or continuing the activity. We recommend you contact us *before* this permit expires to discuss a permit reissuance.

If you change the plans or construction methods for work within our jurisdiction, please contact us immediately to discuss modification of this authorization. This office must approve any changes before you undertake them.

This authorization requires you to complete and return the enclosed Work Start Notification Form to this office at least two weeks before the anticipated starting date. You must also complete and return the enclosed Compliance Certification Form within one month following the completion of the authorized work (including any required mitigation).

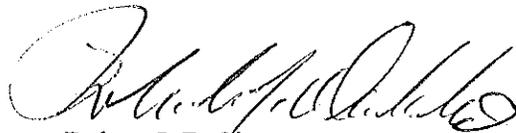
This permit does not obviate the need to obtain other Federal, state, or local authorizations required by law, as listed in Section 1 of the GP. Performing work not specifically authorized by this determination or failing to comply with any special condition(s) provided above or all the terms and conditions of the GP may subject you to the enforcement provisions of our regulations.

This authorization presumes that the work as described above and as shown on your plans noted above is in waters of the U.S. Should you desire to appeal our jurisdiction, please submit a request for an approved jurisdictional determination in writing to this office.

We continually strive to improve our customer service. In order for us to better serve you, we would appreciate your completing our Customer Service Survey located at [http://corpsmapu.usace.army.mil/cm\\_apex/f?p=regulatory\\_survey](http://corpsmapu.usace.army.mil/cm_apex/f?p=regulatory_survey).

Please contact Susan Lee of my staff at (978) 318-8494 if you have any questions.

Sincerely,



Robert J. DeSista  
Chief, Permits & Enforcement Branch  
Regulatory Division

Attachments

Copy Furnished:

Attn: Bob Gilmore  
Connecticut DEEP – IWRD  
79 Elm Street  
Hartford, Connecticut 06106

**Effective Date: July 15, 2011**

**Expiration Date: July 15, 2016**

**Applicant: General Public in the State of Connecticut & Lands Located within the Boundaries of an Indian Reservation**

**DEPARTMENT OF THE ARMY  
GENERAL PERMIT**

**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 a General Permit (GP) for activities in waters of the United States (U.S.) that have minimal individual and cumulative impacts on the aquatic environment within the State of Connecticut and lands located within the exterior boundaries of an Indian reservation.

This GP is separated into sections. **Section 1** is for activities occurring within Inland Waters and Wetlands within the State of Connecticut. **Section 1A** is for activities occurring within Inland Waters and Wetlands located within the boundaries of Mashantucket. **Section 2** is for activities occurring within Tidal, Coastal and Navigable Waters.

In order for activities to qualify for this GP, they must meet the GP's terms and eligibility criteria and stipulations listed in the Definition of Categories (Appendices 1 and 2) as well as the GP's general conditions.

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<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 PERMIT

### General Conditions

The following conditions, as well as Appendices 1 and 2 apply to **ALL** activities authorized under this GP unless otherwise specified.

- 1. Other Permits.** Authorization under this General Permit does not obviate the need to obtain other federal, state, or local authorizations required by law.
  
- 2. Federal Jurisdictional Boundaries.** Applicability of this GP shall be evaluated with reference to Federal jurisdictional boundaries. Applicants are responsible for ensuring that the boundaries depicted satisfy the Federal criteria defined at 33 CFR 328-329. Wetland boundaries need to be delineated for all wetlands on the subject parcel(s), including isolated wetlands and/or vernal pools. This requirement can be waived by the Corps and Connecticut Department of Energy & Environmental Protection, (CT DEEP) on a case-by-case basis and after coordination with the resource agencies. Wetland boundaries shall be delineated in accordance with the applicable Corps of Engineers Wetlands Delineation Manual and regional supplement. 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 [www.nae.usace.army.mil/reg](http://www.nae.usace.army.mil/reg) and then click on “Jurisdictional Limits and Wetlands”. The Natural Resources Conservation Service (NRCS) publishes the current hydric soil definition, criteria and lists which can be found at <http://soils.usda.gov/use/hydric>. For the Field Indicators for Identifying Hydric Soils in New England, visit: [www.neiwpcc.org/hydricsoils.asp](http://www.neiwpcc.org/hydricsoils.asp).
  
- 3. Minimal Direct, Secondary and Cumulative Impacts.**
  - a. Projects authorized by this general permit shall have no more than minimal direct, secondary and cumulative adverse environmental impacts. Applicants shall provide information on secondary and cumulative impacts.
  
  - b. Secondary impacts to waterway and/or wetland areas, (e.g., areas drained, flooded, cleared, excavated or fragmented) shall be added to the total fill area when determining whether the project qualifies for Category 1 or 2. Site clearing, grading and construction activities in the upland habitat within 750 feet surrounding vernal pools are secondary impacts. **(NOTE: Not applicable for activities within the exterior boundaries of the Mashantucket Reservation—see additional criteria specified within Appendix 1)**
  
  - c. Cumulative impacts are the changes in an aquatic ecosystem that are attributable to the collective effect of a number of individual discharges of dredged or fill material. Although the impact of a particular discharge may constitute a minor change in itself, the cumulative effect of numerous such piecemeal changes can result in a major impairment of the water resources and interfere with the productivity and water quality of existing aquatic ecosystems

Mitigation will generally be required to offset unavoidable direct, secondary and temporary impacts in accordance with the April 10, 2008 Mitigation Rule 33 CFR 332. See **General Condition 15** below for additional information regarding mitigation.

**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 cumulative environmental impacts 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 this GP 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 this GP.

**5. Single and Complete Projects** means the total project proposed or accomplished by one owner/developer or partnership or other association of owners/developers.

- a. This GP shall not be used for piecemeal work and shall be applied to single and complete projects. When determining eligibility for a single and complete project, proponents must include any permanent historic fill placed since August 1993 that is associated with that project and all currently proposed temporary and permanent impact areas.
- b. 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.
- c. Unless the Corps determines the activity has independent utility:
  - (1) This GP shall not be used for any activity that is part of an overall project for which an Individual Permit is required.
  - (2) All components of a single project and/or all planned phases of a multi-phased project shall be treated together as constituting one single and complete project.
- d. 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 Category 2 review or an individual permit, then the entire linear project shall be reviewed as one project under Category 2 or the individual permit procedures.

**6. Permit On-Site.** For Category 2 projects, the permittee shall ensure that a copy of this GP and the accompanying authorization letter are at the work site (and the project office) authorized by this GP 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 this GP. This shall be achieved by including the entire permit authorization in the specifications for work. The term “entire permit authorization” means this GP, 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 GP authorization, and no contract or sub-contract shall require or allow unauthorized work in areas of Corps jurisdiction.

**7. Historic Properties.** Any activity authorized by this GP shall comply with Section 106 of the National Historic Preservation Act. Information on the location and existence of historic resources can be obtained from the Connecticut Commission on Culture and Tourism, Historic Preservation and Museum Division, the National Register of Historic Places and the Tribal Historic Preservation Officer (THPO) of both the Mashantucket Pequot Tribe and the Mohegan Tribe. Project proponents shall apply to the Corps for all projects that would otherwise qualify for Category 1 if the authorized activity may have the potential to cause effects to any historic properties listed, determined to be eligible for listing on, or potentially eligible for listing on the National Register of Historic Places, including previously unidentified properties. . These projects may be eligible under Category 2. If the permittee, while accomplishing the activity authorized by this permit, encounters a previously unidentified archaeological or other cultural resource that might be eligible for listing in the National Register of Historic Places, he/she shall immediately notify the District Engineer. The historic properties contacts can be found on Appendix 4.

**8. National Lands.** Any of the following is not eligible under Category 1:

- a. 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.
- b. Work on Corps properties and/or Corps-controlled easement. Contact the Corps Real Estate Division at (978)318-8585 to initiate reviews about both Corps holdings and permit requirements.
- c. Any proposed temporary or permanent modification or use of a federal project (including but not limited to a levee, dike, floodwall, channel, seawall, bulkhead, jetty, wharf pier, or other work built by the United States), 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 that go beyond minor modifications required for normal operations and maintenance and is not eligible for Category 1 and requires review and approval by the Corps pursuant to 33 USC 408.

## 9. Federal Threatened and Endangered Species.

- a. No activity may be authorized under this GP (Category 1 or 2) which would:
  - (1) Be “likely to adversely affect” a threatened or endangered species, a proposed species, designated or proposed critical habitat (all herein referred to as “listed species or habitat”) as identified under the federal Endangered Species Act (ESA),
  - (2) Result in a “take” of any federally-listed, threatened or endangered species of fish or wildlife, or
  - (3) Result in any other violation of Section 9 of the ESA protecting threatened or endangered species of plants.
- b. No activity may be authorized under Category 1 if any listed species or designated critical habitat might be affected or is in the vicinity of the project, or if the project is located in designated critical habitat (see (c) below). The following USFWS and NMFS sites must be referenced to ensure that listed species or critical habitat are not present in the action area or to provide information on federally-listed species or habitat:  
[www.fws.gov/newengland/EndangeredSpec-ConsultationProject\\_Review.htm](http://www.fws.gov/newengland/EndangeredSpec-ConsultationProject_Review.htm) and  
[www.nero.noaa.gov/prot\\_res/esp/ListE&Tspec.pdf](http://www.nero.noaa.gov/prot_res/esp/ListE&Tspec.pdf).
- c. Proponents must submit an application if any of the activities in (a) or (b) may occur and provide information on federally-listed species or habitat to allow the Corps to conduct any required consultation under Section 7 of the ESA. The Endangered Species Act Consultation Handbook – Procedures for Conducting Section 7 Consultations and Conferences, defines action areas as “all areas to be affected directly or indirectly by the federal action and not merely the immediate area involved in the action”. [50 CFR 402.02]

**10. Essential Fish Habitat.** As part of the GP reviewing process, the Corps will coordinate with the NMFS in accordance with the 1996 amendments to the Magnuson-Stevens Fishery Conservation and Management Act (MSA) to protect and conserve the habitat of marine, estuarine and anadromous finfish, mollusks, and crustaceans. This habitat is termed “Essential Fish Habitat,” (EFH) and is broadly defined to include “those waters and substrate necessary to fish for spawning, breeding, feeding and growth to maturity.” All species managed under the MSA have had EFH designations. There are 61 species with EFH in the coastal waters of southern New England. Applicants may be required to describe and identify potential impacts to EFH. For instance, in Connecticut, this act protects Atlantic salmon (*Salmo salar*) habitat. Any work in the main stem or tributary streams of the Connecticut River watershed that are being managed for Atlantic salmon are **NOT** be eligible for authorization under Category 1 of this GP because the activity requires screening for potential impacts to designated EFH. Conservation recommendations regarding the protection of EFH for species managed under the MSA made by NMFS will normally be included as special conditions to any permit issued by the Corps. Information on the location of EFH can be obtained from NMFS. The NMFS has established a web site at [www.nero.nmfs.gov/RO/DOC/appguide1.html](http://www.nero.nmfs.gov/RO/DOC/appguide1.html).

**11. Wild and Scenic Rivers.** Any activity that occurs in the designated main stem of, within 0.25 miles up or downstream of the designated main stem of, or in tributaries within 0.25 miles of the designated main stem of a National Wild and Scenic River, or that has the potential to alter flows within a river within the National Wild and Scenic River System is not eligible for Category 1, regardless of the size of the impacts. This condition applies to both designated Wild and Scenic Rivers and rivers officially designated by Congress as study rivers for possible inclusion while such rivers are in official active study status.

The Corps will consult with the National Park Service (NPS) with regard to potential impacts of the proposed work on the resource values of the wild and scenic river. The culmination of this coordination will be a determination by the NPS and the Corps that the work: (1) may proceed as proposed; (2) may proceed with recommended conditions; or (3) could pose a direct and adverse effect on the resource values of the river and an Individual Permit is required. If preapplication consultation between the applicant and the NPS has occurred whereby NPS has made a determination that the proposed project is appropriate for authorization under this GP (with respect to Wild and Scenic River issues), this determination should be furnished to the Corps with submission of the application.

As of May 31, 2011, 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/wildriverslist.html> and scrolling down to “Connecticut”.

**12. Federal Navigation Project.** Any structure or work that extends closer to the horizontal limits of any Corps 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.

### **13. Navigation.**

- a. 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.
- b. The permittee understands and agrees that, if future operations by the U.S. 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.

**14. 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; and
- d. design or construction deficiencies associated with the permitted work; (e) damage claims associated with any future modification, suspension, or revocation of this permit.

**15. Avoidance, Minimization and Compensatory Mitigation.**

- a. Discharges of dredged or fill material into waters of the U.S., including wetlands, shall be avoided and minimized to the maximum extent practicable. Compensatory mitigation of unavoidable direct and indirect impacts (including temporal loss) is expected for all Category 2 projects. The mitigation will need to be sufficient to replace the suite of aquatic resource functions and services lost as a result of the permitted activity (see the NAE Mitigation Guidance and Recommended Ratios at <http://www.nae.usace.army.mil/reg/Mitigation/CompensatoryMitigationGuidance.pdf>).

Applicants can also pursue minimization by the implementation of low impact development (LID) practices to reduce impervious cover and better manage stormwater. Examples of LID best management practices include, but are not limited to: replacing curbs and gutters with swales; using an open space design for subdivisions; using permeable, pervious or porous pavements; constructing bio-retention systems; and/or, adding a green roof or rain garden. For additional information on these best management practices, including applicability and maintenance and cost considerations, please see <http://cfpub.epa.gov/npdes/stormwater/menuofbmps/index.cfm> and click on post construction.

For additional information see the Corps website at <http://www.nae.usace.army.mil/reg> and click on “Mitigation” to view the April 10, 2008 “Final Compensatory Mitigation Rule” (33 CFR 332) and related documents. The Q&A document states: “In order to reduce risk and uncertainty and help ensure that the required compensation is provided, the rule establishes a preference hierarchy for mitigation options. The most preferred option is mitigation bank credits, which are usually in place before the activity is permitted. In-lieu fee (ILF) program credits are second in the preference hierarchy, because they may involve larger, more ecologically valuable compensatory mitigation projects as compared to permittee-responsible mitigation. Permittee-responsible mitigation is the third option, with three possible circumstances: (1) conducted under a watershed approach, (2) on-site and in kind, and (3) off-site/out-of-kind. While Connecticut is lacking In-Lieu-Fee and Mitigation Bank choices, mitigation will be required on a case-by-case basis. However, when such choices are available, mitigation will be required for all Category 2 projects. Mitigation will become more practical as additional ILF and Banking choices become available in Connecticut.

- b. For coastal structures such as piers and docks, the height above the marsh at all points should be equal to or exceed the width of the deck. The height shall be measured from the marsh substrate to the bottom of the longitudinal support beam. This will help ensure sunlight reaches the area beneath the structure.

- c. Coastal floats must be supported at least 18” above the intertidal and shallow sub-tidal substrate during all tidal cycles.

**16. 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 (see General Condition 17 below). An adequate supply of spill containment equipment shall be maintained on site.

**17. Temporary Fill.** Fill placed into waters of the U.S. (including wetlands) totaling greater than or equal to 5,000 square feet in total area (i.e., the sum of permanent and temporary fill areas) exceeds the Category 1 threshold and may not be discharged without written authorization from the Corps. When temporary fill is used (e.g., access roads, swamp mats, cofferdams), it shall be stabilized and maintained during construction in such a way as to prevent its eroding into portions of waters of the U.S. where it is not authorized and shall be removed immediately following construction. The following criteria must also be met:

- a. Unconfined temporary fill authorized for discharge into flowing water (rivers and streams) shall consist only of clean stone.
- b. Temporary fill authorized for discharge into wetlands shall be placed on geotextile fabric laid on the pre-construction wetland grade. (Swamp and timber mats are excluded from this requirement.)
- c. Temporary fill shall be removed as soon as it is no longer needed, and it shall be disposed of at an upland site and suitably contained to prevent its subsequent erosion into waters of the U.S.
- d. Waters of the U.S. where temporary fill was discharged shall be restored (see **General Condition 18**).
- e. No temporary work shall drain a water of the U.S. by providing a conduit for water on or below the surface.

**18. 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 in the “New England District Compensatory Mitigation Guidance”.

- 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.

**19. 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.erdc.usace.army.mil>. Select “Products/ Services,” “Publications.” Part 5, Chapter 7-8, a (2) c is particularly relevant.

**20. Sedimentation and Erosion Control.** Adequate sedimentation and erosion control management measures, practices and devices, such as phased construction, vegetated filter strips, geotextile silt fences, hay bales or other devices, shall be installed and properly maintained to reduce erosion and retain sediment on-site during and after construction. These measures shall be capable of preventing erosion, of collecting sediment, suspended, and floating materials, and of filtering fine sediment. These devices shall be removed upon completion of work and the disturbed areas shall be stabilized. The sediment collected by these devices shall be removed and placed at an upland location, in a manner that will prevent its later erosion into a waterway or wetland. All exposed soil and other fills shall be permanently stabilized at the earliest practicable date.

## **21. Waterway Crossings.**

- a. All temporary and permanent crossings of waterbodies shall be suitably culverted, bridged, or otherwise designed to withstand and to prevent the restriction of high flows, and to maintain existing low flows, and so as not to obstruct the movement of aquatic life indigenous to the waterbody beyond the actual duration of construction.
- b. Open bottom arches, bridge spans or embedded culverts are generally preferred over traditional culverts and are required for Category 1 projects. However, site constraints (e.g., placing footings) may make use of an open bottom arch, bridge span or embedded culverts impractical, and in these cases well-designed culverts may actually perform better. Project proponents shall consult with the Corps if an open bottom arch, bridge span or embedded culvert is impractical.

- c. No projects involving open trench excavation in flowing waters are allowed in Category 1 unless the permittee utilizes management techniques such as temporary flume pipes, culverts, cofferdams, etc. and maintains normal flows within the stream boundary's confines so the work does not occur in flowing waters. Projects utilizing these management techniques must meet the other Category 1 requirements and all of this GP's terms and conditions. If not, they will require review under the Category 2 screening procedures.
- d. Temporary bridges, culverts, or cofferdams shall be used for equipment access across streams. (**Note:** areas of fill and/or cofferdams must be included in total waterway/wetlands impacts to determine applicability of this GP).
- e. Projects using slip lining (retrofitting an existing culvert by inserting a smaller diameter pipe), plastic pipes, and High Density Polyethylene Pipes (HDPP) are not authorized under Category 1, either as new work or maintenance activities.
- f. For projects that otherwise meet the terms of Category 1, unconfined in-stream construction work shall be conducted during the low flow period June 1 through September 30 in any year except in instances where a specific written exception has been issued by the Connecticut Department of Energy & Environmental Protection. All other projects shall be screened pursuant to Category 2, regardless of the waterway and wetland fill and/or impact area.
- g. All temporary fill must be removed as soon as it is no longer needed and all disturbed areas must be returned to their pre-construction conditions

**22. Discharge of Pollutants.** All activities involving any discharge of pollutants into waters of the U.S. authorized under this GP 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).

**23. Spawning Areas.** Discharges of dredged or fill material, and/or suspended sediment-producing activities in fish and shellfish spawning or nursery areas and amphibian and waterfowl breeding areas shall be avoided. During all times of year, impacts to these areas shall be avoided to the maximum extent practicable.

**24. 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.

**25. 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 environment 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.

**26. Protection of Vernal Pools.** Wetland boundaries for vernal pools and isolated wetlands on the subject parcel(s) must be delineated in accordance with Federal criteria defined at 33 CFR 328-329. For all inland Category 2 projects, the applicant must complete a vernal pool survey of the entire site, not just for the areas being directly impacted. The applicant must report the results of the survey to the Corps. If no vernal pools are found on the site, the applicant must confirm that in writing and also identify the party that conducted the survey and the survey date. This requirement may be waived by the Corps, in writing, on a case-by-case basis. Impacts to uplands in proximity (within 750 feet) to the vernal pools referenced in the Definitions of Categories shall be minimized to the maximum extent possible.

**27. 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 Category 2 inland projects proposing fill in Corps jurisdiction shall include an Invasive Species Control Plan (ISCP).

Additional information can be found at: [www.hort.uconn.edu/cipwg/](http://www.hort.uconn.edu/cipwg/)

**28. 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. To facilitate these inspections, the permittee shall complete and return to the Corps:

- a. For Category 1 Inland projects, the **Category 1 Form (Appendix 1A)**, and the **Compliance Certification Form (Appendix 5)**.
- b. For Category 2 projects, the **Work-Start Notification Form** and the **Compliance Certification Form**. Both are provided as attachments with each Category 2 authorization letter.

**29. Maintenance.** The permittee shall maintain the activity authorized by this GP 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 2 – Coastal Definition of Categories (attached) and/or 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). Information on mosquito ditching and maintenance is provided at [www.nae.usace.army.mil](http://www.nae.usace.army.mil). Go to “Regulatory/Permitting,” and then “Other.”

**30. Property Rights.** This permit does 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.

**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. Restoration.** The permittee, upon receipt of a notice of revocation of authorization under this permit, shall restore the wetland or waterway to its former conditions, without expense to the United States and as directed by the Secretary of the Army or his authorized representative. If the permittee fails to comply with such a directive, the Secretary or his designee may restore the wetland or waterway to its former condition, by contract or otherwise, and recover the cost from the permittee.

**33. 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 or restoration.

**34. 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 permit will not be valid, and the U.S. government may institute appropriate legal proceedings.

**35. 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 District Engineer.

**36. Enforcement cases.** This GP does 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.

**37. Duration of Authorization.** This GP expires five years from the effective date listed at the top of Page 1 of this GP. Activities authorized by this GP 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 this GP's 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 appropriate date. 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 GP current at the time.

Activities authorized under this GP will remain authorized, unless:

- a. the GP is either modified or revoked, or
- b. 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 Category 1 or Category 2 authorizations of this GP will continue to be authorized by this GP after its expiration date.

**38. Previously Authorized Activities:**

- a. Activities completed under the authorizations of past GPs that were in effect at the time the activity was completed will continue to be authorized by those GPs.
- b. Projects that have received written verification or approval from the Corps, based on applications made to the Corps prior to issuance of this GP, regional general permits, or letters of permission shall remain authorized as specified in each authorization.
- c. Activities authorized pursuant to 33 CFR Part 330.3 (“Activities occurring before certain dates”) are not affected by this GP.
- d. 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 this General Permit, 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).

*J. McCarthy*  
for DISTRICT ENGINEER \_\_\_\_\_ DATE 7/15/11

**SECTION 1**  
**ACTIVITIES OCCURRING WITHIN INLAND WATERS & WETLANDS  
LOCATED WITHIN THE STATE OF CONNECTICUT**

**I. ACTIVITIES COVERED:**

The discharge of dredged or fill material into Waters of the United States<sup>1</sup>, which is regulated by the Corps under Section 404 of the Clean Water Act (CWA)<sup>1</sup>

**II. REVIEW PROCESS:**

**1. State and Local Approvals:**

In order for authorizations under this GP 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 approvals as well as any local approvals (see General Condition 1):

**Inland Wetlands and Watercourses Permit** under the Inland Wetlands and Watercourses Act (Connecticut General Statutes (CGS) Sections 22a-36 to 22a-45(a), inclusive)

**Water Diversion Permit** under the Connecticut Water Diversion Policy Act (CGS Sections 22a-365 to 22a-378(a), inclusive)

**Stream Channel Encroachment Lines Permit** (CGS Sections 22a-342 to 22a-349(a), inclusive)

**Dam Safety Construction Permit** (CGS Sections 22a-401 to 22a-411, inclusive)

**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.

**Flood Management Certification (CGS Sections 25-68b through 25-68h)**

The Connecticut Department of Energy & Environmental Protection, Inland Water Resources Division (CT DEEP IWRD) has conditionally granted WQC for Category 1 activities in inland wetlands and waterways provided those activities meet the criteria as contained in the attached definition of categories.

The U.S. EPA granted WQC for Category 1 activities located on land within the exterior boundaries of an Indian Reservation.

The CT DEEP- IWRD has denied WQC for Category 2 activities in inland wetlands and waterways, until the Commissioner issues a written 401 eligibility determination.

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<sup>1</sup>Defined at 33 CFR 328

## **2. General Permit Review Categories:**

**a. Category 1 – An application to the Corps is NOT required. However, submittal of the attached Category 1 Form at Appendix 1A to the Corps and CT DEEP, IWRD is required prior to commencement of work authorized by this GP.**

### **Eligibility Criteria**

Activities in Connecticut and lands located within the exterior boundaries of an Indian reservation that meet the following criteria are eligible under Category 1 of this General Permit:

- are subject to Corps jurisdiction (See General Condition 2),
- meet the definition of Category 1 in the attached Appendix 1, Definition of Categories, and
- meet the General Conditions of the GP

Project proponents seeking Category 1 authorizations must comply with this GP's 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 Connecticut Commission on Culture and Tourism and any appropriate Indian tribes, is recommended when there is a high likelihood of the presence of resources of concern.

Projects not eligible under Category 1 of this GP may be screened under Category 2, provided they meet the criteria as defined in the attached Definition of Categories for Category 2 activities.

### **b. Category 2 – An application to the Corps is required.**

### **Eligibility Criteria**

Activities in Connecticut and lands located within the exterior boundaries of an Indian reservation that meet the following criteria are eligible under Category 2 of this General Permit:

- are subject to Corps jurisdiction (See General Condition 2),
- meet the definition of Category 2 in the attached Appendix 1, Definition of Categories, and
- meet the General Conditions of the GP

## **3. Applying for a Category 2 permit:**

A Corps application form (ENG Form 4345) is required for Category 2 activities and can be found on our website: [www.nae.usace.army.mil/reg](http://www.nae.usace.army.mil/reg) under forms as well as a list of required additional information.

Applicants must also submit the following to the Corps:

- 2 copies of the application form,
- one set of 8.5" x 11" drawings and one large-scale drawing,
- 2 copies of the wetlands functions and values assessment,
- 2 copies of Federal wetland delineation documentation (data sheets),

- one copy of the CT DEEP addendum found at: [http://www.ct.gov/dep/lib/dep/Permits\\_and\\_Licenses/LandUse\\_General\\_Permits%5CInland\\_Water\\_General\\_Permits/CT\\_addendum\\_app.pdf](http://www.ct.gov/dep/lib/dep/Permits_and_Licenses/LandUse_General_Permits%5CInland_Water_General_Permits/CT_addendum_app.pdf),
- one copy of any correspondence with the Connecticut Commission on Culture and Tourism and Tribal Historic Preservation Officer indicating coordination with these entities,
- an Invasive Species Control Plan (See **General Condition 27**), and
- a plan describing any proposed mitigation.

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” drawings, large scale drawings;
- 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 Category 2 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 criteria in paragraph 2 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.

**NOTE: For projects receiving State funding with work proposed within a FEMA floodway/floodplain, it is recommended that applicants apply for and receive a Flood Management Certification from CT DEEP, IWRD if one is required, before applying to the Corps.**

**Written approval from the Corps for Category 2 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 Category 1 or Category 2 of this General Permit is not required.

**Individual Permit Procedures:** Work that is **NOT** eligible under Category 2 as defined in the attached Appendix 1, Definition of Categories, or that does not meet the terms and conditions of this GP, 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 before Corps’ permit issuance. **The application form and instructions for Section 401 Water Quality Certification are available from the Connecticut DEP web site at <http://www.ct.gov/dep/>.**

## The following activities ARE eligible under CATEGORY 2:

### 2. A. NEW FILL AND/OR FILL ASSOCIATED WITH EXCAVATION

5,000 s.f. to less than 1 acre of Fill and Secondary Impacts in Inland Waters and/or Wetlands.

Direct fill impacts include all temporary and permanent fill and excavation discharges resulting from a single and complete project.

Secondary impacts include, but are not limited to impacts to inland waters or wetlands drained, dredged, flooded, cleared or degraded resulting from a single and complete project. (See 40 CFR 230.11 (g) and (h))

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### LIMITATIONS FOR SPECIFIC PROJECT ACTIVITIES:

#### UTILITY LINE RIGHT-OF-WAY CROSSING:

- The uppermost 12 inches of the trench is backfilled with native soil or streambed material, as appropriate, consistent with the adjacent soil or streambed material, and
- The right-of-way is managed to prevent the introduction, establishment, or spread of plant species determined by the Connecticut Invasive Plants Council to be invasive or potentially invasive.  
[http://invasives.eeb.uconn.edu/ipane/ctcouncil/CT\\_Invasive\\_Plant\\_List.htm](http://invasives.eeb.uconn.edu/ipane/ctcouncil/CT_Invasive_Plant_List.htm)
- Temporary mats are not counted towards the 1 acre threshold provided they are adequately cleaned after previous use, removed immediately after completion of construction, and disposed of at an upland site.

**STREAM, RIVER, BROOK CROSSINGS.** The following are required for driveway or roadway crossings constructed on streams, rivers, brooks and their tributaries. These provisions do not apply to crossings of drainage ditches or waters with no definable channel.

- **CROSSING CONSTRUCTED USING A BRIDGE OR OPEN-BOTTOM STRUCTURE:**
  - Spans at least 1.2 times the watercourse bank full width,
  - Has an openness ratio<sup>(5)</sup> equal to or greater than 0.25 meters, and
  - Allows for continuous flow of the 50-year frequency storm flows
- **CROSSING CONSTRUCTED USING A CULVERT:**
  - The use of a bridge or open-bottom structure is determined to be not practicable,
  - For a crossing constructed with a **single box or pipe arch culvert**, the inverts are set not less than 12 inches below the elevation of the natural streambed,
  - For a crossing constructed with **multiple box or pipe arch culverts**, the inverts of one of the boxes or pipe arch culverts are set at least 12 inches below the elevation of the natural streambed,
  - For a crossing constructed with a **pipe culvert**, the inverts are set such that not less than 25% of the diameter of the pipe or 12 inches, whichever is less, is set below the elevation of the natural stream bed,
  - The culvert gradient (slope) is no steeper than the streambed gradient immediately upstream or downstream of the culvert,
  - The culvert is backfilled with natural substrate material matching upstream and downstream substrate,
  - The culvert has an openness ratio<sup>(5)</sup> equal to or greater than 0.25 meters
  - The structure does not result in a change in the normal water surface elevation of the upstream waters or wetlands, and
  - The structure allows for continuous flow of the 50-year frequency storm flows
  - There is no practicable alternative location for the crossing that would have less environmental impacts.

**NOTE:** In instances where it is determined by the agencies that it is not practicable to construct a crossing consistent with the standards, the crossing may be authorized as a Category 2 project provided that the crossing is constructed in a manner that minimizes impediments to fish and aquatic life passage to the greatest extent practicable. A mere showing of expense will not necessarily determine that compliance with the standards is not practicable. Documentation should be submitted with the Category 2 application package.

## 2. B. STREAM BANK STABILIZATION

Stream Bank Stabilization not to exceed 500 feet in length with the following limitations:

- Fill not to exceed an average of 1 cubic yard per linear foot below ordinary high water
- No fill within the streambed beyond the toe of slope of the stream bank, and
- Work limited to the period June 1 through September 30

**NOTE:** Length is defined as the sum of the lengths of bank stabilization work along each bank of the inland water.

## 2. C. REPAIR & MAINTENANCE OF EXISTING AUTHORIZED OR GRANDFATHERED FILL

Replacement of Non-Serviceable Fills, or Repair or Maintenance of Serviceable Fills with horizontal expansion of less than 1 acre or with a change in use.

### LIMITATIONS FOR SPECIFIC PROJECT ACTIVITIES:

**REPLACEMENT OF EXISTING STREAM, RIVER, BROOK CROSSINGS.** The following are required for the replacement of existing driveway or roadway crossings constructed on streams, rivers, brooks and their tributaries. These provisions do not apply to crossings of drainage ditches or waters with no definable channel.

- **CROSSING RECONSTRUCTED USING A BRIDGE OR OPEN-BOTTOM STRUCTURE:**
  - Spans at least 1.2 times the watercourse bank full width,
  - Has an openness ratio<sup>(5)</sup> equal to or greater than 0.25 meters, and
  - Allows for continuous flow of the 50-year frequency storm flows
- **CROSSING RECONSTRUCTED USING A CULVERT:**
  - The use of a bridge or open-bottom structure is determined to be not practicable,
  - For a crossing constructed with a **single box or pipe arch culvert**, the inverts are set not less than 12 inches below the elevation of the natural streambed,
  - For a crossing constructed with **multiple box or pipe arch culverts**, the inverts of one of the boxes or pipe arch culverts are set at least 12 inches below the elevation of the natural streambed,
  - For a crossing constructed with a **pipe culvert**, the inverts are set such that not less than diameter of the pipe or 12 inches, whichever is less, is set below the elevation of the natural stream bed,
  - The culvert is backfilled with natural substrate material matching upstream and downstream substrate,
  - The culvert has an openness ratio<sup>(5)</sup> equal to or greater than 0.25 meters
  - The structure does not result in a change in the normal water surface elevation of the upstream waters or wetlands, and
  - The structure allows for continuous flow of the 50-year frequency storm flows
- **UTILITY LINE RIGHT-OF-WAY CROSSING:**

Temporary mats are not counted towards the 1 acre threshold provided they are adequately cleaned after previous use, removed immediately after completion of construction ,and disposed of at an upland site

**NOTE:** In instances where it is determined by the agencies that it is not practicable to construct a crossing consistent with the standards, the crossing may be authorized as a Category 2 project provided that the crossing is constructed in a manner that minimizes impediments to fish and aquatic life passage to the greatest extent practicable. A mere showing of expense will not necessarily determine that compliance with the standards is not practicable. Documentation should be submitted with the Category 2 application package.

**2. D. WETLAND OR STREAM RESTORATION OR ENHANCEMENT**

Such projects with any amount of impact may be screened for eligibility under Category 2. The Corps, in concurrence with State and Federal agencies, must determine that net adverse effects are minimal.

**2. E. POND OR LAKE RESTORATION OR ENHANCEMENT**

Such projects with any amount of impact may be screened for eligibility under Category 2. The Corps, in concurrence with the Connecticut Department of Energy & Environmental Protection, Inland Water Resources Division (CT DEEP, IWRD), must determine that net adverse effects are minimal.

**LIMITATIONS:**

- There is no horizontal expansion of the pond or lake.
- Excavation is limited to restoring the pond or lake basin to its original contours through the removal of accumulated material,
- Excavated material is disposed outside of inland waters, wetlands and floodplains,
- The area being dredged is physically isolated from adjoining areas of flowing water during construction,
- Best management practices are employed to avoid creating erosion, sedimentation or water quality degradation during excavation and during any period of dewatering and refilling,
- Adequate littoral zones and cover are maintained to provide habitat suitable for supporting fish and other aquatic life during construction, and following completion of the project
- During the period of pond or lake refilling, continual downstream flow is maintained consistent with the requirements under Water Diversion Regulations, Section 22a-377(b)-1(b) of the Regulations of Connecticut State Agencies.

## DEFINITIONS

- (1) **Waters of the U. S.:** Inland rivers, streams, brooks, lakes, ponds and wetlands. [Refer to Title 33 CFR 328 and Section 1362 Federal Clean Water Act], including navigable waters.
- (2) **Navigable Waters:** Waters that are subject to the ebb and flow of the tide, and Federally designated navigable waters which in Connecticut includes the Connecticut River to the Massachusetts state line. [Refer to Title 33 CFR Part 329 and Section 1362 Federal Clean Water Act]
- (3) **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 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. **(NOTE: The Corps will determine on a case-by-case basis which vernal pools are within their jurisdiction. When Corps jurisdiction over a project has been established, impacts to vernal pools from project activities will be considered. All vernal pools are subject to the jurisdiction of the CT DEEP under Connecticut Water Quality Standards or, the Mashantucket Pequot Tribal Nation under the MPTN IWWC Regulation.)**
- (4) **Threatened, Endangered or Special Concern Species; Significant Natural Communities:** Species listed by CT DEEP pursuant to Chapter 495 of the Connecticut General Statute as threatened or endangered species or species of special concern. Known locations of threatened and endangered species and species of special concern, and significant natural communities are identified on maps entitled “State and Federal Listed Species and Significant Natural Communities“, as amended. These maps are available at city or town clerk offices and in the CT DEEP File Room located on the store level of 79 Elm Street, Hartford and on their website: <http://www.ct.gov/dep/>
- (5) **Openness Ratio:** The cross-sectional area (in square meters) of the opening of a structure divided by the length (measured in meters) of the structure. For a box culvert, openness ratio = (height x width)/length (measured in meters). The imbedded portion of the culvert is not included in the cross-sectional area used for calculating the openness ratio.
- (6) **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.

## APPENDIX 4

### 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

##### ***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 PROPERTIES**

#### ***Tribal Historic Preservation Officers***

Mashantucket Pequot Tribal Historic Pres. Officer  
Attn: Ms. Elaine Thomas, THPO  
Mashantucket Pequot Tribal Nation  
550 Trolley Line Boulevard  
P. O. Box 3202  
Mashantucket, Connecticut 06338-3202  
phone (860) 396-7570  
fax (860) 396-6745

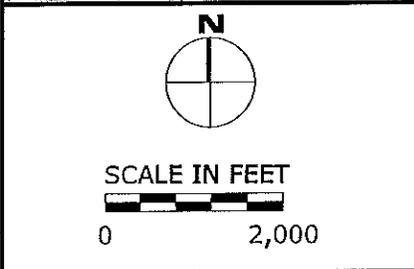
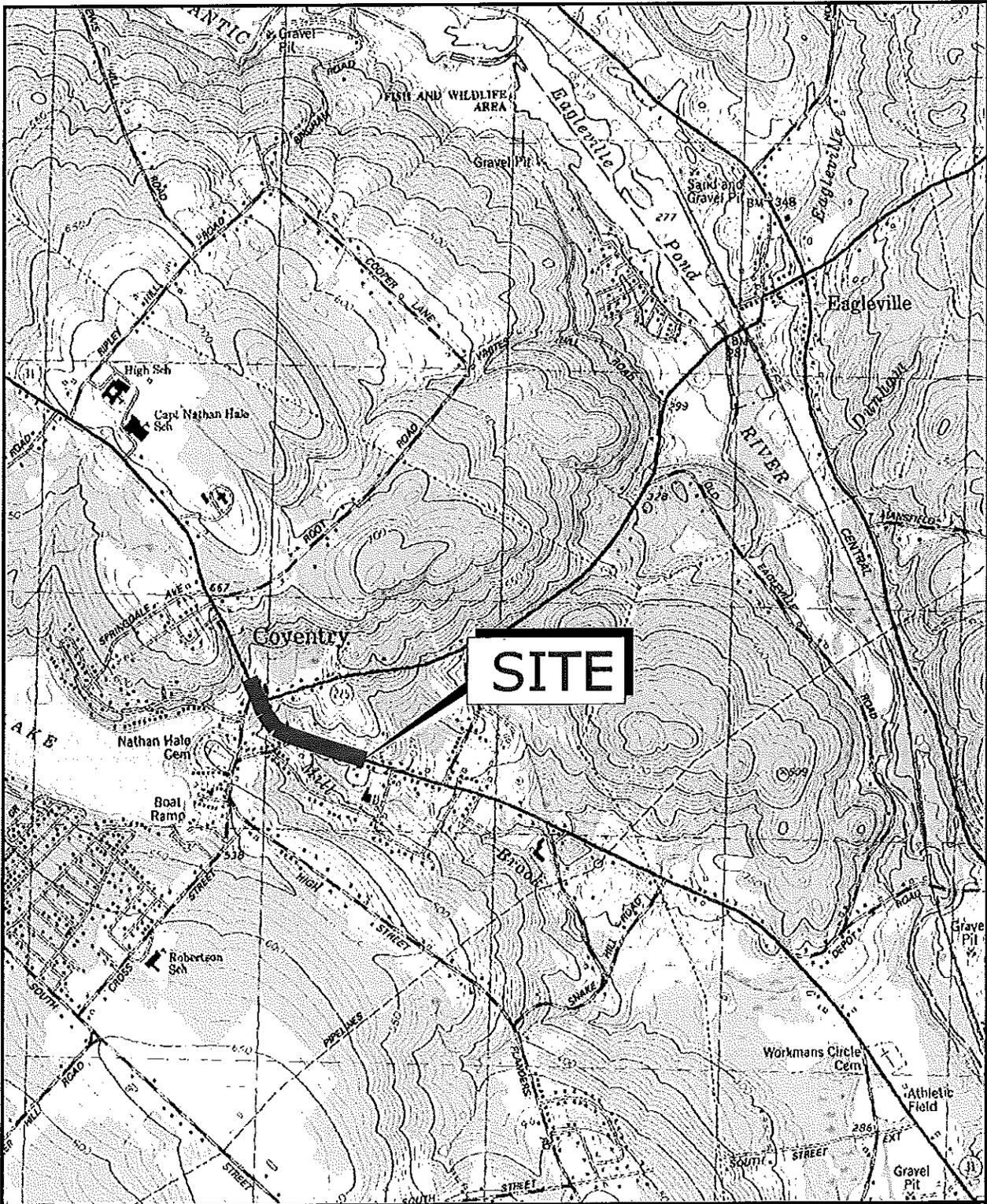
The Mohegan Tribe  
James Quinn  
Tribal Historic Preservation Officer  
13 Crow Hill Rd.  
Uncasville, CT 06382  
(860) 862-6393

#### ***Archaeological Information***

Connecticut Commission on Culture and Tourism  
Historic Preservation & Museum Division  
One Constitution Plaza, 2<sup>nd</sup> Floor  
Hartford, Connecticut 06103-6103  
(860) 424-3005

### **4. ORGANIZATIONAL WEBSITES**

U. S. Army Corps of Engineers [www.nae.usace.army.mil](http://www.nae.usace.army.mil) (click “Regulatory/Permitting”)  
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 [www.ct.gov/dep/](http://www.ct.gov/dep/)  
Connecticut Dept. of Agriculture, Bureau of Aquaculture & Laboratory [www.ct.gov/doag/](http://www.ct.gov/doag/)  
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)



**SITE LOCUS**

RECONSTRUCTION OF ROUTE 31  
 COVENTRY, CONNECTICUT, STATE  
 PROJECT NO. 32-130  
 UNITED STATES GEOLOGICAL SURVEY  
 (USGS) TOPOGRAPHIC QUADRANGLE MAP

**BSC GROUP**

Source: UCONN MAGIC  
 USGS Quadrangle Map:  
 Coventry

**RECONSTRUCTION OF ROUTE 31, COVENTRY,  
CONNECTICUT STATE PROJECT NO. 32-130**

**INDEX OF PLATES**

<u>DESCRIPTION</u>	<u>SHEET NUMBER</u>
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ROADWAY CROSS SECTION 'A-A'	4
IMPACT AREA 'B' - FIRE POND NORTH (B1), CENTRAL (B2), AND SOUTH (B3)	5
IMPACT AREA 'B1' - FIRE POND NORTH ROADWAY CROSS SECTION 'A-A'	6
IMPACT AREA 'B2' - FIRE POND CENTRAL STONE CHANNEL PLAN	7
IMPACT AREA 'B2' - FIRE POND CENTRAL STONE CHANNEL PROFILE	8
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PLANT SCHEDULE	18

**WETLAND AND WATERCOURSE IMPACT SUMMARY**

**IMPACT AREA 'A'**  
 390 S.F. PERMANENT  
 85 S.F. TEMPORARY

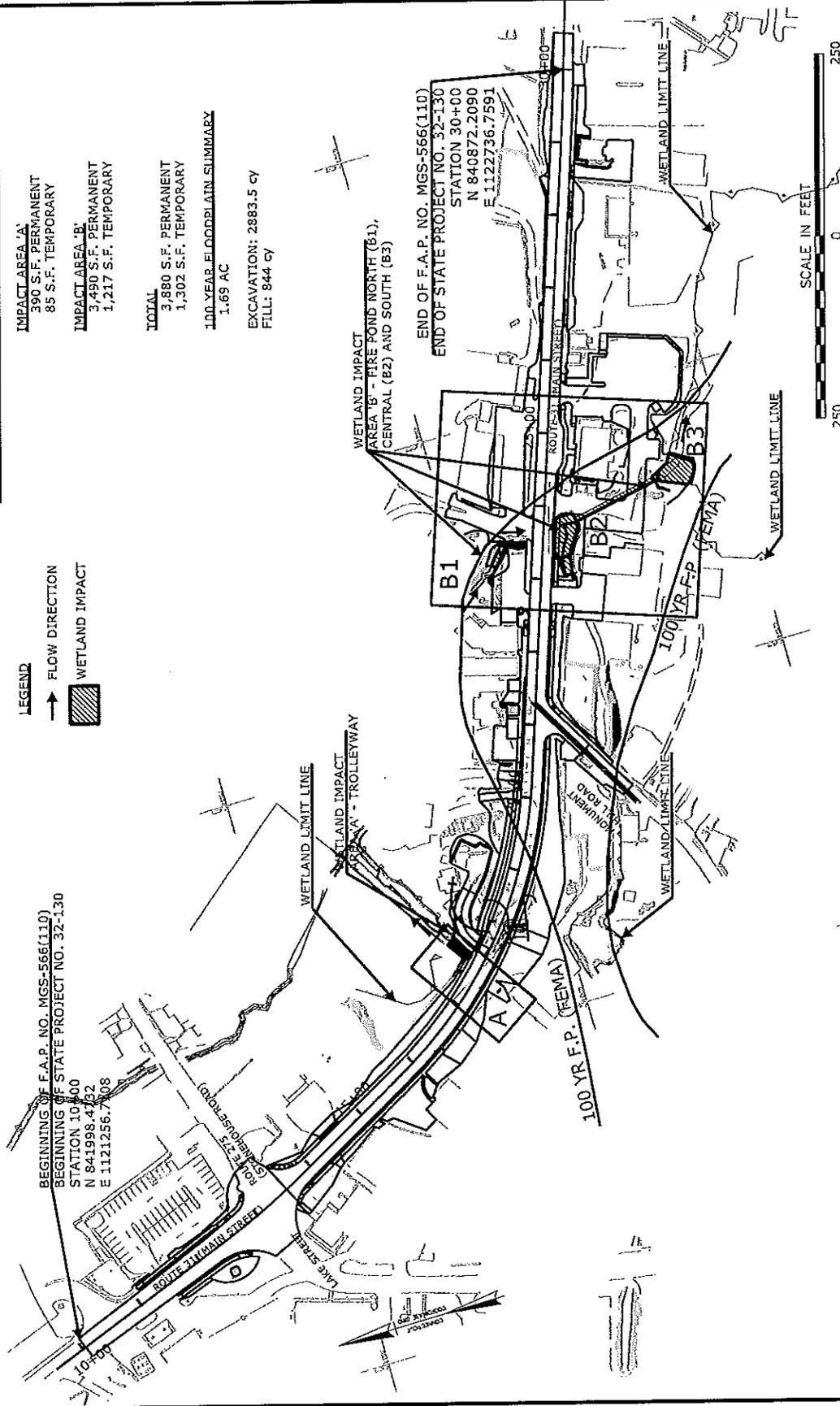
**IMPACT AREA 'B'**  
 3,490 S.F. PERMANENT  
 1,217 S.F. TEMPORARY

**TOTAL**  
 3,880 S.F. PERMANENT  
 1,302 S.F. TEMPORARY

**100-YEAR FLOODPLAIN SUMMARY**  
 1.69 AC

EXCAVATION: 2883.5 cy  
 FILL: 844 cy

**LEGEND**  
 → FLOW DIRECTION  
 WETLAND IMPACT



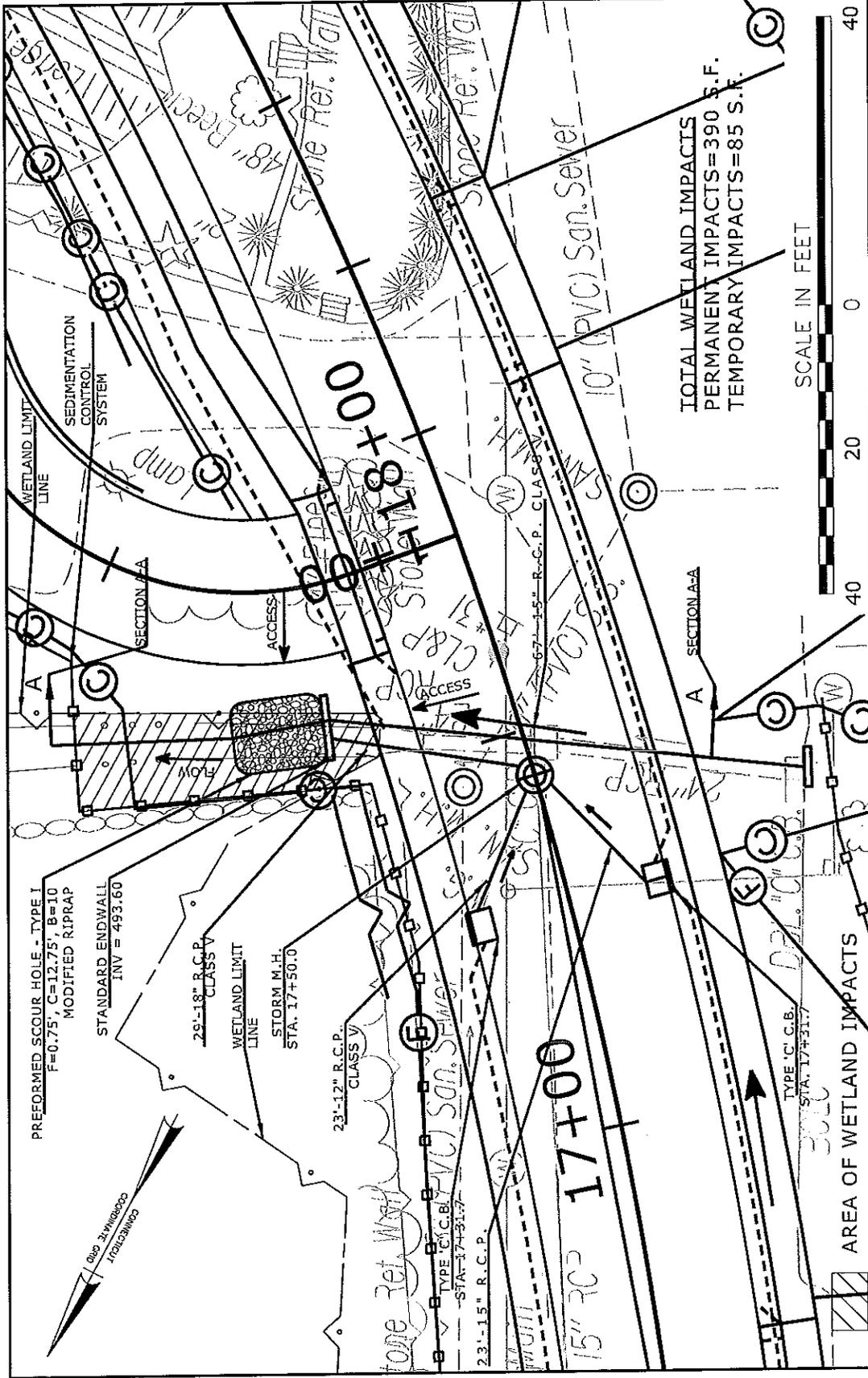
**RECONSTRUCTION OF ROUTE 31, COVENTRY,  
 CONNECTICUT STATE PROJECT NO. 32-130  
 OVERALL LAYOUT**

DATE: 05/13/13

APPLICANT: CONNECTICUT DEPARTMENT OF  
 TRANSPORTATION  
 2800 BERLIN TURNPIKE  
 NEWINGTON, CONNECTICUT

TOLLAND COUNTY  
 COVENTRY, CONNECTICUT

**BSC GROUP**  
 180 Glastonbury Boulevard  
 Suite 103  
 Glastonbury, Connecticut 06033  
 860 652 8227



RECONSTRUCTION OF ROUTE 31, COVENTRY, CONNECTICUT, STATE PROJECT NO. 32-130  
 IMPACT AREA 'A'-TROLLEYWAY

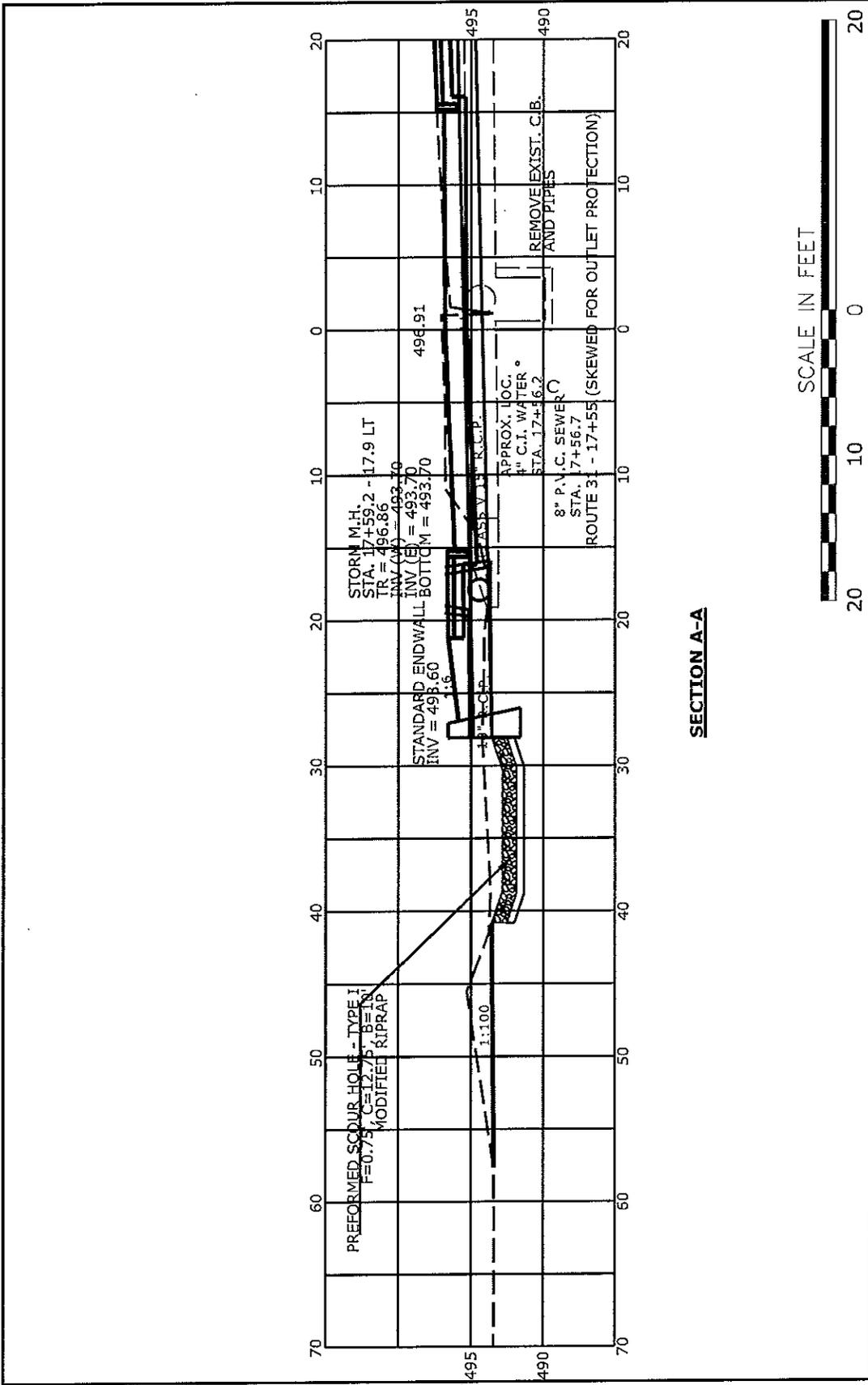
DATE: 05/13/13

APPLICANT: CONNECTICUT DEPARTMENT OF TRANSPORTATION  
 2800 BERLIN TURNPIKE  
 NEWINGTON, CONNECTICUT

TOLLAND COUNTY  
 COVENTRY, CONNECTICUT

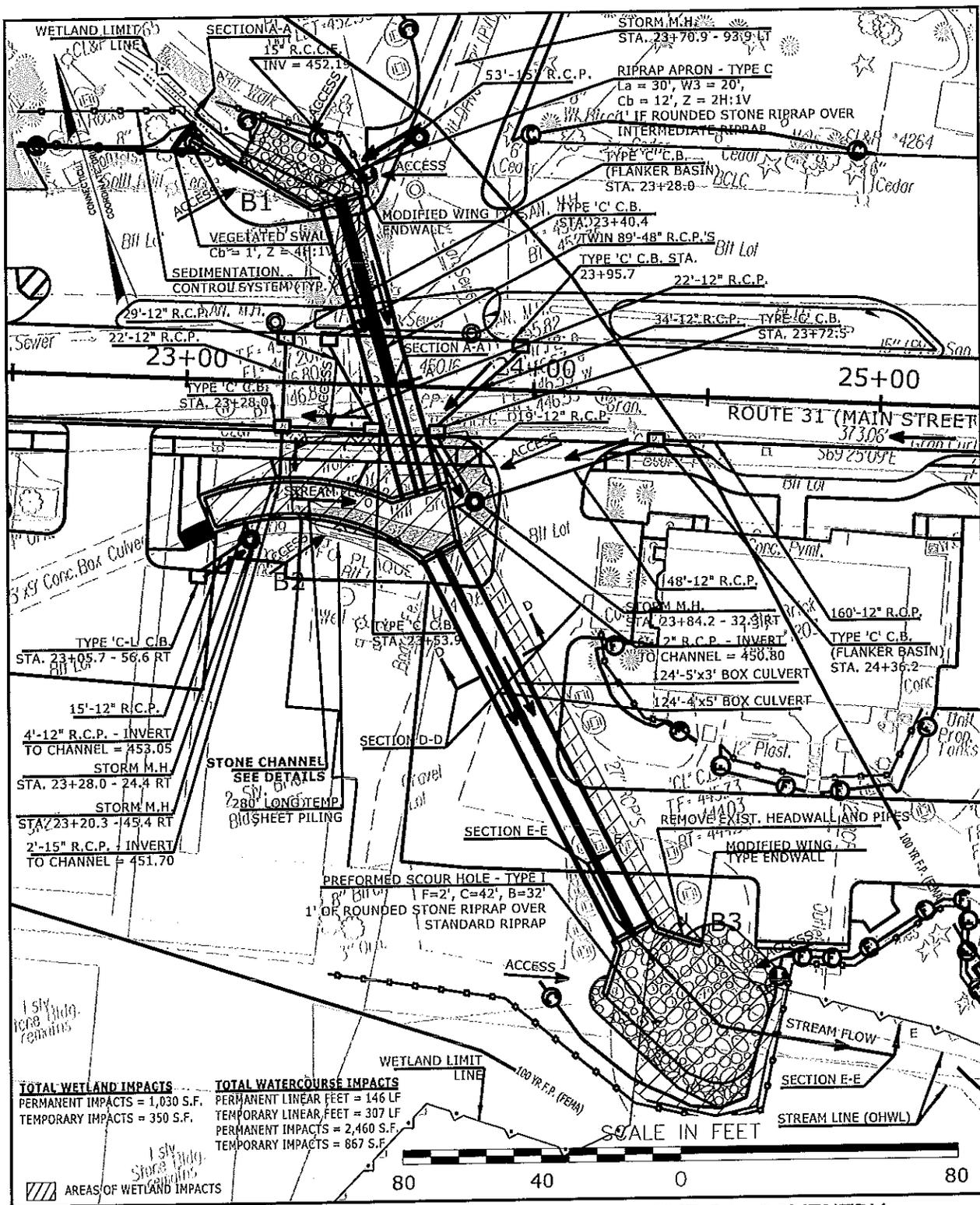
SHEET 3 OF 18

**BSC GROUP**  
 180 Glastonbury Boulevard  
 Suite 103  
 Glastonbury, Connecticut 06033  
 860 652 8227



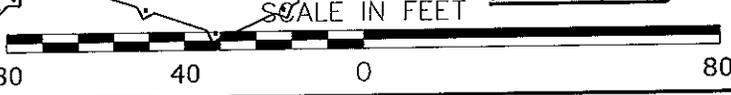
**SECTION A-A**

<p>DATE: 05/13/13</p>	<p>RECONSTRUCTION OF ROUTE 31, COVENTRY, CONNECTICUT, STATE PROJECT NO. 32-130          IMPACT AREA 'A' - TROLLEYWAY - SECTION 'A-A'</p>	<p><b>BSC GROUP</b>          180 Glastonbury Boulevard          Suite 103          Glastonbury, Connecticut 06033          860 652 8227</p>
<p>SHEET 4 OF 18</p>	<p>APPLICANT: CONNECTICUT DEPARTMENT OF TRANSPORTATION          2800 BERLIN TURNPIKE          NEWINGTON, CONNECTICUT</p>	<p>TOLLAND COUNTY          COVENTRY, CONNECTICUT</p>

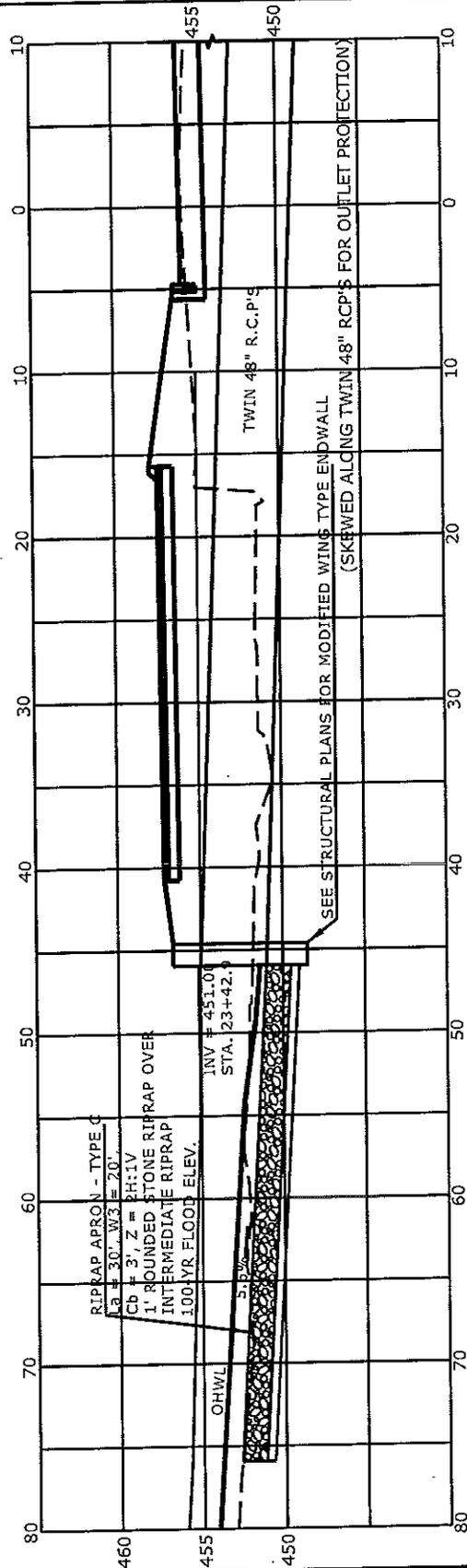


**TOTAL WETLAND IMPACTS**  
 PERMANENT IMPACTS = 1,030 S.F.  
 TEMPORARY IMPACTS = 350 S.F.

**TOTAL WATERCOURSE IMPACTS**  
 PERMANENT LINEAR FEET = 146 LF  
 TEMPORARY LINEAR FEET = 307 LF  
 PERMANENT IMPACTS = 2,460 S.F.  
 TEMPORARY IMPACTS = 867 S.F.



<p><b>BSC GROUP</b>          180 Glastonbury Boulevard          Suite 103          Glastonbury, Connecticut 06033          860 652 8227</p>	<b>RECONSTRUCTION OF ROUTE 31, COVENTRY,          CONNECTICUT, STATE PROJECT NO. 32-130          IMPACT AREA 'B' - FIRE POND NORTH (B1), CENTRAL (B2)          AND SOUTH (B3)</b>	
	TOLLAND COUNTY COVENTRY, CONNECTICUT	APPLICANT: CONNECTICUT DEPARTMENT OF TRANSPORTATION 2800 BERLIN TURNPIKE NEWINGTON, CONNECTICUT

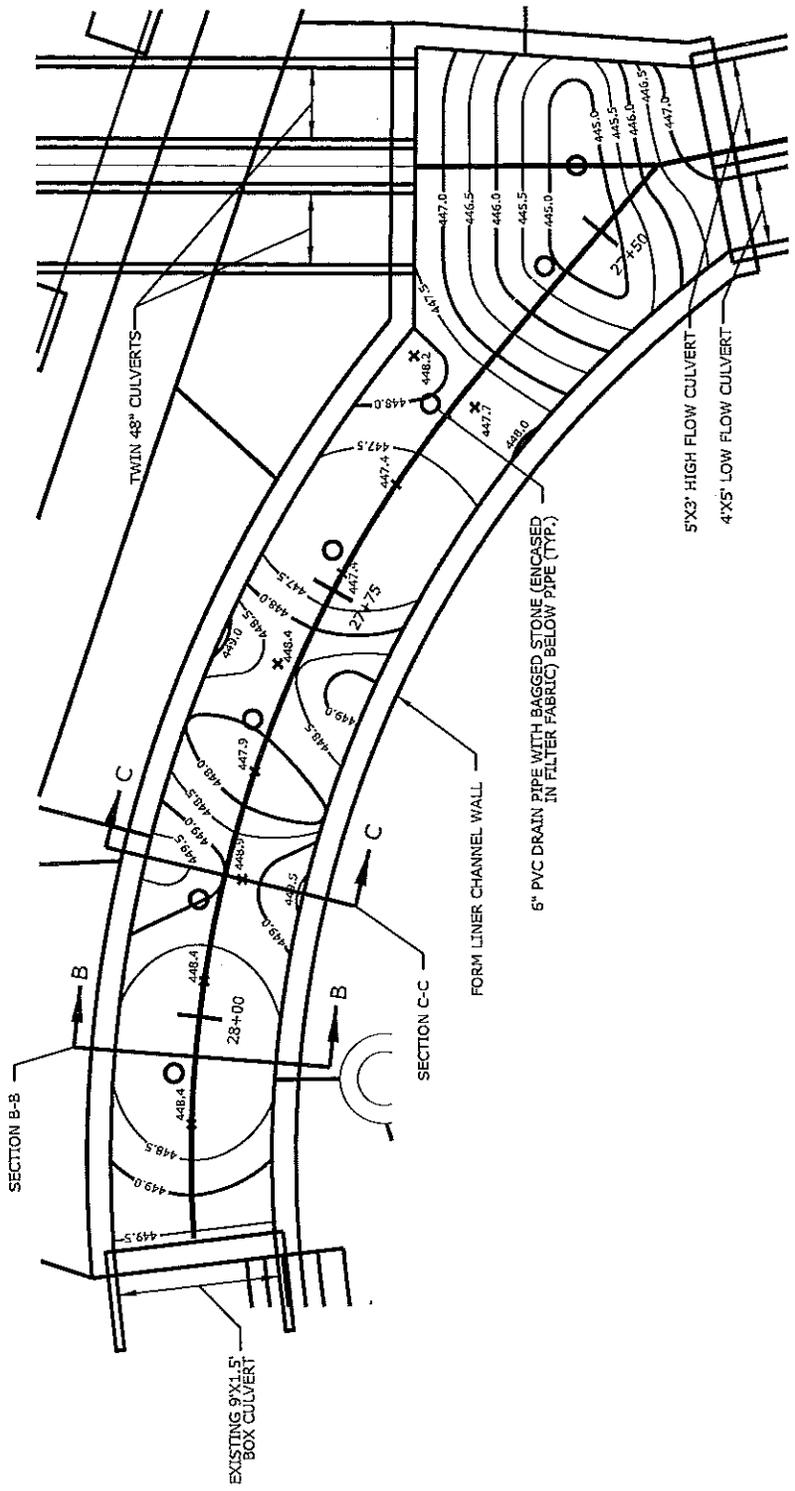


**SECTION A-A**

SCALE IN FEET



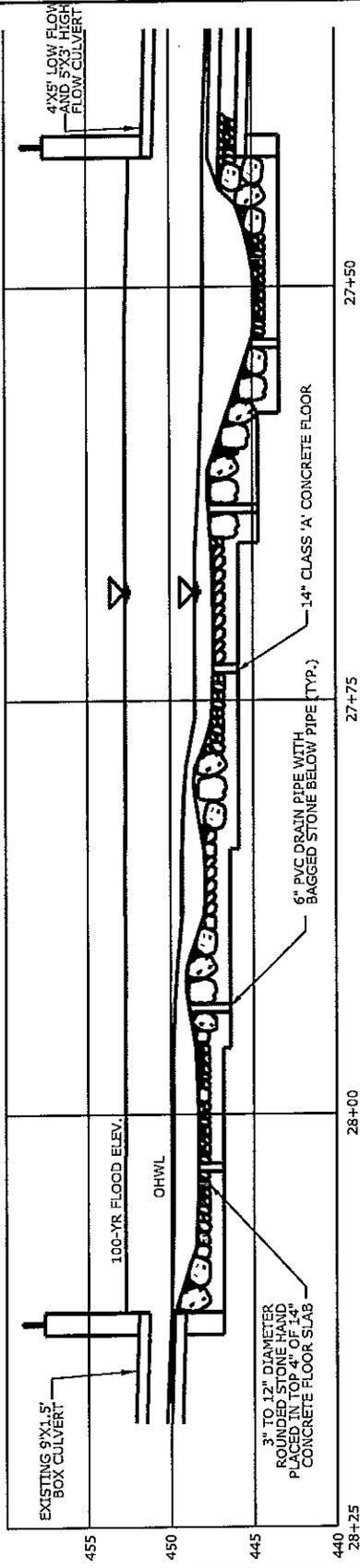
<p><b>BSC GROUP</b>          180 Glastonbury Boulevard          Suite 103          Glastonbury, Connecticut 06033          860 652 8227</p>	<p>RECONSTRUCTION OF ROUTE 31, COVENTRY,          CONNECTICUT, STATE PROJECT NO. 32-130          IMPACT AREA 'B1' - FIRE POND NORTH - SECTION 'A-A'</p>	<p>DATE: 05/13/13</p>
<p>TOLLAND COUNTY          COVENTRY, CONNECTICUT</p>	<p>APPLICANT: CONNECTICUT DEPARTMENT OF          TRANSPORTATION          2800 BERLIN TURNPIKE          NEWINGTON, CONNECTICUT</p>	<p>SHEET 6 OF 18</p>



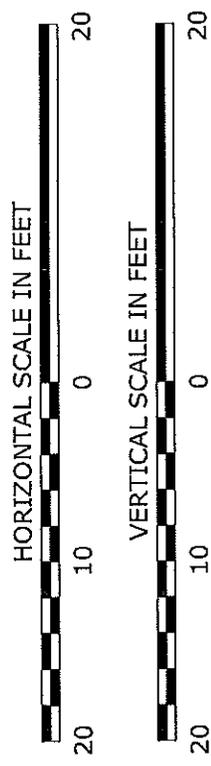
**STONE CHANNEL PLAN**



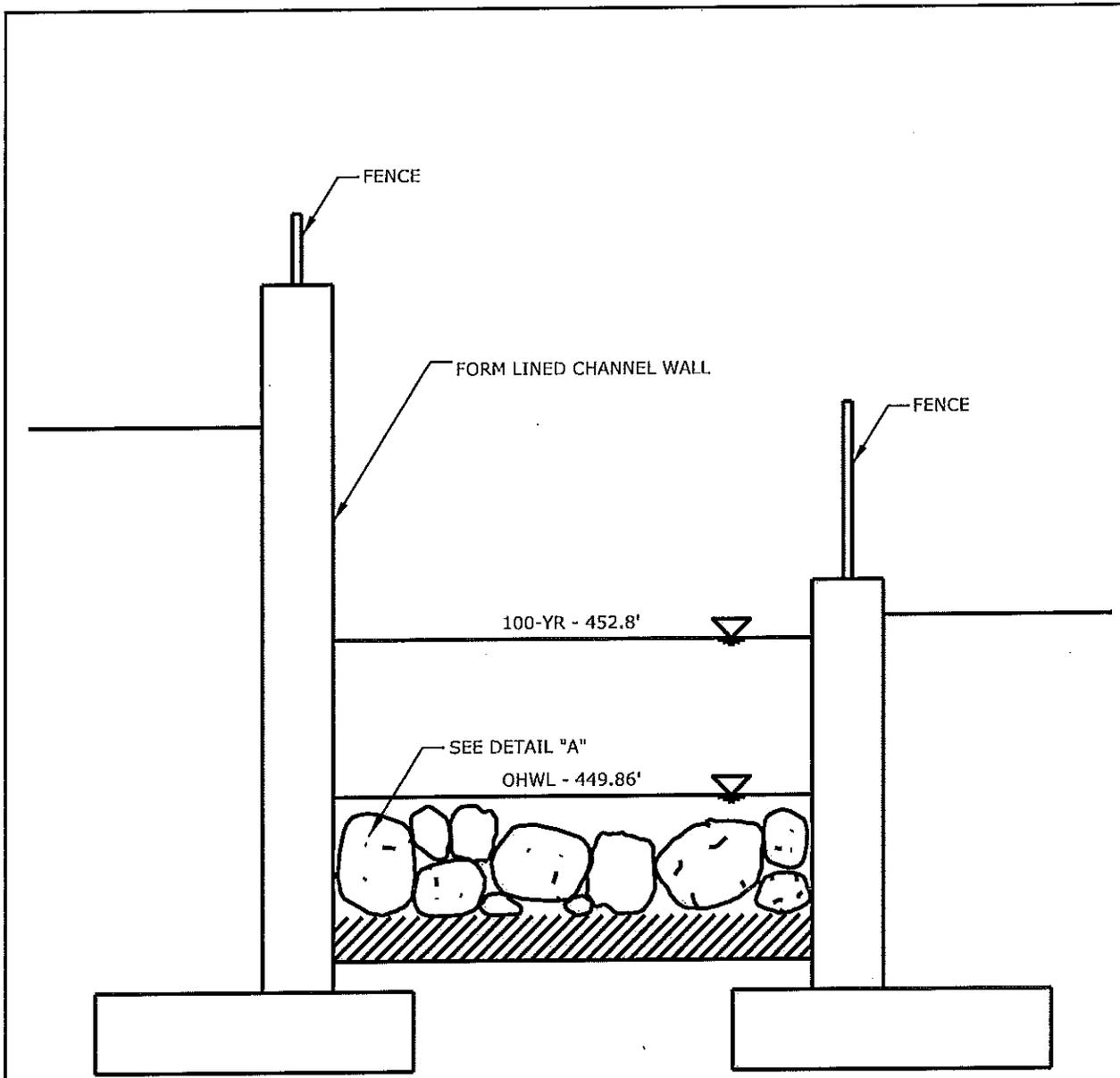
<p><b>BSC GROUP</b>          180 Glastonbury Boulevard          Suite 103          Glastonbury, Connecticut 06033          860 652 8227</p>	<p>RECONSTRUCTION OF ROUTE 31, COVENTRY,          CONNECTICUT, STATE PROJECT NO. 32-130,          IMPACT AREA 'B2' - FIRE POND CENTRAL - STONE          CHANNEL PLAN</p>	<p>DATE: 05/13/13</p>
<p>TOLLAND COUNTY          COVENTRY, CONNECTICUT</p>	<p>APPLICANT: CONNECTICUT DEPARTMENT OF          TRANSPORTATION          2800 BERLIN TURNPIKE          NEWINGTON, CONNECTICUT</p>	<p>SHEET 7 OF 18</p>



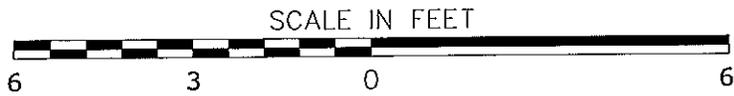
**STONE CHANNEL PROFILE**



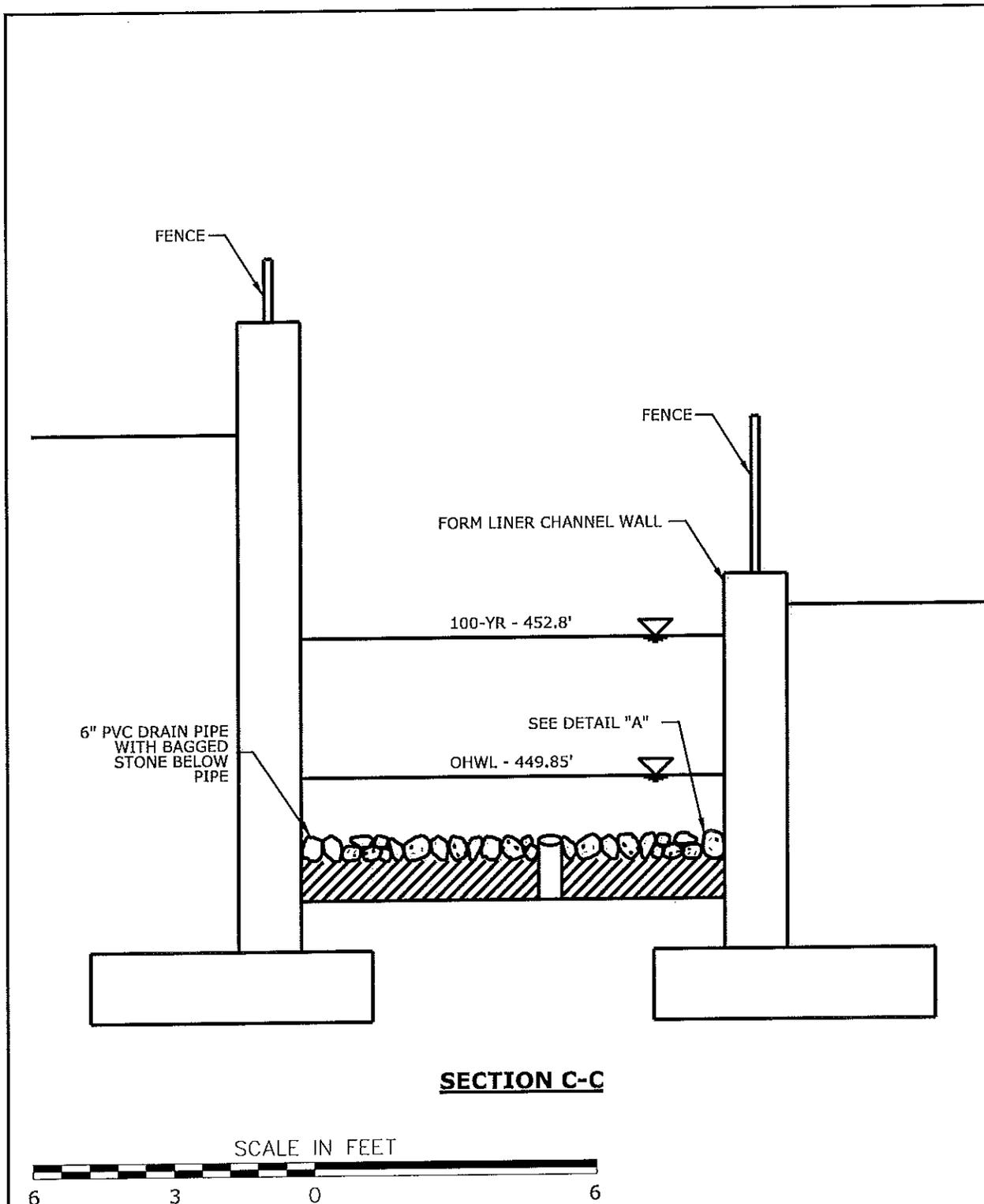
<p>DATE: 05/13/13</p>	<p>RECONSTRUCTION OF ROUTE 31, COVENTRY, CONNECTICUT, STATE PROJECT NO. 32-130 IMPACT AREA 'B2' - FIRE POND CENTRAL - STONE CHANNEL PROFILE</p>	<p><b>BSC GROUP</b> 180 Glastonbury Boulevard Suite 103 Glastonbury, Connecticut 06033 860 652 8227</p>
<p>SHEET 8 OF 18</p>	<p>APPLICANT: CONNECTICUT DEPARTMENT OF TRANSPORTATION 2800 BERLIN TURNPIKE NEWINGTON, CONNECTICUT</p>	<p>TOLLAND COUNTY COVENTRY, CONNECTICUT</p>



**SECTION B-B**



 <b>BSC GROUP</b> 180 Glastonbury Boulevard Suite 103 Glastonbury, Connecticut 06033 860 652 8227	<b>RECONSTRUCTION OF ROUTE 31,          COVENTRY, CONNECTICUT, STATE PROJECT NO.          32-30 IMPACT AREA 'B2' - FIRE POND CENTRAL -          SECTION 'B-B'</b>	
	TOLLAND COUNTY COVENTRY, CONNECTICUT	APPLICANT: CONNECTICUT DEPARTMENT OF TRANSPORTATION 2800 BERLIN TURNPIKE NEWINGTON, CONNECTICUT



**SECTION C-C**

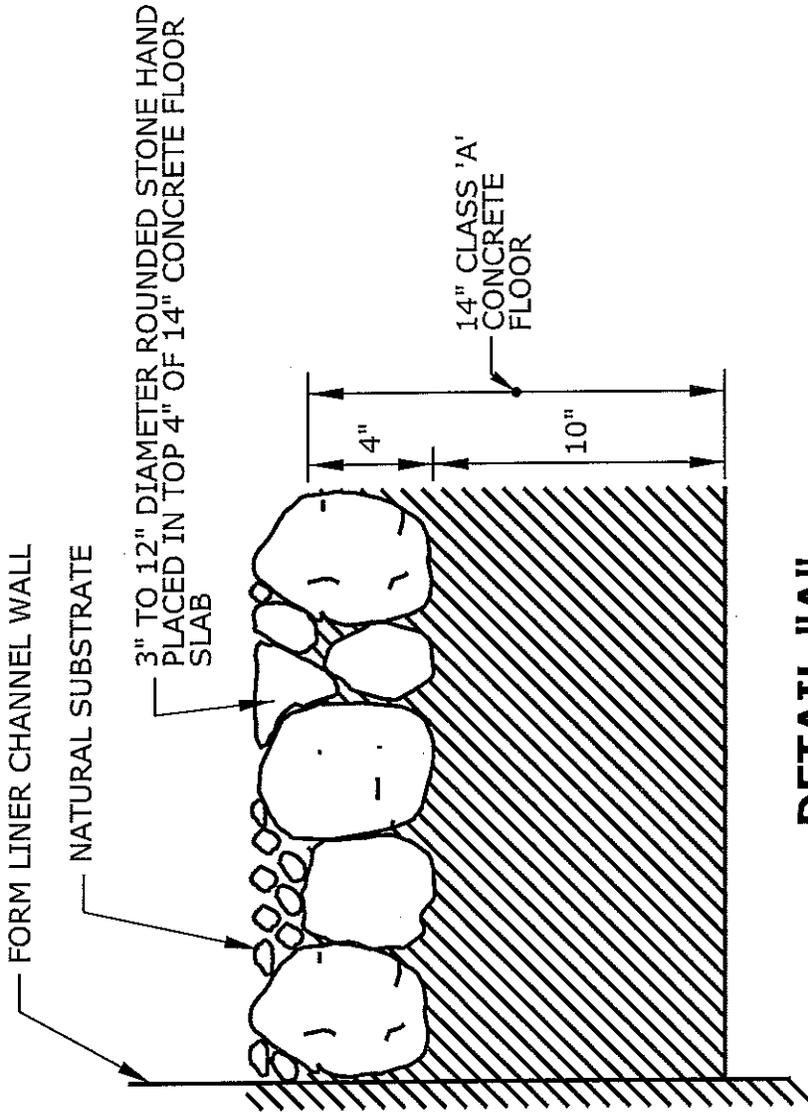
**BSC GROUP**  
 180 Glastonbury Boulevard  
 Suite 103  
 Glastonbury, Connecticut 06033  
 860 652 8227

**RECONSTRUCTION OF ROUTE 31, COVENTRY,  
 CONNECTICUT STATE PROJECT NO. 32-130  
 IMPACT AREA 'B2' - FIRE POND CENTRAL -  
 SECTION 'C-C'**

TOLLAND COUNTY  
 COVENTRY, CONNECTICUT

APPLICANT: CONNECTICUT  
 DEPARTMENT OF  
 TRANSPORTATION  
 2800 BERLIN TURNPIKE  
 NEWINGTON, CONNECTICUT

DATE: 05/13/13  
 SHEET 10 OF 18



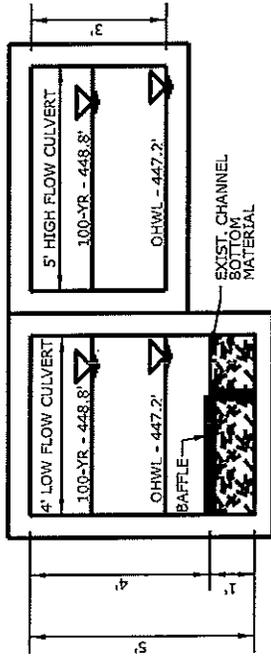
**DETAIL "A"**

SCALE IN FEET



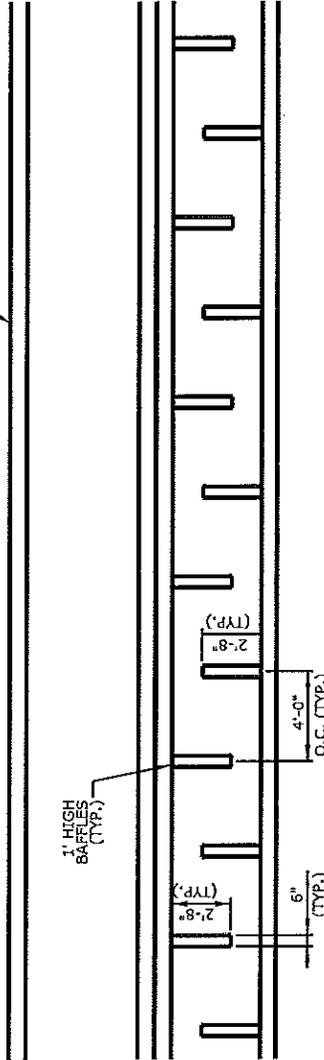
<p><b>BSC GROUP</b>          180 Glastonbury Boulevard          Suite 103          Glastonbury, Connecticut 06033          860 652 8227</p>	<p>RECONSTRUCTION OF ROUTE 31, COVENTRY,          CONNECTICUT, STATE PROJECT NO. 32-130          IMPACT AREA 'B2' - FIRE POND CENTRAL - DETAIL 'A'</p>	<p>DATE: 05/13/13</p>
<p>TOLLAND COUNTY          COVENTRY, CONNECTICUT</p>	<p>APPLICANT: CONNECTICUT DEPARTMENT OF          TRANSPORTATION          2800 BERLIN TURNPIKE          NEWINGTON, CONNECTICUT</p>	<p>SHEET 11 OF 18</p>

PROPOSED GRADE VARIES



**SECTION D-D**  
SCALE: 1"=4'

HIGH FLOW CULVERT



**BAFFLE LAYOUT PLAN**  
SCALE: 1"=8'

RECONSTRUCTION OF ROUTE 31, COVENTRY,  
CONNECTICUT, STATE PROJECT NO. 32-130  
IMPACT AREA 'B2' - FIRE POND CENTRAL - SECTION 'D-D'

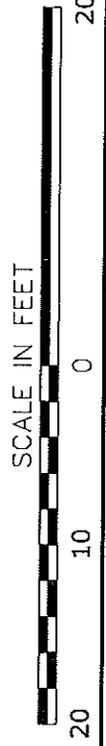
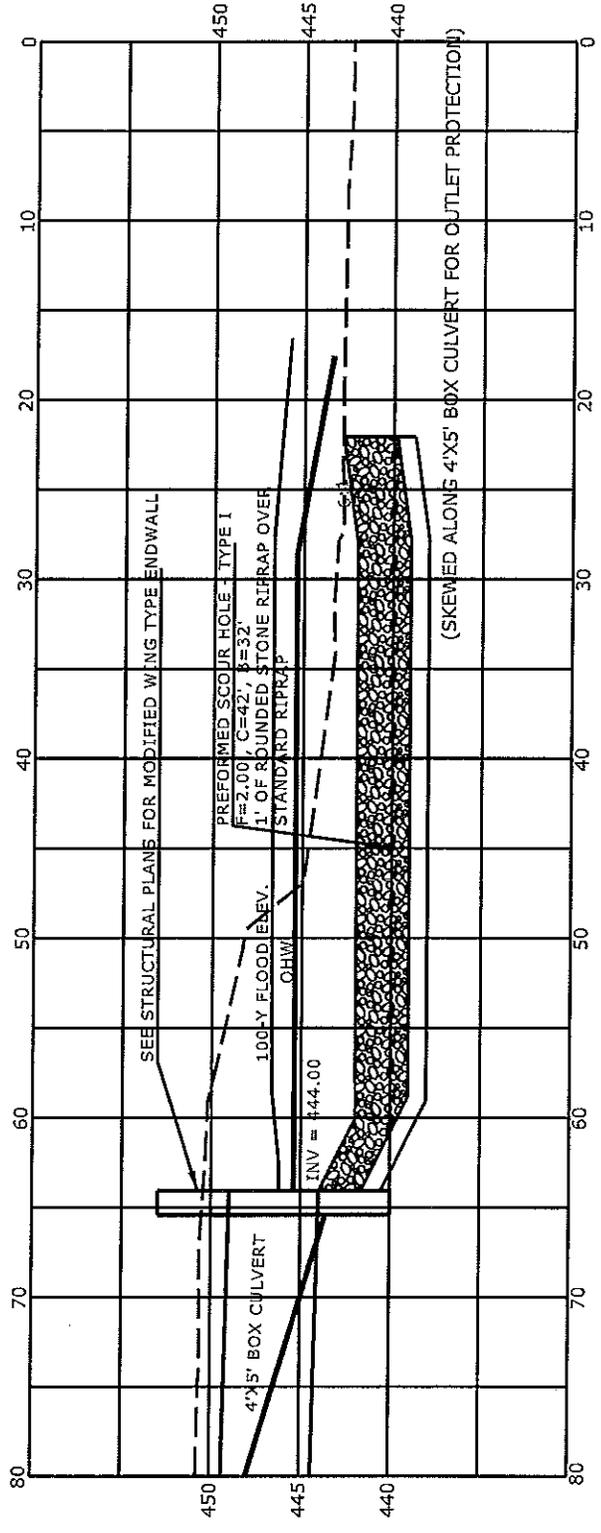
DATE: 05/13/13

**BSC GROUP**  
180 Glastonbury Boulevard  
Suite 103  
Glastonbury, Connecticut 06033  
860 652 8227

APPLICANT: CONNECTICUT DEPARTMENT OF  
TRANSPORTATION  
2800 BERLIN TURNPIKE  
NEWINGTON, CONNECTICUT

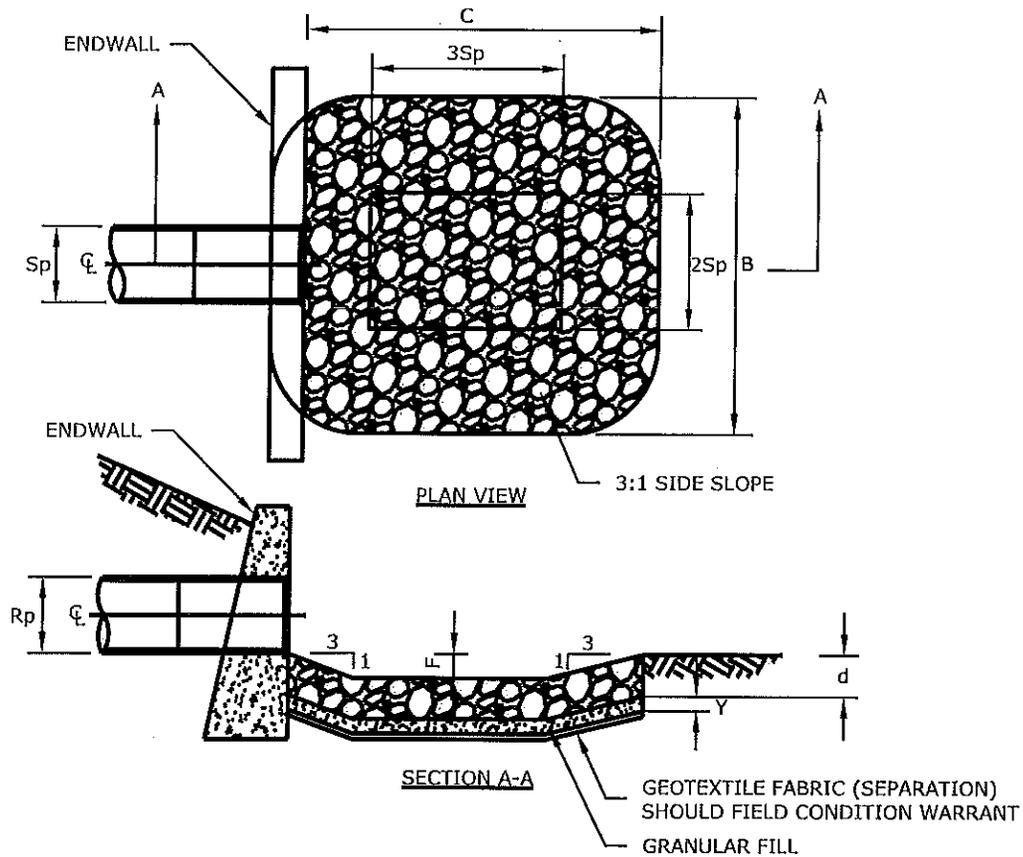
TOLLAND COUNTY  
COVENTRY, CONNECTICUT

SHEET 12 OF 18



SECTION E-E

<p>DATE: 05/13/13</p>	<p>RECONSTRUCTION OF ROUTE 31, COVENTRY, CONNECTICUT, STATE PROJECT NO. 32-130 IMPACT AREA 'B3' - FIRE POND SOUTH - SECTION 'E-E'</p>	<p><b>BSC GROUP</b> 180 Glastonbury Boulevard Suite 103 Glastonbury, Connecticut 06033 860 552 8227</p>
<p>SHEET 13 OF 18</p>	<p>APPLICANT: CONNECTICUT DEPARTMENT OF TRANSPORTATION 2800 BERLIN TURNPIKE NEWINGTON, CONNECTICUT</p>	<p>TOLLAND COUNTY COVENTRY, CONNECTICUT</p>



PREFORMED SCOUR HOLE - TYPE I						
LOCATION	d	F	C	B	Y	RIPRAP TYPE
ROUTE 31 STA. 17+65LT	12"	0.75'	12.75'	10'	6"	MODIFIED
ROUTE 31 STA. 24+35RT	36"	2.00'	42'	*32'	12"	STANDARD

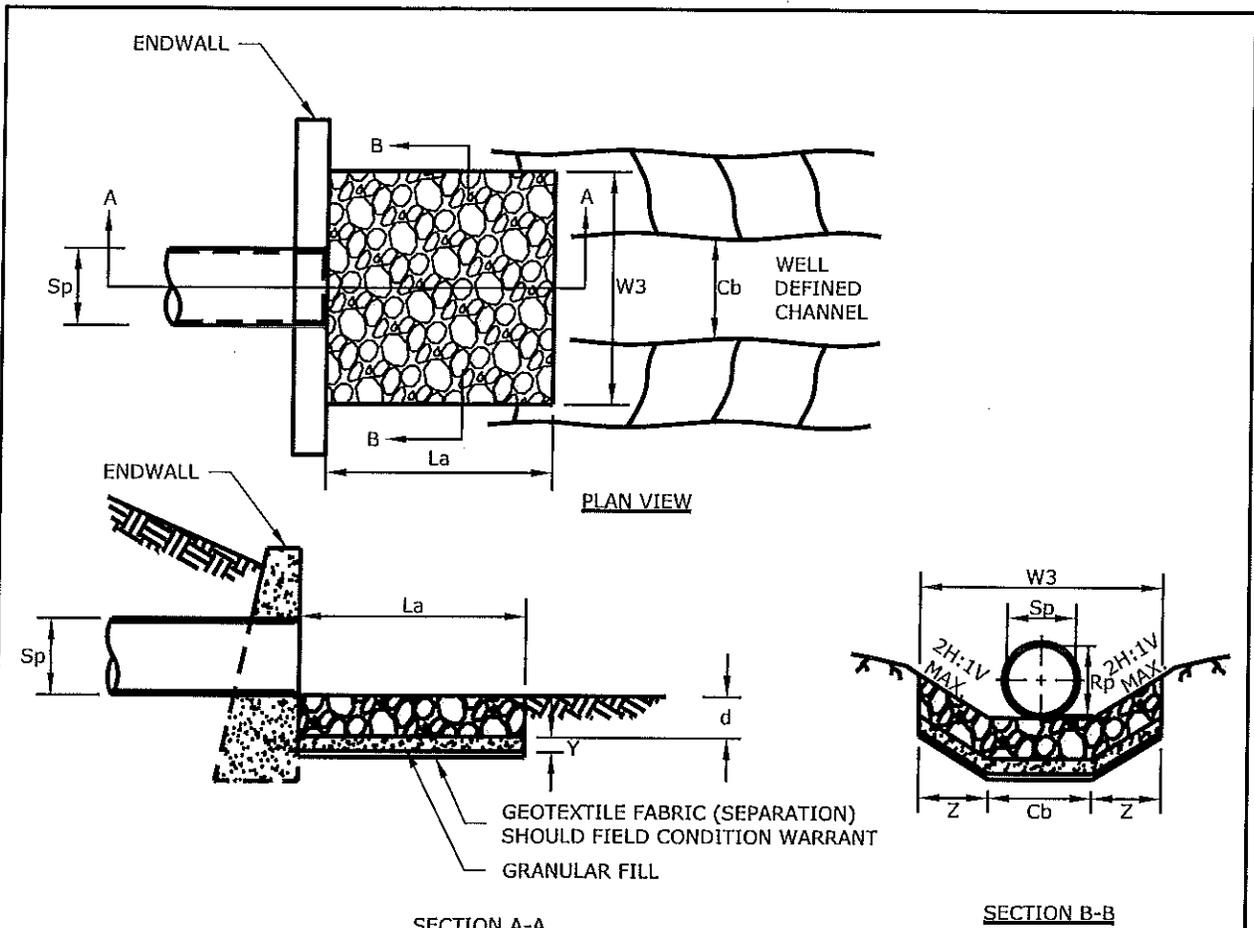
\*RIPRAP WILL EXTEND TO THE EAST SIDE OF THE SCOUR HOLE AN ADDITIONAL 5' AT A 1:2 SLOPE TO ELEVATION 446.5, AND TO THE WEST SIDE AN ADDITIONAL 7.5' AT A 1:3 SLOPE TO ELEVATION 446.5, OR TO WHERE THE SLOPE FLATTENS OUT.

**NOTES:**

1. THE TYPE C RIPRAP APRON ROUTE 31 STA. 23+41LT. AND THE PREFORMED SCOUR HOLES - TYPE I AT ROUTE 31 STA. 24+35RT. SHALL PROVIDE A 1' TOP LAYER OF ROUNDED STONE RIPRAP TO BE PAID UNDER ITEM 0703029A "ROUNDED STONE RIPRAP".
2. FOR ENDWALLS WITH TWO PIPES Sp IS THE DISTANCE BETWEEN THE OUTSIDE WALLS OF THE TWO PIPES.

**PREFORMED SCOUR HOLE - TYPE 1 (ENDWALL)**

<p><b>BSC GROUP</b> 180 Glastonbury Boulevard Suite 103 Glastonbury, Connecticut 06033 860 652 8227</p>	<p>RECONSTRUCTION OF ROUTE 31, COVENTRY, CONNECTICUT, STATE PROJECT NO. 32-130 PREFORMED SCOUR HOLE - TYPE 1 (ENDWALL) DETAIL</p>	
	<p>TOLLAND COUNTY COVENTRY, CONNECTICUT</p>	<p>APPLICANT: CONNECTICUT DEPARTMENT OF TRANSPORTATION 2800 BERLIN TURNPIKE NEWINGTON, CONNECTICUT</p>



$d = \begin{cases} 12'' - \text{MODIFIED RIPRAP} \\ 18'' - \text{INTERMEDIATE RIPRAP} \\ 36'' - \text{STANDARD RIPRAP} \end{cases}$

TYPE C RIPRAP APRON								
	Sp	La	W3	Z	Cb	d	Y	RIPRAP TYPE
ROUTE 31 STA. 23+41LT.	12'	30'	20'	4'	12'	18"	6"	INTERMEDIATE

**NOTES:**

1. THE TYPE C RIPRAP APRON ROUTE 31 STA. 23+41LT. AND THE PREFORMED SCOUR HOLES - TYPE I AT ROUTE 31 STA. 24+35RT, SHALL PROVIDE A 1' TOP LAYER OF ROUNDED STONE RIPRAP TO BE PAID UNDER ITEM 0703029A "ROUNDED STONE RIPRAP".
2. FOR ENDWALLS WITH TWO PIPES Sp IS THE DISTANCE BETWEEN THE OUTSIDE WALLS OF THE TWO PIPES.

**RIPRAP APRON - TYPE C (ENDWALL)**

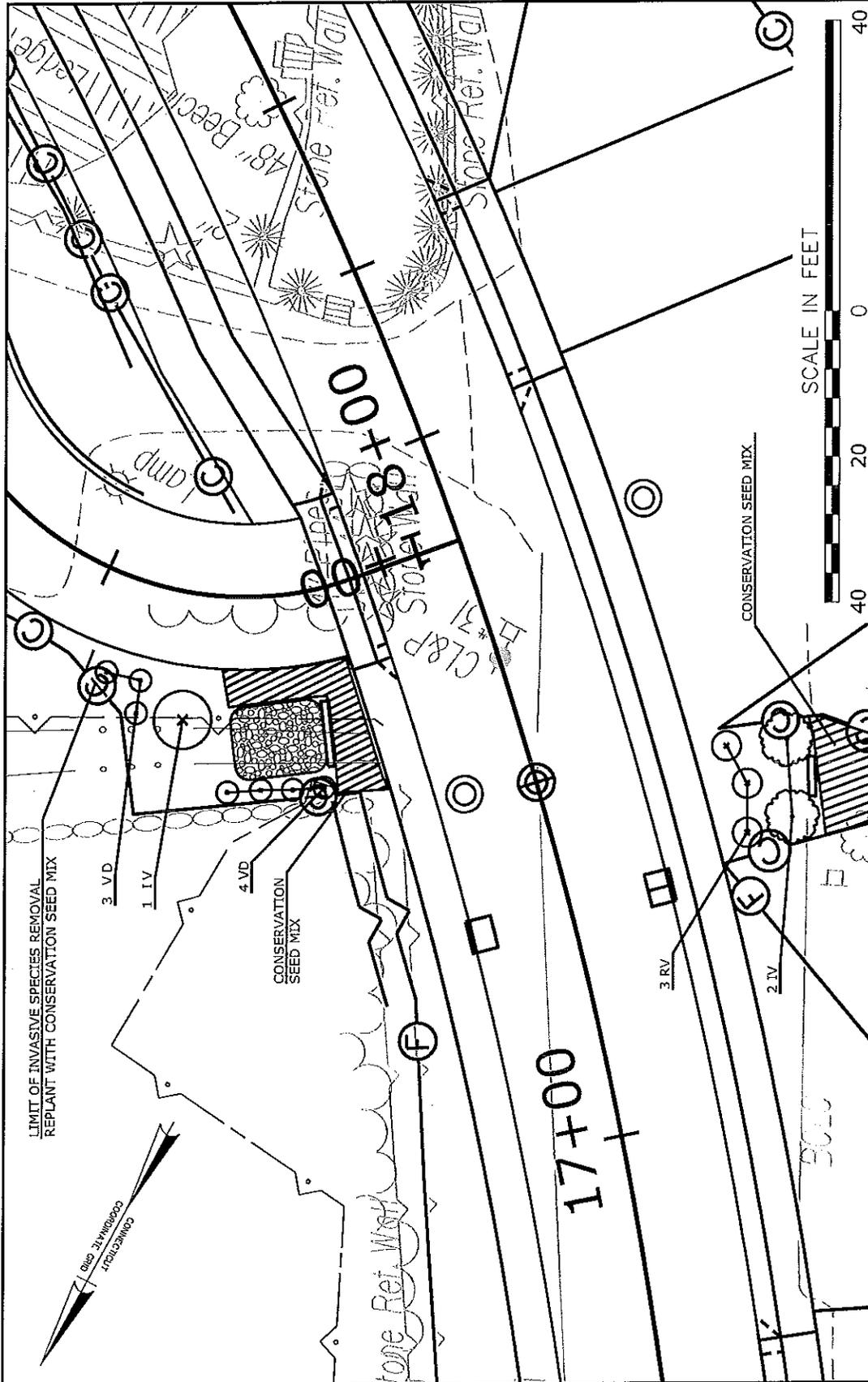
**BSC GROUP**  
 180 Glastonbury Boulevard  
 Suite 103  
 Glastonbury, Connecticut 06033  
 860 652 8227

**RECONSTRUCTION OF ROUTE 31, COVENTRY,  
 CONNECTICUT, STATE PROJECT NO. 32-130  
 RIPRAP APRON - TYPE C (ENDWALL) DETAIL**

TOLLAND COUNTY  
 COVENTRY, CONNECTICUT

APPLICANT: CONNECTICUT  
 DEPARTMENT OF  
 TRANSPORTATION  
 2800 BERLIN TURNPIKE  
 NEWINGTON, CONNECTICUT

DATE: 05/13/13  
 SHEET 15 OF 18



RECONSTRUCTION OF ROUTE 31, COVENTRY,  
 CONNECTICUT, STATE PROJECT NO. 32-130  
 PLANTING PLAN - IMPACT AREA 'A' - TROLLEYWAY

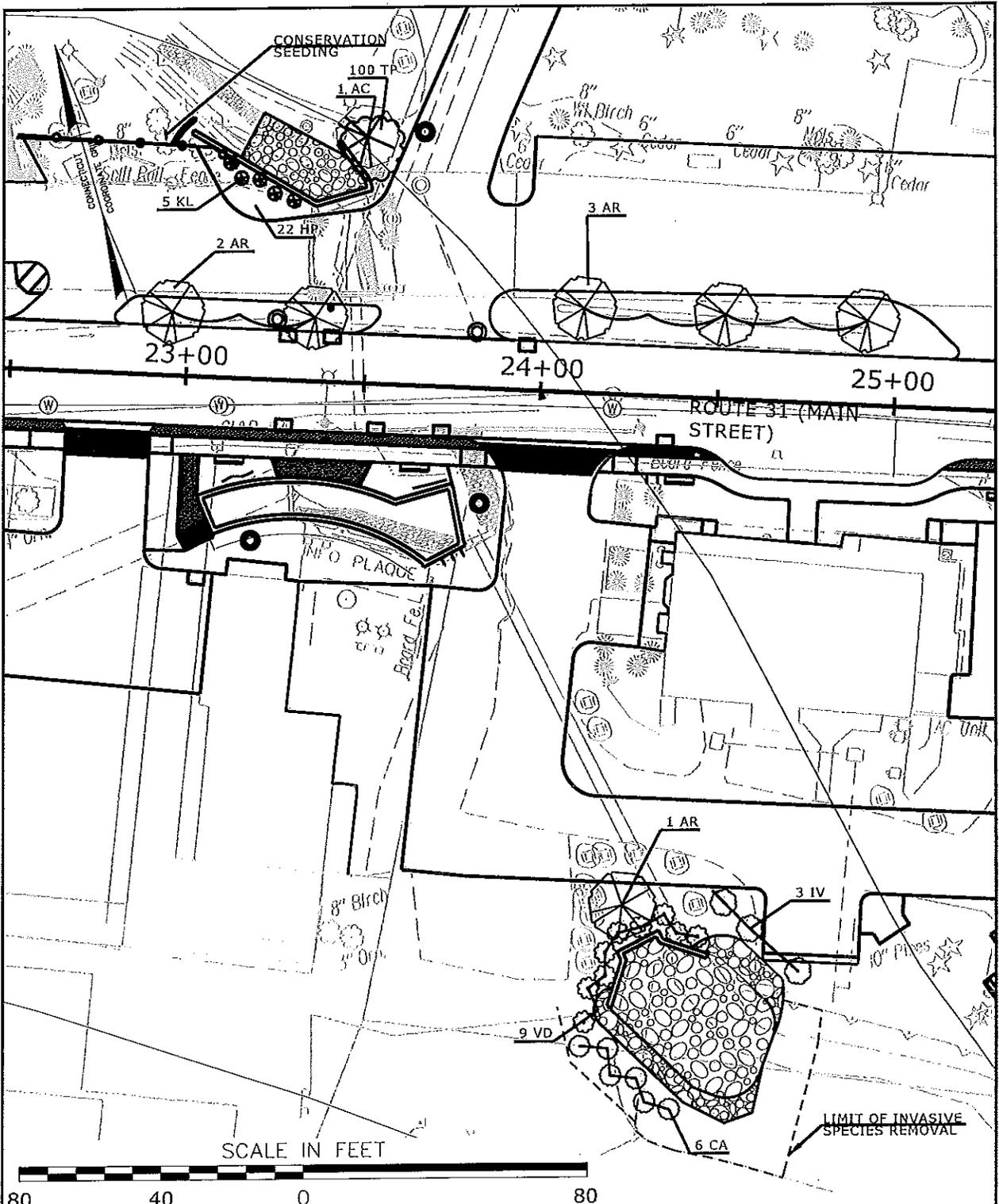
**BSC GROUP**  
 180 Glastonbury Boulevard  
 Suite 103  
 Glastonbury, Connecticut 06033  
 860 652 8227

DATE: 05/13/13

APPLICANT: CONNECTICUT DEPARTMENT OF  
 TRANSPORTATION  
 2800 BERLIN TURNPIKE  
 NEWINGTON, CONNECTICUT

TOLLAND COUNTY  
 COVENTRY, CONNECTICUT

SHEET 16 OF 18



 <p>180 Glastonbury Boulevard Suite 103 Glastonbury, Connecticut 06033 860 652 8227</p>	<p><b>RECONSTRUCTION OF ROUTE 31, COVENTRY, CONNECTICUT, STATE PROJECT NO. 32-130 PLANTING PLAN - IMPACT AREA 'B'</b></p>	
	<p>TOLLAND COUNTY COVENTRY, CONNECTICUT</p>	<p>APPLICANT: CONNECTICUT DEPARTMENT OF TRANSPORTATION 2800 BERLIN TURNPIKE NEWINGTON, CONNECTICUT</p>

PLANT SCHEDULE				
KEY	BOTANICAL NAME	SIZE	QUANTITY	SPACING
AC	<i>Amelanchier canadensis</i>	8'-10' Ht. Multi-Stem	1	SEE PLAN
AR	<i>Acer rubrum</i>	2" - 2 1/2" Cal. B&B	6	SEE PLAN
CA	<i>Clethra alnifolia</i>	18"-24" HT. 2 GALLON CONT.	6	7' O.C.
KL	<i>Kalmia latifolia</i>	18"-24" HT. 2 GAL. CONT.	5	5' O.C.
HP	<i>Hemerocallis</i>	1 GALLON CONT. 3 FAN MIN.	22	3' O.C.
IV	<i>Ilex verticillata</i>	2'-3' HT. B&B	6	SEE PLAN
RV	<i>Viburnum dentatum</i>	2'-3' HT. B&B	6	4' O.C.
TP	<i>Thelypteris palustris</i>	1 GALLON	100	12" O.C.
VD	<i>Viburnum dentatum</i>	2'-3' HT. B&B	16	5' O.C.

 <b>BSC GROUP</b> 180 Glastonbury Boulevard Suite 103 Glastonbury, Connecticut 06033 860 652 8227	RECONSTRUCTION OF ROUTE 31, COVENTRY, CONNECTICUT, STATE PROJECT NO. 32-130 <b>PLANT SCHEDULE</b>		DATE: 05/13/13
	TOLLAND COUNTY COVENTRY, CONNECTICUT	APPLICANT: CONNECTICUT DEPARTMENT OF TRANSPORTATION 2800 BERLIN TURNPIKE NEWINGTON, CONNECTICUT	SHEET 18 OF 18

USACOE CONNECTICUT GENERAL PERMIT APPLICATION  
CATEGORY II SCREENING

Table 1-2: Wetland Impact Summary Table

Impact Area	Type of Impact	Total Wetland/Waters Impact in Acres (Square Feet)	-Subset- Wetland Impact in Acres (Square Feet)		-Subset- Watercourse Impact Acres (Square Feet)		Linear Watercourse Impact <sup>1</sup>		Wetland/Watercourse Impact in Cubic Yards	
			Permanent	Temporary	Permanent	Temporary	Permanent	Temporary	Excavation	Fill
Area A	Replace endwall and outlet, scour protection.	0.01 (475)	0.009 (390)	0.002 (85)	0	0	0	0	22	15
Area B1	Replace/extend culvert and endwall; scour protection.	0.012 (541)	0	0	0.01 (430)	0.003 (111)	58	37	15	75
Area B2	Stone liner channel and step pool creation.	0.04 (1813)	0	0	0.037 (1615)	0.005 (198)	48	22	150	315
Area B3	Replace culverts and endwall, scour protection	0.054 (2353)	0.02 (1030)	0.008 (350)	0.01 (415)	0.013 (558)	40	248	295	180
<b>Totals</b>		<b>0.12 (5,182)<sup>2</sup></b>	<b>0.03 (1,420)</b>	<b>0.01 (435)</b>	<b>0.057 (2,460)</b>	<b>0.02 (867)</b>	<b>146</b>	<b>307</b>	<b>482</b>	<b>585</b>

<sup>1</sup>The identified watercourse impacts are taking place over the course of the linear footages listed. The length of each culvert was also counted.  
<sup>2</sup>When temporary wetland and all watercourse impacts are removed from the total, 1420 sf of permanent wetland impacts are proposed.



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**GENERAL PERMIT  
WORK-START NOTIFICATION FORM**  
(Minimum Notice: Two weeks before work begins)

\*\*\*\*\*  
\* MAIL TO: U.S. Army Corps of Engineers, New England District \*  
\* Permits and Enforcement Branch \*  
\* Regulatory Division \*  
\* 696 Virginia Road \*  
\* Concord, Massachusetts 01742-2751 \*  
\*\*\*\*\*

Corps of Engineers Permit No. **NAE-2013-1470** was issued to **CTDOT, 2800 Berlin Turnpike, P.O. Box 317546, Newington, CT 06131-7546** on March 10, 2014. This work is located in Manning Brook, and Mill Brook and adjacent wetlands alongside Route 31 in Coventry, CT. The permit authorized the permittee to excavate/grade/place fill in approximately 5,182 SF (3,380 SF permanent, 1,302 SF temporary) of Manning Brook, and Mill Brook and adjacent wetlands (4 impact sites) in association with the reconstruction of approximately 2000 LF of Route 31 (Main Street) in Coventry, Connecticut. The project extends from 300 LF north of the Stonehouse Road (Route 275)/Route 31 intersection to about 1000 LF east of Monument Hill Road), and includes reconstruction of short sections of affected intersecting roads (Stonehouse Road, Lake Street and Monument Hill Road) within the project limits. Impacts on stream areas and wetlands are associated with riprap scour protection at culvert endwall/outlet areas, culvert replacements and extension on Manning Brook and Mill Brook, channel improvements (formed concrete liner/stone channel and step pool creation in Mill Brook for fisheries enhancement). Temporary cofferdams/sheet pile containment will be required. The project includes invasive species removal in the project areas at impact areas A and B3.

The people (e.g., contractor) listed below will do the work, and they understand the permit's conditions and limitations.

**PLEASE PRINT OR TYPE**

**Name of Person/Firm:** \_\_\_\_\_

**Business Address:** \_\_\_\_\_  
\_\_\_\_\_

**Telephone Numbers:** ( ) \_\_\_\_\_ ( ) \_\_\_\_\_

**Proposed Work Dates:** Start: \_\_\_\_\_ Finish: \_\_\_\_\_

**Permittee/Agent Signature:** \_\_\_\_\_ **Date:** \_\_\_\_\_

**Printed Name:** \_\_\_\_\_ **Title:** \_\_\_\_\_

**Date Permit Issued:** 03/10/2014 **Date Permit Expires:** 07/15/2016

\*\*\*\*\*

**FOR USE BY THE CORPS OF ENGINEERS**

**PM:** Susan Lee **Submittals Required:** no

**Inspection Recommendation:** yes



**US Army Corps  
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New England District

(Minimum Notice: Permittee must sign and return notification  
within one month of the completion of work.)

**COMPLIANCE CERTIFICATION FORM**

Permit Number: NAE-2013-1470

Project Manager Susan Lee

Name of Permittee: CTDOT

Permit Issuance Date: March 10, 2014

Please sign this certification and return it to the following address upon completion of the activity and any mitigation required by the permit. You must submit this after the mitigation is complete, but not the mitigation monitoring, which requires separate submittals.

\*\*\*\*\*  
 \* MAIL TO: U.S. Army Corps of Engineers, New England District \*  
 \* Permits and Enforcement Branch B \*  
 \* Regulatory Division \*  
 \* 696 Virginia Road \*  
 \* Concord, Massachusetts 01742-2751 \*  
 \*\*\*\*\*

Please note that your permitted activity is subject to a compliance inspection by an U.S. Army Corps of Engineers representative. If you fail to comply with this permit you are subject to permit suspension, modification, or revocation.

**I hereby certify that the work authorized by the above referenced permit was completed in accordance with the terms and conditions of the above referenced permit, and any required mitigation was completed in accordance with the permit conditions.**

\_\_\_\_\_  
Signature of Permittee

\_\_\_\_\_  
Date

\_\_\_\_\_  
Printed Name

\_\_\_\_\_  
Date of Work Completion

( ) \_\_\_\_\_  
Telephone Number

( ) \_\_\_\_\_  
Telephone Number

## **PERMITS AND/OR SUPPLEMENTAL TO FORM 816 AND REQUIRED PROVISIONS**

The following Permits and/or Supplemental to Form 816 and Required Provisions follow this page and are hereby made part of this Contract.

- **PERMITS AND/OR PERMIT APPLICATIONS**

<b>Permit Name</b>	<b>Issue Date</b>
• CT DEEP Flood Management Certification	September 30, 2013
• CT DEEP Inland Wetlands and Watercourses Permit	November 15, 2013
• CT DEEP 401 Water Quality Certification	November 15, 2013
• U.S. Army Corps of Engineers Section 404 Connecticut General Permit Category 2	March 10, 2014
• General Permit for the Discharge of Stormwater and Dewatering Activities Associated with Construction Activities (with associated SWPCP document)	Acquisition occurs during construction

- **SUPPLEMENTAL SPECIFICATIONS TO STANDARD SPECIFICATIONS FORM 816**

- **Construction Contracts - Required Contract Provisions (FHWA Funded Contracts)**